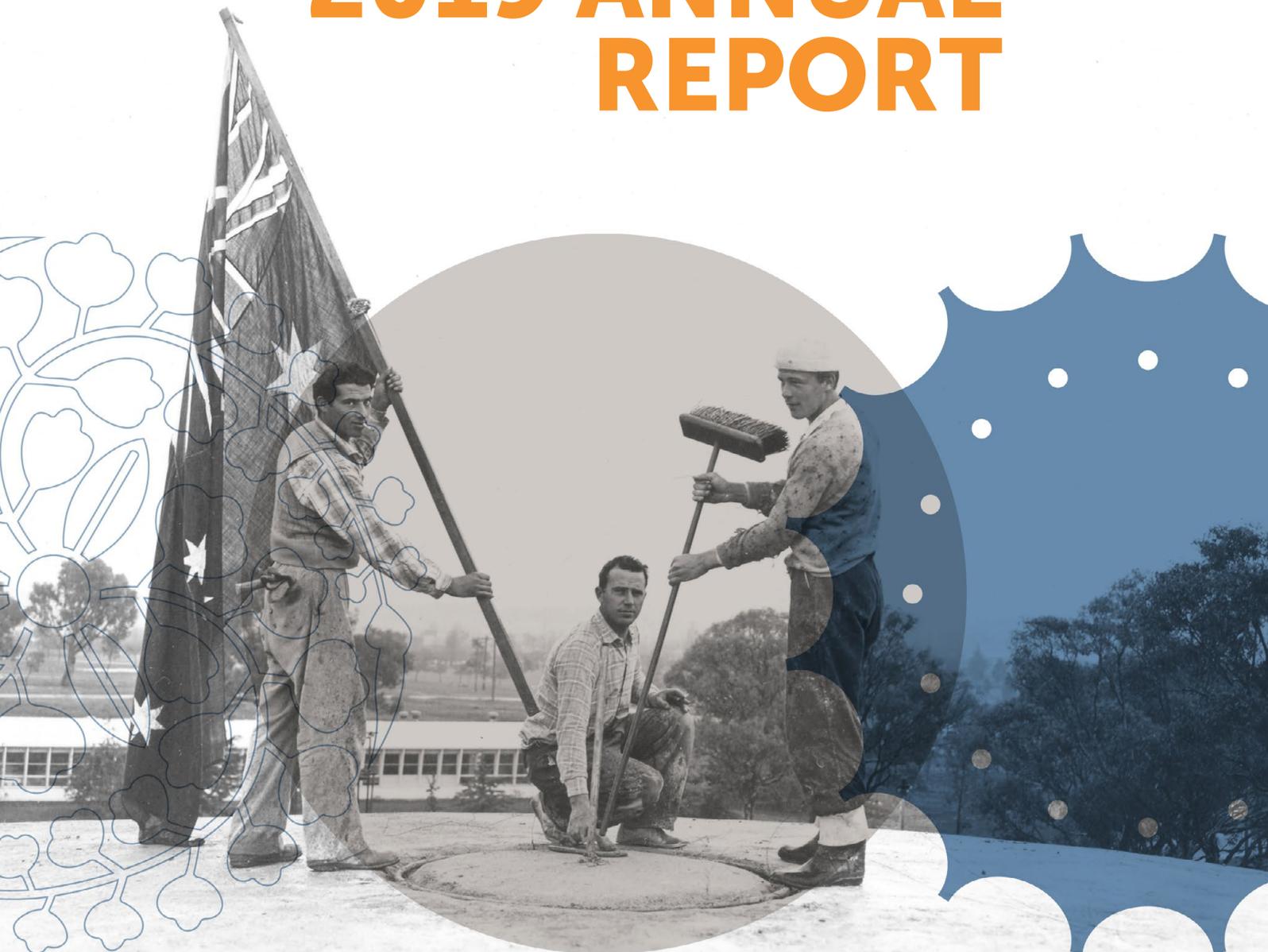


65 YEARS OF THE ACADEMY
60 YEARS OF THE SHINE DOME



AUSTRALIAN ACADEMY OF SCIENCE **2019 ANNUAL REPORT**



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GPO Box 783
Canberra ACT 2601

Tel +61 (0)2 6201 9400
Email aas@science.org.au
www.science.org.au

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

Cover: In 2019, the Academy celebrated its 65th year and the 60th year of the Shine Dome. The cover image depicts the iconic wisteria of the Academy's secretariat home, Ian Potter House; the Shine Dome, as seen from above; and dome construction workers at a 'richtfest' party held to celebrate the completion of the concrete phase of the dome's construction.

PHOTO COURTESY OF ERIC LIPPONEN,
PHOTOGRAPHER UNKNOWN

2019 Highlights

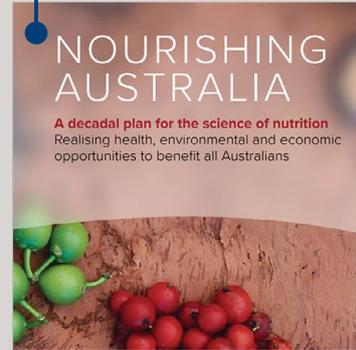
Welcomed a 10-year continuation of Lindau with \$1 million SIEF funding



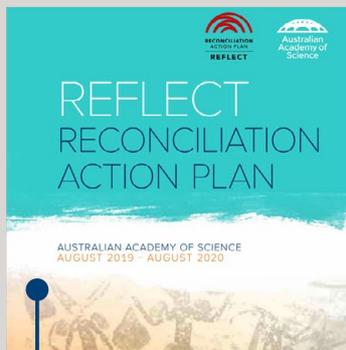
Measles alert

Conducted a highly successful social media campaign with videos and articles on measles for the Department of Health

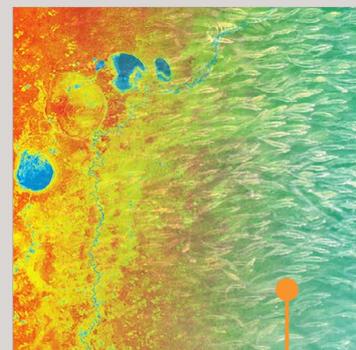
Published 10-year plans on the science of nutrition, Australia's digital future, sustainable cities and regions, and women in STEM



Celebrated Emeritus Professor Cheryl Praeger winning the Prime Minister's Prize for Science



Made great progress in diversity and inclusion, by publishing our Reconciliation Action Plan, launching 3 major women in STEM initiatives, providing many opportunities for EMCRs, and supporting SAGE



Convened an expert panel to investigate and report on fish kills in the Darling river NSW

MESSAGE FROM THE PRESIDENT

Welcome to the 2019 Annual Report, my second as President. The year was a particular one of celebration as we marked 65 years since the Academy was formed and 60 years since the iconic Shine Dome became our home.

I would like to warmly thank the Council members whose period of service finished in May, and in particular to acknowledge Vice-President and Secretary Biological Sciences Dr TJ Higgins for his tireless commitment to the Academy over the previous seven years. I was also pleased to welcome the new members of Council who joined the team at a very busy and exciting time.

In 2019 we elected 22 of Australia's leading scientists as Fellows and we welcomed two Corresponding Members. Our Fellows were publicly recognised for their work in Australian and international forums—congratulations in particular go to Cheryl Praeger for being awarded the Prime Minister's Prize for Science. Many Fellows contributed to the Academy's work, and I thank them for their involvement.

This annual report demonstrates the Academy's national leadership role in diversity and inclusion. After broad national consultation, and working with other organisations, we published the Women in STEM Decadal Plan and encouraged organisations to publish their progress implementing the plan. In August we initiated an online directory, STEM Women, which has done a lot to make women more visible. We published our Reconciliation Action Plan, supported nearly 5000 early- and mid-career researchers, and continued our strong support of SAGE. The Academy Council also took the 'panel pledge' to further

strengthen the positive influence we can have on diversity.

Early in the year we produced a scientific report on the causes of the devastating mass fish kills in the Darling River. The report was widely circulated and re-affirmed our ability to respond quickly with credible, expert information needed to inform decisions.

I warmly congratulate the recipients of our awards and grants, and would like to especially mention Rhys Pirie, who became the first Australian to win Young Innovator of the Year at the global Falling Walls competition in Berlin.

Our education programs continued to help teachers and students be inspired by mathematics and science, and our first event connecting Fellows with Year 12 students was an energising experience for all.

The Academy continues to engage the public in science through our world-leading communications capability. Our global audience expanded and we ended the year with 2.1 million Facebook followers. Our reach was much greater than that however, with our videos being viewed 25 million times on social media and embedded more than 400 times in online news media.

Donations, partnerships and grants played a crucial part in the impacts we made during the year. Ongoing financial support for the Academy is crucial. I sincerely thank our donors and encourage everyone to consider how they may be able to contribute. This report is an excellent example of just how much our creative and determined organisation can achieve.

Professor John Shine AC PresAA



MESSAGE FROM THE CHIEF EXECUTIVE

2019 was a year of continued progress, achievement and growing influence for the Academy. The Academy would not exist were it not for the Fellows, and I thank them for their ongoing guidance, commitment and contributions in so many areas of importance to Australia. Together they work with Academy staff who bring enormous commitment and professionalism in pursuing the Academy's strategic objectives.

Our work has been further enhanced through partnerships with the philanthropic sector, governments, industry, and a range of others in the STEM sector.

The 2019 Annual Report gives an overview of the breadth and impacts of the Academy's activities, with further information available on our website.

Importantly, our independence and commitment to excellence allows us to convene stakeholders across disciplines, institutions and countries. As such, we were able to make timely and relevant scientific policy contributions to issues of national importance, such as the underlying causes of the mass fish deaths in the Darling River and the broader implications for water policy in the Murray-Darling Basin, a water system Australia so heavily relies on. Similarly, our early advice on issues relating to the unprecedented bushfires at the end of

2019 will no doubt see an important role for independent scientific advice as we move into 2020, with implications for climate science and greenhouse gas emission reduction policies.

Overall, this year the Academy made significant inroads to create an environment that welcomes the regular and routine provision of evidence from independent, authoritative and trusted sources. This mission is ongoing and continues to be a priority so as to strengthen decision making, democracy, leadership, and trust in governments.

Finally, the Academy's role in the international landscape is not always visible, so I am delighted that this year the Academy was able to quantify the benefits returned to Australia through its membership of global science organisation, the International Science Council.

The Academy's ability to contribute Australian expertise and leadership in regional and global science networks strengthens our nation and the ever-growing role science plays as a soft power asset in diplomacy.

To learn more about how you can contribute to the work of the Academy, you are very welcome to contact me.

Anna-Maria Arabia



Strategic Plan 2018–2022



OBJECTIVES

- | | | | | |
|---|---|---|---|--|
| <p>INFLUENTIAL VOICE</p> <ul style="list-style-type: none"> Be deeply influential in setting Australia's science agenda Be a trusted independent advisor on scientific matters | <p>INTERNATIONAL ENGAGEMENT</p> <ul style="list-style-type: none"> Be a leader in the international science academy network | <p>SCIENTIFIC LITERACY</p> <ul style="list-style-type: none"> Deliver innovative education programs at scale and with impact Enable a better-informed public that values science | <p>EXCELLENCE AND DIVERSITY</p> <ul style="list-style-type: none"> Be a national leader in diversity, equity and inclusion in the science sector Empower the next generation of scientists | <p>OPERATIONAL EXCELLENCE</p> <ul style="list-style-type: none"> Ensure long-term sustainability and financial viability along with the highest standards of professionalism |
|---|---|---|---|--|

science.org.au/strategic-plan

THE FELLOWSHIP

The Australian Academy of Science is a Fellowship of the nation's most distinguished scientists, elected by their peers for outstanding research that has pushed back the frontiers of knowledge.

science.org.au/fellowship

2019 FELLOWS



Professor Warren Alexander
Walter and Eliza Hall Institute of Medical Research (medical researcher)



Professor David Balding
University of Melbourne (genetic statistician)



Professor Christopher Barner-Kowollik
Queensland University of Technology (polymer chemist)



Professor Lyn Beazley
Murdoch University (neuroscientist)



Professor Debra Bernhardt
University of Queensland (chemist)



Professor Maria Byrne
University of Sydney (marine biologist)



Professor Mark Cassidy
University of Melbourne (civil engineer)

539

Fellows at 31 December

22

Fellows elected in 2019

2

Corresponding
Members admitted



Newly-elected Fellow Professor Christopher Barner-Kowollik providing an overview of his work at Science at the Shine Dome.



Distinguished Professor Peter Corke
Queensland University of Technology (roboticist)



Dr Surinder Singh
CSIRO (plant scientist)



Professor Joanne Etheridge
Monash University (physicist)



Professor Catherine Stampfl
University of Sydney (physicist)



Professor John Hamilton
University of Melbourne (medical researcher)



Professor James Whelan
La Trobe University (plant scientist)



Professor Paul Hodges
University of Queensland (medical researcher)



Professor Cynthia Whitchurch
University of Technology Sydney (microbiologist)



Emeritus Professor David Karoly
CSIRO (atmospheric scientist)



Professor Ian Wright
Macquarie University (plant ecologist)



Professor Kerry Landman
University of Melbourne (mathematical biologist)



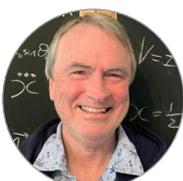
Professor Alexander Zelinsky
University of Newcastle (engineer)



Professor Maria Makrides
South Australian Health and Medical Research
Institute (nutrition researcher)



Professor Venkatesh
Institute of Advanced Study, Princeton
(mathematician)



Professor David McClelland
Australian National University (physicist)



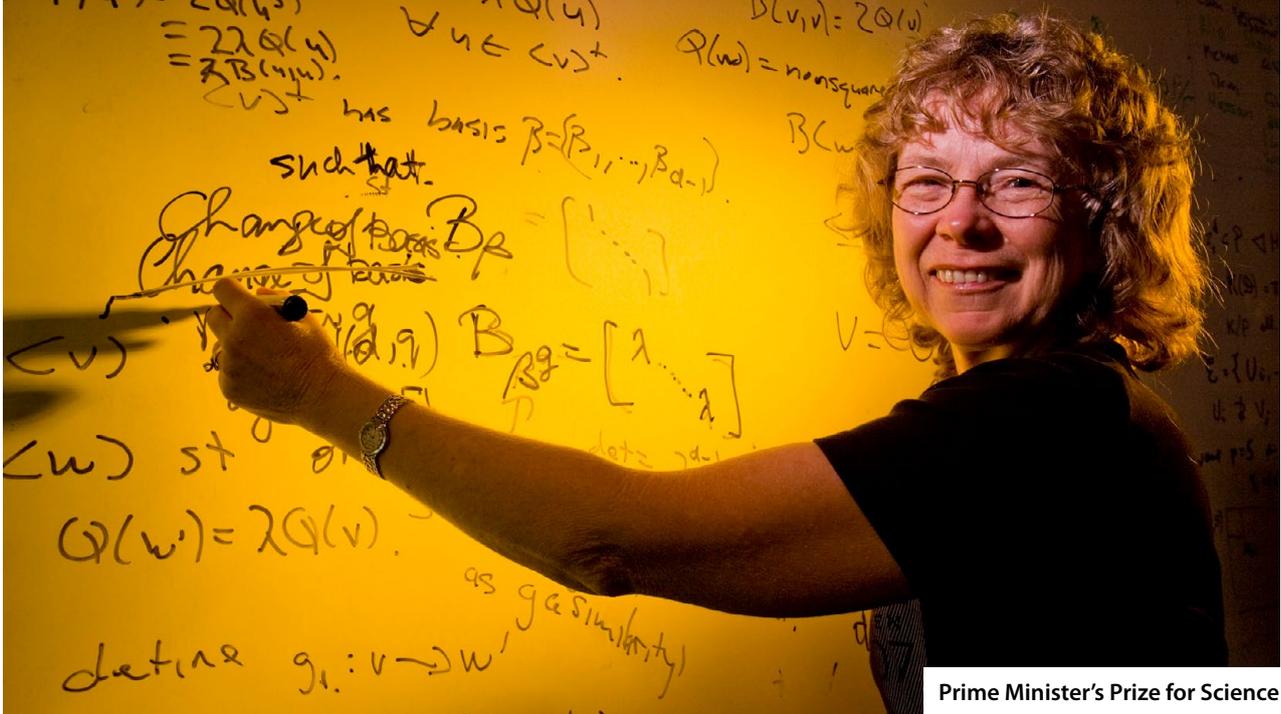
Professor Krzysztof Matyjaszewski
Carnegie Mellon University (polymer chemist)



Professor Alex Molev
University of Sydney (pure mathematician)



2019 CORRESPONDING MEMBERS



Prime Minister's Prize for Science

HONOURS AND AWARDS TO FELLOWS

Top: Emeritus Professor Cheryl Praeger—Prime Minister's Prize for Science for contributions to research in pure and applied mathematics.

Right: Professor Branka Vucetic—CSIRO Eureka Prize for Leadership in Innovation and Science for contributions to the fields of coding and wireless communications.

Below left: Professor Rose Amal—New South Wales Scientist of the Year for significant contributions to the advancement of science which has benefited or has the potential to benefit the people of New South Wales.

Below right: Professor Jozef Gécz—South Australian Scientist of the Year for excellence in STEM and making an outstanding contribution in providing leadership that has inspired others.



PHOTO: UNIVERSITY OF SYDNEY - JENNIFER PETERSON-WARD

CSIRO Eureka Prize for Leadership in Innovation and Science



New South Wales Scientist of the Year



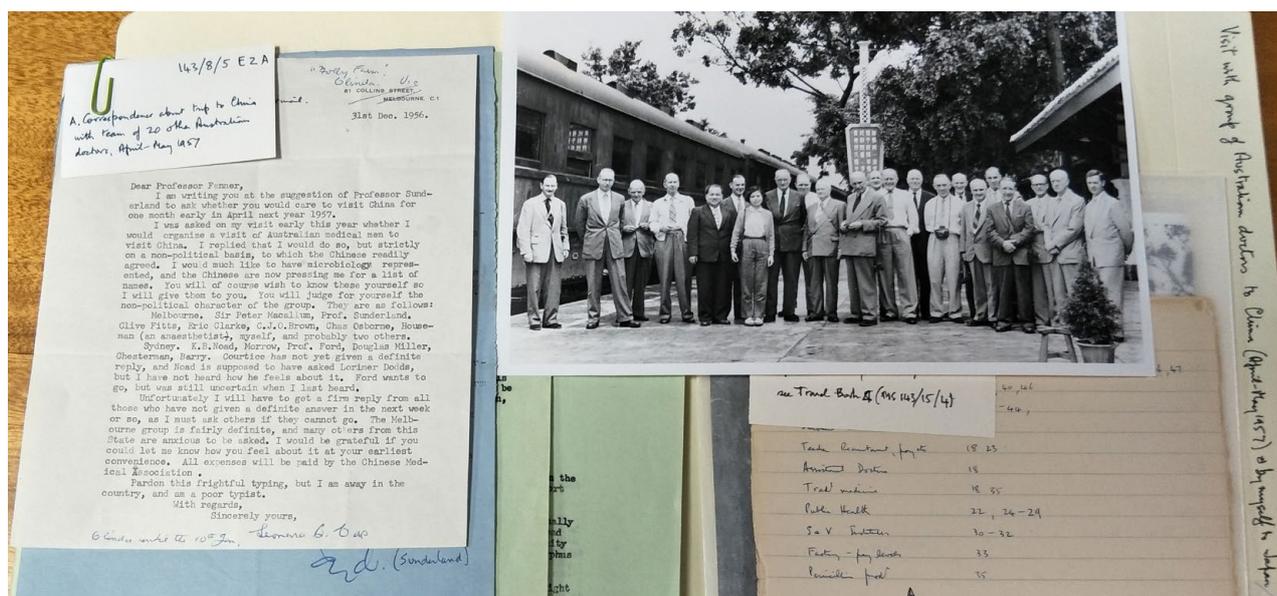
South Australian Scientist of the Year

All honours and awards to Fellows

Name	Award name
Professor Rose Amal AC FAA FTSE	New South Wales Scientist of the Year
Professor Michael Archer AM FAA FRSN	Romer-Simpson Medal, Society of Vertebrate Paleontology
Professor David Burke AC FAA FRACP FTSE	Order of Australia: Companion in the General Division
Professor Maria Byrne FAA	Established Researcher Medal, Australian Coral Reef Society
Professor Frank Caruso FAA FRS	Leverhulme Medal, Royal Society of London
Professor David Celermajer AO FAA FRACP	Ruthven Blackburn Medal, University of Sydney
Professor John Church FAA FTSE	Frontiers of Knowledge Award, BBVA Foundation
Professor Susan Clark FAA	Excellence in Medical Biological Sciences, NSW Premier's Prize
Professor Alan Cowman AC FAA FRS	Order of Australia: Companion in the General Division
Emeritus Professor Patrick De Deckker AM FAA	Brady Medal, The Micropalaeontological Society
Dr Liz Dennis AC FAA FTSE	Order of Australia: Companion in the General Division
Professor Ron Ekers AO FAA FRS	Order of Australia: Officer in the General Division
Scientia Professor Matthew England FAA	James Cook Medal, Royal Society of NSW
Professor Yuri Estrin FAA	Foreign Member, Russian Academy of Sciences
Professor Denis Evans AM FAA FRACI	Lennard-Jones Lectureship, Royal Society of Chemistry
Professor Jozef Gécz FAA	South Australian Scientist of the Year
Professor Jenny Graves AO FAA	Foreign Associate, National Academy of Sciences (USA)
Professor Min Gu FAA FTSE	Dennis Gabor Award in Diffractive Optics, SPIE
Professor John Hamilton FAA	Lifetime Achievement Award, International Association of Inflammation Societies
Professor Paul Hodges FAA	Prize for Lumbar Spine Research (Basic Science), ISSLS
Professor Terry Hughes FAA	Honorary Degree (Trinity College Dublin)
Professor Chennupati Jagadish AC FAA FTSE	Electronic Devices Society Education Award, IEEE Appointed Editor-in-Chief of Applied Physics Reviews
Professor Nalini Joshi AO FAA	Excellence in Mathematics, Earth Sciences, Chemistry or Physics, NSW Premier's Prize Bragg Member, Royal Institution of Australia
Professor Bruce Kemp AO FAA FRS	Order of Australia: Officer in the General Division
Professor Brian Kennett AO FAA FRS	Order of Australia: Officer in the General Division
Professor Helene Marsh FAA FTSE	Bragg Member, Royal Institution of Australia
Professor Krzysztof Matyjaszewski NAS FAA	Member, National Academy of Sciences (USA)
Professor Jacques Miller AC FAA FRS	Albert Lasker Basic Medical Research, Lasker Awards
Professor Tanya Monro FAA FTSE	Excellence in Women's Leadership, SA Trailblazer for Gender Equality, University of Adelaide
Professor Dietmar Müller FAA	Clarke Medal, Royal Society of NSW
Emeritus Professor Cheryl Praeger AM FAA	Prime Minister's Prize for Science
Professor Leo Radom AC FAA FRACI FRSC	Order of Australia: Companion in the General Division
Professor Margaret Reid FAA	Moyal Medal, Macquarie University
Professor Marilyn Renfree AO FAA	Carl G Hartman Award, Society for the Study of Reproduction
Professor Linda Richards AO FAA	Order of Australia: Officer in the General Division
Professor Elaine Sadler AO FAA	Order of Australia: Officer in the General Division
Professor Lois Salamonsen FAA FRANZCOG (hon)	Monash Lifetime Achievement Award
Professor Frances Separovic AO FAA	Order of Australia: Officer in the General Division
Professor Frances Separovic AO FAA	Margaret Sheil Leadership Award, Royal Australian Chemical Institute
Professor Michelle Simmons AO FAA FRS FTSE	Order of Australia: Officer in the General Division
Dr Surinder Singh FAA FTSE	Fellow, Australian Academy of Technology and Engineering

All honours and awards to Fellows (continued)

Name	Award name
Professor Sally Smith FAA	Trailblazer for Gender Equality, University of Adelaide
Dr Andreas Strasser FAA	Florey Medal, CSL
Professor Patrick Tam FAA FRS	Julian Wells Medal, Lorne Genome Conference
Professor David Vaux AO FAA	Florey Medal, CSL
Professor Akshay Venkatesh FAA FRS	Fellow, Royal Society of London
Professor Mark von Itzstein AO FAA	Order of Australia: Officer in the General Division
Professor Branka Vucetic FAA FTSE FIEEE	CSIRO Eureka Prize for Leadership in Innovation and Science
Professor Alex Zelinsky AO FAA FTSE	Bragg Member, Royal Institution of Australia



Frank Fenner's manuscript collection is an extraordinary record of his life and achievements.

FENNER COLLECTION ADDED TO AUSTRALIAN MEMORY OF THE WORLD REGISTER

The Academy's historical archives were in the spotlight with the Frank Fenner manuscript collection being added to the UNESCO Australian Memory of the World Register. Professor Fenner is internationally known for his significant contribution to control of the rabbit plague in Australia, and to the global eradication of smallpox. The collection documents Professor Fenner's enormous contribution to scientific research and science communication over more than eight decades.

INTERVIEWS WITH AUSTRALIAN SCIENTISTS

The Academy committed to reinvigorating Interviews with Australian Scientists in audio (podcast) format, delving deep into the extraordinary lives and achievements of our best scientists.

FELLOWS' INVOLVEMENT IN THE ACADEMY

Academy-related activities in which Fellows were involved included: National Committees for Science • international meetings and collaborations • awards committees • Academy policy submissions and reports • sectional committees for assessing nominations of new Fellows • media participation • video and article reviewers and expert interviewees • symposium convenors • Science at the Shine Dome • National Speaker Series • Canberra Speaker Series • regional groups

65 YEARS CELEBRATION

The 65-year anniversary of the Academy was celebrated at Science at the Shine Dome in May, and our branding throughout the year in public promotions acknowledged the anniversary.

65 YEARS OF THE ACADEMY 60 YEARS OF THE SHINE DOME

VALE



Sir Michael Francis Atiyah
22 April 1929 to 11 January 2019



Dr Bruce Fraser
14 August 1924 to 15 June 2019



Professor Noel Sydney Hush
15 December 1924 to 20 March 2019



Professor Brian Johnstone
25 February 1924 to 31 August 2019



Professor James Waldo Lance
29 October 1926 to 20 February 2019



Sir Rupert Horace Myers
21 February 1921 to 21 February 2019



Professor John 'Jack' Pettigrew
2 October 1943 to 7 May 2019



Professor Joseph Sambrook
1 March 1939 to 14 June 2019



Professor Scott Sloan
2 July 1954 to 23 April 2019



Professor Sally Smith
10 May 1941 to 12 September 2019

PHILANTHROPY AND PARTNERSHIPS

DONATIONS

Many of the Academy's core activities such as scientific meetings, advice to support policy development, publications, education, public awareness of science, international activities, awards and fellowships would not be possible without gifts and legacies from Fellows and friends of the Academy. We warmly thank all our donors.

Impacts

The Academy's activities funded by donations have far-reaching and life-changing impacts. Here are some examples from 2019.

The **Margaret Middleton Fund for endangered Australian native vertebrate animals** has supported early-career researchers for 20 years. Dr Middleton, the generous benefactor behind the fund, passed away in March at the age of 90, leaving a bequest of \$400 000 to sustain the fund.

"It's really important that grants like these are available to early-career researchers because they provide a good way for PhDs and postdocs to establish their own track record and become independent" Recipient Dr Tim Doherty, who used the fund to study reptile movements in an agricultural landscape.

Right: Dr Tim Doherty received support from the Margaret Middleton Fund to study Australian reptiles.



Philanthropic income

2019

113
DONORS

TOTAL \$667 307

\$400 000 IN BEQUESTS

\$74 507 IN GENERAL DONATIONS

\$192 800 IN AWARD FUNDING

Awards

GRAND TOTAL
AWARDED OR
COMMITTED IN 2019

\$364 896

\$17 500

\$26 933

\$30 500

\$289 963

HONORIFIC AWARDS

Total value of the awards with associated honoraria and lecture funding awarded in 2019. **20** awardees, **5** career awards, **2** mid-career awards and **10** early-career awards.

TRAVELLING FELLOWSHIPS

Total committed in 2019. **4** awardees, **6** countries to be visited and **12** universities and organisations to be visited.

CONFERENCE AWARDS AND LECTURES

Total committed in 2019. **4** awards, **3** conferences and **1** lecture.

RESEARCH AWARDS

Total committed in 2019. **17** awardees.



The 20 honours students who attended 'Catalysing change' were equipped with a strong conceptual understanding of the circular economy, as well as real-world examples of circular economy concepts in action.

Future Earth Australia, which is hosted by the Academy, brought together leading honours students to explore how waste can be seen as a resource. **Catalysing change: Moving towards a circular economy** was funded by a philanthropic donation from the McDougall family.

"The McDougall family's donation will enhance sustainability in Australia by equipping young people with the skills, knowledge and capacity to create positive change"

Director of Future Earth Australia, Dr Tayanah O'Donnell

The **Adam J Berry Memorial Fund** supports early-career Australian scientists to travel to the US and spend time at the National Institutes of Health. Patrice Jones was encouraged to apply for the award by her PhD supervisor, Dr Emma Beckett—herself a recipient of the award in 2014.

"You're gaining the experience of being able to work with another team, and showing incentive—those types of things that are really important at this stage of your career"

Recipient Patrice Jones, who spent six weeks at the National Institute of Environmental Health Sciences in North Carolina, researching the relationship between sex hormones and breast cancer.

The inaugural recipients of the **Aboriginal and Torres Strait Islander Scientist Travelling Research Award**, Bradley Moggridge, Tui Nolan and Amy Searle, attended Science at the Shine Dome to receive their certificates and participate in the event as part of their award.

"Water science really connected with me, because of my connection to country. It's about acknowledging a gap in science: Aboriginal people don't have a voice in water"

Recipient Bradley Moggridge, who travelled to Aotearoa New Zealand to connect with Māori iwi (tribes) and learn about their experiences with water management.

Acknowledgements

For the period 1 July 2018 – 30 June 2019

Academy Pillars

Donations of or valued at \$500,000 +

In perpetuity

Sir Jack Ellerton Becker FAA

Estate of Thomas Lewis Davies

Department of Communications, Information Technology and the Arts

FJ Fenner AC CMG MBE FAA FRS and Mrs Bobbie Fenner

Dr Margaret Middleton

The Royal Society (UK)—Theo Murphy (Australia) Fund

Estate of Ian Gordon Ross AO FAA

Estate of Miss JG Russell

Professor John Shine AC FAA

Telstra Foundation

Professor GW Kenneth Cavill Bequest

President's Circle

Donations of or valued at \$100,000 – \$499,999

Professor Ian McDougall FAA

Dr Anna Rickards

Science Circle

Donations of or valued at \$20,000 – \$99,999

Professor Michael Barber AO FAA FTSE

Jon Day

Doug Hooley PSM

ARC Georgina Sweet Australian Laureate Fellowship to Professor Kate-Smith Miles

Dr Anna Rickards

Estate of the Late Professor John Newton FAA and

Dr Silva Newton (additional payment)

University of Melbourne

Anonymous (1)

Valued donations to the Academy are not always financial. Acclaimed artist Dean Home donated a portrait of Sir Gustav Nossal AC CBE FAA FRS FTSE through the Australian Government's **Cultural Gifts Program**. The donated portrait was a precursor to a larger piece painted for the National Portrait Gallery, which houses portraits of many Academy Fellows. Thanks to the generosity of the gallery, 34 of these arresting images were displayed at the 2019 Science at the Shine Dome gala dinner.

PARTNERSHIPS

The Academy is open to partnering with organisations that recognise and value the mutual role science plays in industry, and industry plays in science.

Partnership support

Science at the Shine Dome 2019 Presenting Partners

UniBank

3M



Proudly supported by
THE UNIVERSITY OF
SYDNEY



University of
South Australia



Dean Home's portrait of Sir Gus Nossal, which will be on display at the Academy. PHOTO: DEAN HOME

Video Sponsors



Proudly supported by
THE UNIVERSITY OF
SYDNEY

content in a way that everyone can access. We create original, high quality videos designed for social media that reach a large unrivaled global audience.

An example of our video partnerships is the federal Department of Health. In 2019, following successful immunisation and meningococcal campaigns the previous year, we delivered public health messages via social media for a measles campaign. Four videos and four articles generated national mainstream and social media interest, with the videos achieving combined views of more than eight million.

science.org.au/dept-health-reaches-millions

Thank you to all our video campaign partners and organisations who have collaborated with the Academy to sponsor content to increase STEM awareness and promote scientific research in Australia.

Science at the Shine Dome—Australia's annual celebration of science

Science Extension students and teachers with 3M

The Academy partnered with 3M to provide an opportunity for leading secondary students and their teachers involved in the NSW Science Extension course to attend Science at the Shine Dome. This was achieved through the establishment of a STEM education initiative, the Science at the Shine Dome Schools Program. We thank 3M for supporting the Academy and STEM education in Australia in 2019.

National Event Partners and Supporters

**UNIVERSITY OF
CANBERRA**

**World
Science
Festival
Brisbane**

**BEAKER
STREET
@TMAG**

A pop-up science bar
Tasmanian Museum
and Art Gallery
16-17 August 2019

**TASTING
AUSTRALIA**

Partnership impact

Video partnerships and sponsored content—Department of Health

The Academy's unique science videos, articles and images reach millions across the globe. Underpinned by excellence, the Academy's vision is to create accurate and engaging

EMCR support with UniBank

The early- and mid-career researcher (EMCR) program was expanded in 2019, with support from EMCR Engagement Partner, UniBank. Seventy-one EMCRs, including sponsored and Lindau delegates, attended the event, a 27% increase on the previous year. Several functions were added to the program, including a masterclass focusing on wellbeing and work-life balance, and a networking dinner. These were in addition to the regular Science at the Shine Dome events, including four EMCR workshops. Thank you UniBank for supporting the Academy and the Australian STEM pipeline in 2019.

Decadal and strategic plans

Nourishing Australia: A decadal plan for the science of nutrition

This plan was published in 2019 and was supported by the Australian Research Council Linkage Learned Academies Special Projects.

Australia's Future in Space: a strategic plan for space science

This plan is in development and is supported by the Australian Space Agency and CSIRO Astronomy and Space Science.

“My experience of Science at the Shine Dome was completely invaluable...in the last few days we have been exposed to an entirely new scientific world in which we can only hope to be a part of in the future.” April Abela, Science Extension student, Glenmore Park High School

More valued partnerships and sponsorships

Other valued partnerships and sponsorships included those that supported:

- Falling Walls Lab Australia
- Future Earth Australia
- Lindau Nobel Laureates Meeting participants and alumni
- National Science Week activities
- Academy involvement in public events across Australia.

science.org.au/philanthropy-and-partnerships



April Abela, NSW Science Extension student, and Ashley Mulcahy, teacher, Glenmore Park High School, speaking to leading scientists at Science at the Shine Dome.

EXCELLENCE IN SCIENCE

Honoric awards

20

awardees

5

career awards

2

mid-career awards

10

early-career awards

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

science.org.au/opportunities

HONORIFIC AWARDS

Career honorifics (for lifelong achievement)

David Craig Medal

- **Professor Peter Gill** FAA, Australian National University

Matthew Flinders Medal and Lecture

- **Dr Richard Manchester** FAA, CSIRO Australia Telescope National Facility (previously announced)

Hannan Medal

- **Professor Alan Welsh** FAA, Australian National University

Jaeger Medal

- **Professor Dietmar Müller** FAA, University of Sydney

Thomas Ranken Lyle Medal

- **Professor Chennupati Jagadish** AC FAA, Australian National University

2020 career award announcement

Macfarlane Burnet Medal and Lecture

- **Professor Marilyn Renfree** AO FAA, University of Melbourne

Mid-career honorifics (8–15 years post-PhD)

Jacques Miller Medal for experimental biomedicine

- **Professor Nicholas Huntington**, Walter and Eliza Hall Institute of Medical Research and Monash University

Nancy Millis Medal for Women in Science

- **Professor Jacqueline Batley**, University of Western Australia

Early-career honorifics (up to 10 years post-PhD)

Anton Hales Medal

- **Professor Isaac Santos**, Southern Cross University

Christopher Heyde Medal

- **Professor Geordie Williamson** FAA FRS, University of Sydney



Matthew Flinders Medal winner, Dr Richard Manchester. PHOTO: KARL SCHWERDTFEGER



Jacques Miller Medal winner, Professor Nicholas David Huntington.



Moran Medal winner, Dr Kim-Anh Lê Cao. Associate Professor Stephen Leslie also received the Moran Medal.

Dorothy Hill Medal

- **Dr Laurie Menviel**, UNSW Sydney

Fenner Medal

- **Dr Daniel Falster**, UNSW Sydney

Gottschalk Medal

- **Associate Professor Laura Mackay**, Doherty Institute

John Booker Medal

- **Professor Changbin Yu**, Australian National University and Westlake University (China)
- **Associate Professor Anna Giacomini**, University of Newcastle

Le Fèvre Medal

- **Associate Professor Elizabeth New**, University of Sydney
- **Dr Lars Goerigk**, University of Melbourne

Moran Medal

- **Dr Kim-Anh Lê Cao**, University of Melbourne
- **Associate Professor Stephen Leslie**, University of Melbourne

Pawsey Medal

- **Professor Steven Flammia**, University of Sydney

Ruth Stephens Gani Medal

- **Dr Justin Wong**, Centenary Institute of Cancer Medicine and Cell Biology

ACADEMY MEDAL

- **Dr Megan Clark** ^{AC}
- **Mr Peter Yates** ^{AM}

LECTURE TOURS AWARDED

Geoffrey Frew Fellow

- **Professor Donna Strickland**—optical physics

Selby Fellow

- **Professor Herbert Huppert**—geophysicist

CONFERENCE AWARDS

Conference awards announced in 2019

2020–21 Elizabeth and Frederick White Research Conference

- Mathematics Sol Terrae

2020–21 Boden Research Conference

- Towards a representation of eucalypt ecology and physiology in vegetation models: What makes eucalypts distinct?"

2020–21 Fenner Conference on the Environment

- Making Australian agriculture sustainable

RESEARCH AWARDS

Research awards announced in 2019

2019 J G Russell Award

- **Dr Giulia Ghedini** Monash University—to resolve how entire ecological communities respond to global warming and identify the mechanisms that drive these responses.
- **Dr Yu Heng Lau** University of Sydney—to uncover a new and generalisable platform technology for controlling chemical reactions on the nanoscale, which could benefit the manufacturing industry.
- **Dr Tatiana Soares da Costa** La Trobe University—to identify novel and smarter herbicide development strategies for effective weed management to sustain our fauna, flora and agricultural industry.
- **Dr Qi Wu** University of Adelaide—to develop an Artificial Intelligence (AI) agent that communicates with humans on the basis of visual input and can complete a sequence of actions in environments by combining computer vision (CV), natural language processing (NLP) and reinforcement learning (RL).

2019 Douglas and Lola Douglas Scholarship in Medical Science

- **Dr Matthew Hare** Royal Darwin Hospital and Menzies School of Health Research—for his research on intergenerational metabolic health in Indigenous and non-Indigenous Australians.

2020 Rudi Lemberg Travelling Fellowship

- **Professor Robert Edwards** San Diego State University—will present his research in Sydney, Perth and Adelaide, and teach a one-week microbiome analysis workshop.

2020 Graeme Caughley Travelling Fellowship

- **Dr Benjamin Allen** University of Southern Queensland—will share Australian advances in best-practice wildlife management with colleagues in Sri Lanka, Nepal and South Africa.

2020 Moran Award for History of Science Research

- **Dr Ruth Morgan** Monash University—will examine the role of Australian climatologists and meteorologists in advancing the state of scientific knowledge about the causes and mechanisms of climate change and variability in the Southern Hemisphere from 1970 to 2000.

2020 Thomas Davies Research Grant for Marine, Soil and Plant Biology

- **Dr Danielle Verdon-Kidd** University of Newcastle—will use mangroves to help reconstruct the climate record in east coast Australia.
- **Dr Mark Waters** University of Western Australia—will study interactions between light and smoke signals in plant development
- **Dr Fiona Walsh** Consultant ethno-ecologist from the Northern Territory—will investigate the patterns of bare circular patches known as ‘fairy circles’ over the top of termite colonies.
- **Dr Elisabeth Strain** University of Melbourne—will investigate the role of kelp in mitigating ocean acidification and its capacity to dampen nearshore waves.
- **Dr Jennifer Lavers** University of Tasmania—will study the role of seabirds as vectors for both soil nutrients and pollutants on islands, and how a decline in seabird population can affect ecosystem processes in these remote locations.
- **Dr Edwin Lampugnani** University of Melbourne—will study plant cell wall biology using the common liverwort *Marchantia* as a model for how flowering plants make cellulose.

- **Dr Simon Williams** Australian National University—aims to establish a system using the bacterium *Escherichia coli* to produce multiple plant immunity proteins that help plants detect and provide protection against diseases.

2020 Margaret Middleton Fund for endangered Australian native vertebrate animals

- **Dympna Cullen** PhD candidate UNSW Sydney—will use the grant to conduct surveys in the Strzelecki Dunefields to explore where the desert-dwelling mammal, the crest-tailed mulgara, finds refuge during drought.
- **Jackie O’Sullivan** PhD candidate Australian National University—will study the role of surface rocks as reptile habitat in agricultural landscapes.
- **Penelope Pascoe** PhD candidate University of Tasmania—will undertake a large-scale evaluation of ecosystem recovery on Australian and New Zealand islands where rodents have been eradicated.

2020 Max Day Environmental Science Fellowship Award

- **Dr Emma Camp** University of Technology Sydney—will assess how the elemental signatures of corals can signal stress from pollution on the Great Barrier Reef.
- **Allison Broad** PhD candidate University of Wollongong—will study the impacts of anchor scour on the seafloor near Wollongong.

Travelling fellowships

4

awardees

6

countries to be visited

12

universities and organisations to be visited

Conference awards and lectures

4

awards

3

conferences

1

lecture

Research awards

17

awardees



2020 Margaret Middleton Fund for endangered native vertebrate animal awardees (announced in 2019).

Top: Jackie O'Sullivan holds a Cunningham's skink. PHOTO: JASON DRINKWATER

Above: Penelope Pascoe with grey-headed albatross parent and chick on subantarctic Macquarie Island.

Right: Dympna Cullen holds a crest-tailed mulgara. PHOTO: NYASHA NYAKUENGAMA

REACHING OUT IN AUSTRALIA AND INTERNATIONALLY

The Academy facilitates Australia's access to global science and technology, promotes strategic partnerships between Australian and overseas researchers, and contributes Australian expertise and leadership in regional and global science networks.

\$1 MILLION IN NEW FUNDING CONNECTS YOUNG SCIENTISTS TO NOBEL LAUREATES

Thirteen Australian-based physicists were awarded Lindau Fellowships by the Academy with support from the Science and Industry Endowment Fund (SIEF). SIEF has funded 80 young researchers to attend the annual Lindau Nobel Laureate in Germany meeting since 2013.

The future of the program was secured with the announcement of \$1 million from SIEF to continue funding the Lindau Nobel Laureate meeting Fellowships and Heidelberg Fellowships for a further 10 years.

**\$1
million**

SIEF funding over the
next 10 years

"When we invest in developing talented young scientists at the stage in their career where they are most creative, it is an investment in Australia's future."

CSIRO Chief Executive and SIEF Trustee,
Dr Larry Marshall

Below: Dr Larry Marshall announcing future SIEF funding with the 2020 participants and alumni of Lindau Nobel Laureate meetings.





Rhys Pirie with Academy Fellow Professor Hans Bacher at Falling Walls Berlin.

AUSTRALIAN SCIENTIST CLAIMS YOUNG INNOVATOR OF THE YEAR AT FALLING WALLS BERLIN

The Academy supported 20 emerging innovators at Falling Walls Lab Australia, with Dr Elena Schneider-Futschik, Ms Kate Secombe and Mr Rhys Pirie selected to represent Australia at the international Falling Walls Lab.

The Academy congratulates PhD candidate Mr Pirie, who became the first Australian to win Young Innovator of the Year at Falling Walls Berlin.

“It’s hard to speak highly enough of the Falling Walls experience...I’m very grateful to the Academy for its support of the program. Winning in Berlin gave our research a global platform and triggered a huge amount of commercial and collaborative interest...It has been the highlight of my academic career so far!” Mr Rhys Pirie, Young Innovator of the Year, Falling Walls Berlin

KEY STATISTICS

International, bilateral and regional science meetings

12

meetings attended by
13 Australian representatives

The Academy’s international activities in Australia

84

Australians supported, including 48 EMCRs

43

International delegates supported

The Academy’s activities overseas

52

Australians supported, including 48 EMCRs

Events

14

international events supported by the Academy

Fostering international collaborations

13

events in Australia held by the Academy

Funding for collaborative international research awarded

\$1.5 million

- Regional Collaboration Programme \$1,250,000
- Australia–India Strategic Research Fund \$155,745
- Mobility grants \$71,785

ACADEMY FEATURES AT BERLIN SCIENCE WEEK

A team from the Academy travelled to Germany in early November to participate in Berlin Science Week. Berlin Science Week spanned 130 events, featuring the best in science from across Europe and around the world. The team was also in Germany to participate in and support the Falling Walls Lab and Falling Walls Engage events.

The Academy held an exhibition for two days at the Museum für Naturkunde Berlin (the Museum of Natural History). The exhibit featured videos from the Academy's ongoing successful communication strategy, which were played on a large-screen TV to engage visitors to the museum. Copies of the Academy's 10-year plans and Q&A documents were also displayed, and the team gave a presentation on creating engaging science communication.

INTERNATIONAL SCIENCE ENGAGEMENT PAYS DIVIDENDS FOR AUSTRALIA

The Academy produced a report on the economic and scientific benefits to Australia's membership of major global science organisations. 'Benefits of Australian membership of the International Science Council and International Scientific Unions' also highlights the important role that science has as a soft power asset in diplomacy.

The report showed that Australia benefits as a member of global science organisations by receiving a direct economic return through hosting scientific union meetings in Australia and other activities; providing opportunities for Australian scientists to

collaborate internationally; providing opportunities for Australian perspectives of global challenges; and enhancing Australia's international scientific profile and reputation.

SCIENTIST SELECTED FOR INTERNATIONAL ASPIRE PRIZE

The Academy recommended Dr Nicholas Murray from UNSW Sydney to the Department of Industry, Innovation and Science to be the Australian nominee for the 2019 APEC Science Prize for Innovation, Research and Education (ASPIRE). Dr Murray competed with 20 other scientists from APEC economies for the international award, which was won by Dr Yun Hau Ng from Hong Kong.

Dr Murray assesses the conservation challenges and management risks associated with sea level rise. His work, combining cloud computing and machine learning to analyse vast archives of satellite data, has helped to conserve ecosystems across the Asia-Pacific.

SUPPORT FOR IMPORTANT INTERNATIONAL SCIENCE COLLABORATIONS

Bilateral relations

The Regional Collaborations Programme awarded \$1.25 million in project and workshop funding to 14 Australian organisations undertaking collaborative research with partners in the Asia-Pacific region.

The Academy supported 17 Chinese and 14 Australians (included 7 early- and mid-career researchers) to attend the 15th Australia-China Symposium in precision medicine.



At the Australia-China Symposium in precision medicine were (from left) Professor Melanie Bahlo, Walter and Eliza Hall Institute of Medical Research, Dr Shafagh Waters, UNSW, Professor Daming Gao, Shanghai Institutes for Biological Sciences, and Professor Yong Shen, Neurodegenerative Disorder Research Centre.



Dr Mohd Sukor Su'ait (left) and Professor Hadiyanto with Professor Elaine Sadler, Foreign Secretary of the Academy.

The Academy also:

- sponsored two international EMCRs to attend Science at the Shine Dome, Dr Mohd Sukor Su'ait from Malaysia and Professor Hadiyanto from Indonesia.

“As a young scientist who is currently involved in the areas of renewable resources and energy materials, I got inspired by the Fellows ... This has motivated me to work harder and pursue academic excellence, extending the benefits to communities, industries and the nation’s development.” Mohammad Sukor Su'ait, Universiti Kebangsaan Malaysia (The National University of Malaysia)

- facilitated access to global science and technology and promoted strategic partnerships between Australian and overseas researchers
- supported senior Australian scientists to showcase Australian science and collaboration opportunities in global platforms
- worked with global science leaders in the call for further action on climate change through contributing to the Commonwealth science academies statement that focuses on climate change, biodiversity and sustainable energy to influence outcomes from CHOGM 2020
- attended the meeting of the Science 20 (S20) national academies in Japan where a position statement on ‘Threats to Coastal and Marine Ecosystems and Conservation of the Ocean Environment—with Special Attention to Climate Change and Marine Plastic Waste’ was presented to Japan’s Prime Minister Shinzo Abe

- managed the Australia–Americas internship program for PhD students from Argentina, Brazil, Colombia and Mexico on behalf of the Australian Government
- announced EMCR recipients of Australia–India researcher fellowships.

Multilateral relations

The Academy continued:

- as an executive member of the InterAcademy Partnership (IAP), with the Academy President a member of the Executive Committee of the IAP for Research, and the Foreign Secretary on the Board of the IAP for Science
- to support in structuring the International Science Council
- to participate in IAP projects, including projects that focus the UN Sustainable Development Goals, and that strengthen trust in and demonstrate the value of scientific advice
- as a member of the Association of Academies and Societies of Sciences in Asia (AASSA) Executive Board, and chaired the AASSA Special Committee for Women in Science and Engineering.

International science union relations

In 2019, the Academy:

- produced the International Science Council (ISC) benefits report
- welcomed Academy Fellow Professor Cheryl Praeger as a member of the ISC’s Committee for global Freedom and Responsibility in Science
- celebrated the Year of the Periodic table by involving school students in ‘scienceXart: elements in everyday life’
- celebrated Australian science at major IUPAC and IUGG international meetings

- commended the election of Emeritus Professor Chris Rizos, an observer on the Academy's National Committee for Earth Sciences, as President-Elect of the International Union for Geodesy and Geophysics.

Funding for collaborative international research

The following three initiatives were funded by the Department of Industry, Science, Energy and Resources.

Regional Collaborations Programme

\$1.25 million of Australian Government funding was awarded to 14 collaborative research projects through the Regional Collaborations Programme, round 2. The grants will support Australian researchers who are collaborating with Asia-Pacific partners to develop innovative solutions to shared challenges. Funded projects address a range of health, technological and environmental challenges, including battery recycling, malaria and coastal water quality monitoring.

Australia-India Strategic Research Fund EMCR Fellowships

More than \$150,000 in grants were awarded in round 4 of the Australia-India Strategic Research Fund Early- and Mid-Career Fellowships to 19 researchers. The grants of up to \$16,500 each are to allow EMCRs to undertake projects at some of India's leading research institutions. The fellowship opens doors for connections with global experts within an EMCR's field, provides leadership opportunities and paves the way for long-term international collaborations.

JSPS Postdoctoral Fellowship Program for Foreign Researchers

Following nominations by the Academy, 14 Australian EMCRs were awarded fellowships through the Japan Society for the Promotion of Science (JSPS) Postdoctoral Fellowship Program for Foreign Researchers. The program aims to allow researchers to advance their own research while contributing to the advancement of research in Japan and Australia. The fellowships are for a period of 12 to 24 months.

INTERNATIONAL ACTIVITIES

The Academy was involved in activities and collaborations with 40 countries.



● Argentina	● Austria	● Bangladesh	● Brazil	● Chile
● China	● Colombia	● Denmark	● Fiji	● Finland
● France	● Germany	● Greece	● India	● Indonesia
● Ireland	● Italy	● Japan	● Kenya	● Kiribati
● Korea	● Malaysia	● Mexico	● Nepal	● Netherlands
● New Zealand	● Pakistan	● Papua New Guinea	● Philippines	● Poland
● Solomon Islands	● Spain	● Sri Lanka	● Sweden	● Switzerland
● Taiwan	● Thailand	● UK	● USA	● Vietnam

France and Europe EMCR mobility grants

A total of \$71,785 in funding was awarded to 15 early- and mid-career researchers by the France and Europe early- and mid-career (EMCR) mobility grants program, supported by the Rod Rickards Fellowships and Bede Morris memorial fund. These grants are intended to strengthen international research networks, providing support of up to \$5000 for Australian researchers to travel to France and Europe and work with leading researchers at major science and technology organisations for a period of between 14 and 28 days.

NATIONAL COMMITTEES FOR SCIENCE

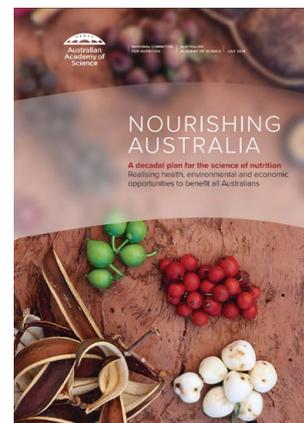
The Academy's 22 National Committees for Science foster their disciplines in Australia and link Australian and overseas scientists. They advise the Academy on Australia's representation for the unions and multidisciplinary bodies of the International Science Council (ISC) and other international bodies.

In 2019, the Academy delivered two 10-year plans through the National Committees for Science.

10-year plans

Preparing for Australia's digital future: A strategic plan for information and communication science, engineering and technology

Future advances in areas such as data, the internet of things, virtual reality, e-health, automation and smart cities will provide great opportunities for new and existing businesses in Australia. This strategic plan specifically addresses how researchers in Australia's information and communication sciences can assist in furthering these opportunities. This plan is a partnership between the National Committee for Information and Communication Sciences and the Australian Academy of Technology and Engineering.



Nourishing Australia: a decadal plan for the science of nutrition

This decadal plan sets out a strategy for realising the vision that Australian nutrition science plays a key role in improving long-term health and wellbeing globally, while delivering environmental, social and economic benefits nationally with core values of equity, sustainability, collaboration and innovation. Successful implementation is expected to result in health, wellbeing and economic benefits. This plan was produced by the National Committee for Nutrition with generous funding from the Australian Research Council's Linkage Learned Academies Special Projects scheme.

Plans under preparation include Australia's Future in Space, in partnership with the Australian Space Agency, and a white paper on evolutionary science.

Plans under review

- Australia in the era of global astronomy: The decadal plan for Australian astronomy 2016–2025
- Physics decadal plan 2012-2021: building on excellence in physics, underpinning Australia's future

Changes to National Committee chairs

National Committee	Outgoing Chair	Incoming Chair
Earth Sciences	Malcolm Sambridge	Patrick De Deckker
Information and Communication Sciences	Rod Tucker	Shazia Sadiq
Materials Science and Engineering	C Jagadish	Joanne Etheridge
Mathematical Sciences	Peter Forrester	Alan Welsh

POLICY INFLUENCE AND ADVICE

21

submissions made to government

3

position statements published

3

roundtable meetings facilitated on fair data, environmental science and policy, and human germline modification

The Academy provides independent, authoritative and influential scientific advice, with the aim of influencing Australia's science agenda and being a trusted independent advisor on scientific matters.

The Academy:

- provided advice to governments through submissions, position papers, commissioned research, and direct engagement with MPs and Senators. We:
 - provided hearing evidence on the prerequisites for nuclear energy in Australia; growing Australian agriculture to \$100 billion by 2030; and the Criminal Code Amendments (Agricultural protection) Bill
 - engaged directly with Environment Minister Sussan Ley on the Independent review of the *Environment Protection and Biodiversity Conservation Act 1999*; and Senator Janet Rice on Gene Technology Act Regulations Amendments
 - made important submissions including on Nationhood, National Identity and Democracy; and Consultation on the Implementation of the National Science and Research Priorities.
- advocated for science through general and discipline-based advocacy and campaign activity in collaborations with sector stakeholders, such as on the UNCOVER Roadmap and work to establish an Australian Brain Initiative
- undertook policy projects including decadal plans for science, policy discussion papers and sector analysis reports
- launched a Science Policy and Diplomacy newsletter.



SCIENTIFIC REPORT ON THE DARLING RIVER FISH KILLS

In three separate events across December 2018 and January 2019, millions of fish—including endangered Murray Cod—died en masse along a 30 km stretch of river near Menindee, NSW. In the wake of these events, the Academy produced a scientific report examining the causes of the disaster, 'Investigation of the causes of mass fish kills in the Menindee Region NSW over the summer of 2018–2019'. The Academy assembled an expert panel of scientists from a range of disciplines, who found that insufficient water flow was a key factor leading to the fish kills.

The report was well received by decision-makers and generated widespread media and community interest.

GENETIC MODIFICATION—QUESTIONS AND ANSWERS

The latest in the Academy's Q&A series of booklets was published during the year. It provides a clear, concise description of genetic modification technology. It highlights the benefits of GM products which include a significant reduction in the use of



Laetitia is one of the many professionals brought together by Taxonomy Australia, a community of taxonomists, users of taxonomic knowledge, and supporters of taxonomy. She is the Chadwick Biodiversity Fellow at the Australian Museum, Sydney. PHOTO: CSIRO

chemical insecticides and improved productivity of existing agricultural land, which both contribute to reduced CO₂ emissions; improved nutritional value from enriched crops; and increased farm incomes. The international scientific consensus is that after 20 years of commercial use, GM technologies used to date pose no greater risk to human health or the environment than similar products derived from traditional breeding and selection processes.

TAXONOMY AUSTRALIA TAKES FLIGHT WITH NEW WEBSITE

Taxonomy Australia, a program of the Academy, launched its website—with the aim of propelling taxonomy and biosystematics onto the radar of policymakers, scientists and the broader community. It is estimated that as much as 70% of Australia's biodiversity remains undescribed. At the current rate,

it will take 400 years to finish describing all of Australia's species—a time frame that will likely see many species become extinct. The website offers a platform for scientists to describe their work in discovering the unknown and exploring our natural world.

taxonomyaustralia.org.au

LAWYERS AND SCIENTISTS DISCUSS CLIMATE CHANGE

The Australian Academy of Science and the Australian Academy of Law jointly sponsored a symposium on climate change and the law in August. The symposium was based on a hypothetical set of facts, with the moderator, Justin Gleeson SC, questioning a panel of Fellows from each Academy.

FUTURE EARTH AUSTRALIA

Future Earth Australia is a national peak initiative that enables Australian researchers, governments, industry and NGOs to collaborate with each other and with international networks and programs across Australia and Oceania.

futureearth.org.au

3

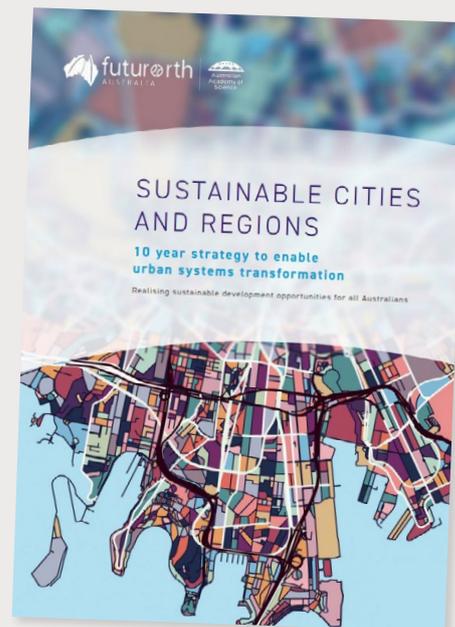
early-career researcher and practitioner events involving over 70 people at Canberra, the Gold Coast and Adelaide.



Increased international engagement, including hosting the Urban Knowledge Action Network annual meeting, becoming a key consortium member in hosting SRI2020, and partnering on Our Coastal Futures with Future Earth Coasts.

SUSTAINABLE CITIES AND REGIONS: 10 YEAR STRATEGY TO ENABLE URBAN SYSTEMS TRANSFORMATION

Future Earth Australia published 'Sustainable cities and regions', a 10-year strategy to enable urban systems transformation. It is a cross-sectoral, national plan for achieving sustainable cities and communities across Australia by 2030. Developed through extensive national consultation and overseen by leading urban research, practice and policy experts, the strategies and recommendations address barriers to sustainable cities.



FUTURE EARTH AUSTRALIA WEBSITE LAUNCHED

Future Earth Australia launched its website, bringing together information on initiatives, publications, news, events and regional activities. Feature events included 'Catalysing change: moving towards a circular economy' and, in partnership with the University of South Australia, 'The future of food: connecting the UN Sustainable Development Goals'.

INSPIRATION AND IMPACT IN SCHOOLS

The Academy's school education programs, *Primary Connections: linking science with literacy*, *Science by Doing*, and *reSolve: Mathematics by Inquiry*, continued to support and give confidence to teachers and students throughout Australia and internationally.

AUSTRALIA

reSolve presented:

- two workshops at the Mathematics Education Research Group Australasia Teachers' Day
- a masterclass at the Australian Association of Mathematics Teachers conference.

Primary Connections and Science by Doing held workshops at 2019 CONASTA, the largest national conference for

science teachers. Academy Fellows Professor Alan Andersen and Professor Lyn Beazley presented keynote addresses.

The Academy attended:

- the ACT STEMEd Conference, with opening address by Academy Fellow Professor Ian Chubb
- the South Australian Science Teacher Association Early Career Teachers conference.

INTERNATIONAL

reSolve led a workshop session at the International Symposium on Elementary Mathematics Teaching, Charles University, Prague on evidence-based approaches to enhance the teaching of mathematics for the 5–12 age group.

In December, Primary Connections was one of 7 programs from 6 continents, and the only one from Australia, to be showcased at the International Dialogue on STEM Education conference in Berlin,



Year 12 NSW Science Extension students and their teachers participated in the Academy's flagship event, Science at the Shine Dome.



Science at the Shine Dome Junior provided a unique opportunity for students and teachers to experience the Primary Connections approach.

and led a workshop on change and improvement in STEM education for sustainable development.

STUDENTS AND TEACHERS ATTEND SCIENCE AT THE SHINE DOME

In a new STEM education initiative and with the help of Presenting Partner STEM Education, 3M, we brought 10 Year 12 HSC Science Extension students and their teachers to our annual Science at the Shine Dome event in late May. The students were passionate about science, and after spending three days with some of Australia's top scientists they left with plenty of inspiration. The students also had a Q&A session with Dr Andy Thomas, the first Australian-born citizen to fly as a NASA astronaut in space.

SCIENCE AT THE SHINE DOME JUNIOR

A week after the Year 12 students and teachers came to the Academy, the Academy's Primary Connections education program hosted Science at the Shine Dome Junior on 5 June. This event brought together 84 Year 2 students and their teachers from 10 schools across the Canberra-Queanbeyan region for a day of inquiry-based science learning.

Students were guided through the initial stages of a hands-on inquiry including consideration of a design challenge,

science and mathematics concepts. While students explored and devised solutions, their teachers experienced the Primary Connections approach and observed strategies that support STEM learning in the classroom.

Funding for the event was through the Commonwealth Bank of Australia's Community Grants scheme. In 2017, Primary Connections received an ACT Grassroots Grant of \$10,000 per year for three years for events in the ACT.

SALOTTO MATHEMATICO

Italian mathematician Piergiorgio Odifreddi visited the Academy to mark the 500th anniversary of Leonardo Da Vinci's death with a public talk. While in Canberra, he engaged with secondary students from the Australian National University's Mathematical Science Institute Extension Maths Course on topics including topography, Turing machines and computability theory.

PROFESSIONAL LEARNING

Supporting pre-service teachers at the beginning of their careers

More than half of the Australian universities providing pre-service teacher education courses included one or more Academy education programs in their coursework or reading lists. Universities chose Academy programs because they were developed by a trusted source, they support the development of scientific and mathematical understanding, and they are quality resources embodying an inquiry approach and modelling effective pedagogy.

Involving teachers in developing the best resources possible

The Academy programs are ever evolving to meet teacher needs, and teachers are highly valued and essential contributors to resource development. To acknowledge and celebrate the passion and commitment of teachers who trial

Almost

300,000

Number of times our education resources were downloaded

More than

200,000

Number of times our education resources were viewed on the national Scootle platform.

resources, Primary Connections wrote a blog post for the national resource platform Scootle, and a reSolve Champion shared their experience on the reSolve website.

Education workshops

Our education workshops for teachers proved popular. For example, in February and March the Primary Connections professional learning team delivered three fully-subscribed design and technology workshops in Brisbane, Sydney and Melbourne. Ninety-three primary school teachers from 48 schools across state, catholic and independent sectors attended the workshops. Primary Connections also partnered with the Victorian Department of Education to deliver professional learning to an additional 20 Victorian primary school teachers.

"The workshop was fantastic. It helped deepen my understanding of what STEM can look like in the classroom and reinforced how much fun STEM is!"

Primary school teacher, Sydney

DIVERSITY AND INCLUSION

The Academy made great progress in our aim to be a leader in diversity and inclusion in Australia's science sector.

science.org.au/diversity

WOMEN IN STEM ACHIEVEMENTS

Women in STEM Decadal Plan

The Women in STEM Decadal Plan was launched in April at Parliament House by the Minister for Industry, Science and Technology, the Hon Karen Andrews MP. The plan outlines six opportunities to strengthen gender equity in STEM in Australia over the next 10 years, providing a shared vision for the STEM ecosystem to attract, retain and progress girls and women in STEM education and careers.

The plan was developed by the Australian Academy of Science in partnership with the Australian Academy of Technology and Engineering, and involved hundreds of organisations that participated in a national consultation process.

Following the launch, the Academy held the Pathways to Equity in STEM symposium, the first implementation activity of the decadal plan. In partnership with UniBank, the Academy and the Australian Academy of Technology and Engineering brought together leaders from across the STEM sector, providing opportunities to learn from each other and collaborate to define their strategy for implementing the decadal plan.

Left: Dr Pauline Treble and Ms Carol Tadros were two of the many women in STEM featured in the decadal plan.

PHOTO: ANSTO

24

STEM Women Champions signed up

From its launch in August, the STEM Women online database achieved

2300

professional profiles

16,500

searches

24,000

users

92,000

page views

#STEMWomenAus

304,000

Twitter impressions

Exposure in over

7

major mainstream media outlets

Connected STEM Women to teachers, journalists, conference organisers, mentors and lots more opportunities

EMCRs

Nearly

5000

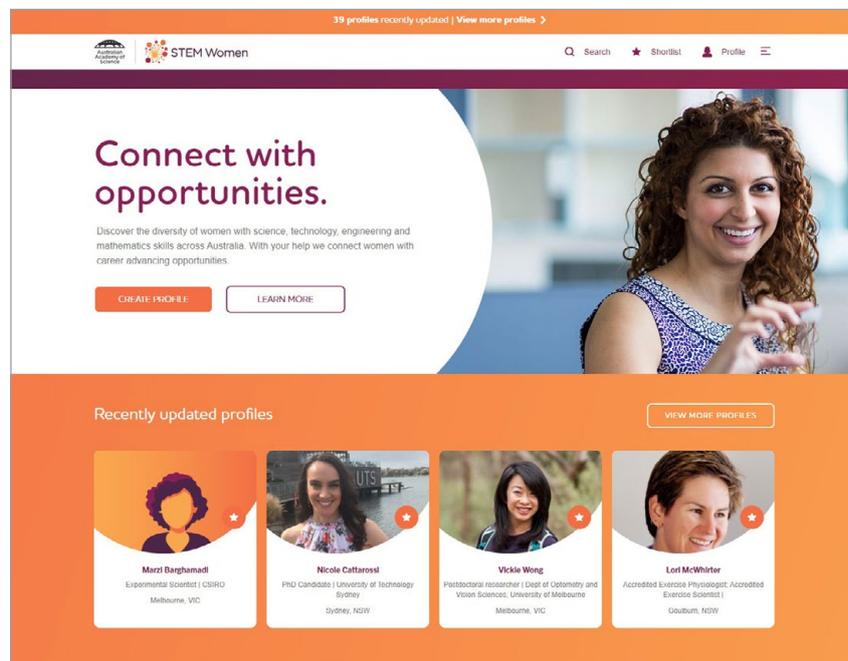
EMCRs directly supported

Women in STEM Decadal Plan Champions

The Academy is building on the efforts already underway across many STEM organisations. It launched an online platform where organisations can publicly share a response outlining how their gender equity activities align with the six opportunities identified in the decadal plan, now and in the future. Champions revisit their response every 12 months and provide an update reflecting their progress. Nearly 30 organisations participated in 2019, including the Academy, government departments, universities and companies.

STEM Women

In August, the Academy launched STEM Women, an online directory of women in Australia working in STEM. Within five months the directory had connected more than 2000 women in STEM with opportunities to progress their careers and personal capabilities such as speaking at conferences, being part of committees and boards, being nominated for awards and being interviewed in the media. The Academy developed the directory in partnership with CSIRO, Science & Technology Australia, and the Australian Science Media Centre, and with financial support from the Australian Government.



RECONCILIATION ACTION PLAN

“Our vision for reconciliation is that the traditional knowledge and cultures of Australia’s First Peoples are highly valued and respected by all Australians, and as one we contribute to creating a better nation and a better world.”

Launched in August, the plan outlines the practical steps the Academy will take to support positive change and facilitate reconciliation. In adopting better practices within the Academy, we hope that we can model, encourage and influence greater diversity and inclusion across the STEM sector nationally.

The plan was developed by a working group of Academy Fellows and staff, and external advisers. It acknowledges work already underway with the Academy’s

awards, grants and education programs, and outlines future actions and opportunities, including:

- investigating how the Academy’s national reach and influence may be able to support the involvement of Aboriginal and Torres Strait Islander people in science, through initiatives such as a professional mentoring program that involves Fellows and National Committee members
- exploring different perspectives of science with Aboriginal and Torres Strait Islander peoples and cultures
- implementing policies to support Aboriginal and Torres Strait Islander employment, including developing and implementing a policy to attract, develop and retain Aboriginal and Torres Strait Islander staff to the Academy, incorporating the Indigenous Traineeship Program.

PANEL PLEDGE

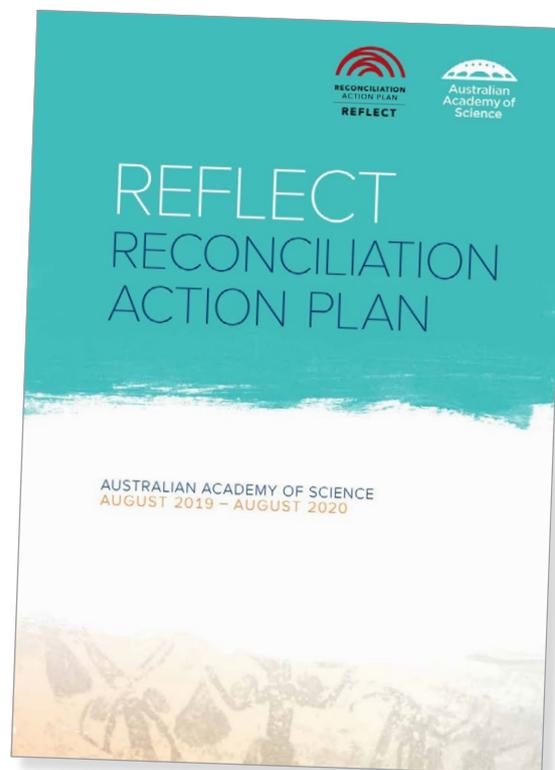
The Academy Council took the following pledge, and encourages all those in STEM to consider how taking a panel pledge may have a positive influence on diversity:

'I believe in gender equity and diversity as an ethical principle.
I pledge to ensure that all forums in which I have operational input, take gender diversity into account and strive towards equity of voice.
I pledge that when invited to speak at an event, I will inquire about the composition of the panelists/speakers, and how the organisers are working towards achieving gender diversity.
I will highlight and promote relevant gender diverse leaders in my field.
I will state my commitment to this pledge at forums at which I speak.
I will reserve the right to withdraw should gender diversity not be appropriately considered.'

EARLY- AND MID-CAREER RESEARCHERS

Events for EMCRs included:

- 2019 Frontiers of Science: Redefining healthy ageing together—Adelaide, 70 participants
- STEM Transferable Skills Toolkit workshops x 4—Sydney and Melbourne, 72 participants
- Science at the Shine Dome workshops and networking events—Canberra, 71 participants
- EMCR Program at the Synthetic Biology Australasia (SBA) 2019 conference—Brisbane, 220 participants (13 mobility grants provided)



- Genomes and biodiversity: research and career development workshop—Sydney, 50 participants (7 mobility grants provided)
- Re:produce workshop—Brisbane, 60 participants (8 mobility grants provided)

SAGE

Science in Australia Gender Equity (SAGE)—a partnership between the Academy and the Australian Academy of Technology and Engineering—continued to expand and develop. It was awarded further Federal Government funding of \$1.8 million for three years to support its national roll out across the higher education and research sector. SAGE is the only transformative gender equity program of its kind in Australia designed to achieve sustained change via ongoing evaluation and a national accreditation framework, and the Academy sees the continued government investment in the program as particularly significant.

SAGE launched a new podcast called Think Difference. The podcast aims to showcase the SAGE Athena SWAN journey, exploring transformative stories in STEM and sharing learnings and insights from practice. In each episode, individuals and institutions talk about their gender equity, diversity and inclusion journey. The first episode, 'Dads are parents too', explored Monash University's initiatives to shift the culture in support of men taking parental leave. It also included interviews with two fathers: Ben Knott from Deakin University who was just starting his primary carer's leave, and Heiko Dietrich from Monash University who reflected back on his experience.

SAGE was also registered as a company: Science in Australia Gender Equity Ltd.



The Academy engaged with and supported EMCRs at events throughout the year.

SAGE

welcomed a further

13

awardees of the SAGE Athena SWAN Institutional Bronze Award for improving gender equity and diversity, in partnership with the Australian Academy of Science and Technology

convened

18

regional network meetings

19

SAGE member workshops

ran

7

peer review assessment panels

participated in

3

national gender equity and diversity events

2

international gender equity and diversity events, including the APEC Policy Partnership on Science, Technology and Innovation Women in STEM Workshop (Chile) and the Pressing for Progress 2019 Conference run by the IPA in Hyderabad

OTHER ACHIEVEMENTS

The Academy also:

- supported the Early- and Mid-Career Researcher Forum to publish a best practice guide for enhancing diversity in prizes and awards
- continued measures to improve our nominations process for Fellowship and increase diversity in our prizes and awards
- supported EMCRs through the EMCR Forum, Theo Murphy Initiative, mobility grants for France and Europe, and Science at the Shine Dome, including international EMCR attendees
- supported Indigenous scientists at Science meets Parliament
- announced two recipients of the 2020 Aboriginal and Torres Strait Islander Scientist Travelling Research Award
- supported the establishment of a national QueersInScience network initiative.

COMMUNICATING SCIENCE

The Academy produced videos, articles and social media content all about science—engaging and informing millions of people. The three strengths of our content were trust, quality and distribution.

SOCIAL MEDIA

We took a sophisticated distribution approach on social media, including Facebook, Twitter and Instagram. Demonstrating the newsworthiness and impact of our content, many leading Australian and international media outlets embedded our topical videos more than 400 times or used its content in digital, print and broadcast news stories. Our content reached a wide and diverse audience, including in rural and regional Australia.

All content was reviewed by at least two independent experts prior to publication, ensuring it was scientifically accurate and up to date. We also worked with our Fellowship and other experts to develop and review all our content. Our team consisted of scientists, science communicators, experienced journalists and news producers, and video professionals—a formula that guaranteed engagement and scientific accuracy.

WEBSITES

The Curious website, where we published our science articles and videos for a broad audience, received nearly 1.6 million visits, 67% more than the previous year

- 25 articles on subjects from measles to magpies
- 97 videos on subjects from climate change to quicksand

science.org.au/curious

The Academy website received nearly 1 million visits, an increase of 47% on the previous year

science.org.au

Facebook

2.1 million

followers. Our videos were viewed 25 million times and watched for 8.8 million minutes. We received 577,000 reactions, comments and shares on our posts

Twitter

55,000

followers. 2900 tweets posted, gaining 63,000 engagements. Around 12 million tweet impressions

Instagram

17,000

followers. 72 posts, 17,000 engagements (161 comments, 16,700 likes) and 20,000 video views.

YouTube

548,423

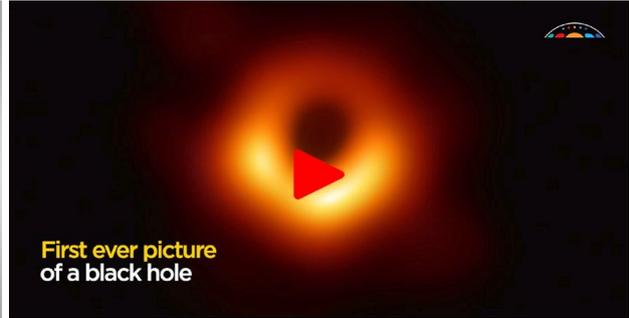
views, 10.5K hours watched, 5,565 subscribers. 1.9 million impressions

Stories or mentions of the Academy on social media

48,700

with 42,100 mentions of the Academy's social media handles only. The majority of mentions are from Facebook and Twitter.

TOP SCIENCE VIDEO STORIES



TOP CAMPAIGNS FOR CHANGE



Bushfires are a reality of the Australian summer

MEDIA

The Academy published on our website

81

news stories

50

media releases



217

total number of times single Academy video most embedded by online news media

Most embedded video— Reef reality—why coral is changing

408

total number of times Academy videos were embedded by online news media, including syndications

30

different Academy videos embedded by online media

Most embedded/referenced article by online news media— How climate change increases bushfire risk

96

total number of times an Academy article was embedded or referenced by online news media, including syndications

6584

total media stories about the Academy and mentions of the Academy across broadcast (3652) print (248) and online media (2684)

SBS Hindi

Hindi radio
THU 5:00 PM AEST

Australian Academy of Science urges precaution for those heading overseas soon

Source: Public Domain

If you are heading overseas in coming months, check if you are vaccinated against the highly contagious and sometimes deadly disease, measles.

45

events across Australia

40

speakers at Science at the Shine Dome

2000

people at Adults-only science at Questacon

EVENTS

The Academy delivered or participated in 45 fascinating events across Australia, with a combined audience of thousands. An overview of some events is below.

Science at the Shine Dome

The year's highlight as always was our flagship annual three-day event, Science at the Shine Dome, in May. A total of 540 attendees heard from more than 40 speakers, including newly elected Fellows, energy experts and guest speakers at the gala dinner.

The event started with the Academy's annual symposium, 'Power up Australia the sustainable way', which focused on the research Australia needs to create sustainable power into the future, based on science and engineering. Australia's Chief Scientist, Dr Alan Finkel AO FAA FTSE, was keynote speaker.

The gala dinner featured addresses by His Excellency the Honourable Sir Peter Cosgrove AK MC (Retd), retired NASA Astronaut Dr Andrew Thomas AO, and Matthew Flinders Medal recipient Dr Richard Manchester FAA.

On the final day of the event, 17 leading researchers received highly sought-after honorific awards for outstanding achievements in science, and EMCRs attended professional development workshops.

For the first time, 10 NSW Science Extension course students and their teachers participated in the Science at the Shine Dome Schools Program.



His Excellency the Honourable Sir Peter Cosgrove AK MC (Retd) speaking at the Science at the Shine Dome gala dinner.



Professor Brian Schmidt and Dr Matt Agnew delighted the audience at Questacon with their witty and honest discussion at Adults-only science (above), while Professor David Day welcomed wine lovers to The chemistry of wine in Adelaide (right).

Changing lives with science

Our Canberra Speaker Series, 'Changing lives with science', featured remarkable science stories of innovation, research, breakthroughs and how science is solving the big challenges of our time. Six events covered transforming implants (and lives) with 3D printing, 'electronic skin' sensors for better health, how AI and VR are changing lives, sounds through science with cochlear implants, envisioning the future of farming, and our built environment and transport.

National Science Week

In National Science Week in August, the Academy joined forces with BeakerStreet@TMAG, a pop-up science bar in Hobart which merged science with music, food and drinks, art and entertainment. Four Academy Fellows gave fascinating talks at Hobart Town Hall as part of the festivities.

In other activities, school students took up the challenge and got creative with the periodic table and the elements in the scienceXart competition hosted by the Academy's National Committee for Chemistry, with the winners experiencing a 'behind the science' tour of Canberra, while the Shine Dome played host to InterACTIVE, a family-friendly science-related afternoon enjoyed by more than 3000 people.

'Adults-only science' night

In the first joint Academy–Questacon event for adults only, nearly 2000 people experienced pop-up science, interactive displays and live music without children, guided by 30 emerging leaders in chemistry, physics and medicine known as Lindau Aussies. For some, the drawcard was the opportunity to see Academy Fellow and Nobel Laureate Professor Brian Schmidt discussing astrophysics with The Bachelor's Dr Matt Agnew.

World Science Festival Brisbane

The Academy injected a dose of chemistry into Queensland Museum's After Dark event, part of the World Science Festival Brisbane in March. The sold-out event attracted 600 people



for a night of music, interactive science entertainment and expert talks. We presented a theatre show, '10 elements in 10 minutes—or near enough!' featuring ABC science journalist and broadcaster and Academy Fellow Professor Robyn Williams, and Dr Nicole Lawrence from the University of Queensland. We also ran an interactive 'chemistry of gin' booth in conjunction with boutique distillery the Art of Booze.

The chemistry of wine

Yalumba chief winemaker, Louisa Rose, and Professor Kerry Wilkinson from the University of Adelaide, delved into the chemistry of wine at the Tasting Australia festival in Adelaide. While the audience sipped award-winning Yalumba wines, the speakers took them on a chemistry journey to remember, exploring colour, aroma, style and faults.

Big Ideas does science communication

ABC's radio program, Big Ideas, recorded a program at the Shine Dome, exploring progress in science communication. Host Paul Barclay led three guests in a lively discussion—Professor Maja Horst from Denmark, Eureka prize-winner Associate Professor Darren Saunders, and leading science communication expert Professor Joan Leach.

THE SHINE DOME

The Academy celebrated the Shine Dome's 60th anniversary as the home of the Australian Academy of Science. It continues to serve that original purpose and is a great source of pride for the Academy.

shinedome.org.au

The Shine Dome is both a meeting place for Australia's leading scientists and an iconic building that many people in Australia—and across the globe—recognise.

The Shine Dome's historical and architectural significance led to it being the first Canberra building to be added to the National Heritage List.

As part of the Canberra and Region Heritage Festival on 5 May, the Academy hosted public tours through the Shine

Dome, providing an insight into this extraordinary building and the Academy's history. The tours, along with a showing of the film *Hidden Figures* in the Shine Dome theatre, were sold-out events.

We welcomed *Grand Designs Australia*, which filmed the opening sequence to an episode at the Shine Dome.

We also hosted the Canberra Convention Bureau's October Networking night with over 120 Event planners attending, showcasing the Shine Dome as a premium event space in Canberra.

Shine Dome as a venue

154

conferences, meetings, weddings, memorials and other events involving

11,000
participants

3000

visited in one day for National Science Week

60 years

celebrated, including tours for the ACT Heritage Festival

2000

welcomed during Art Not Apart festival



Left: Chief Executive Ms Anna-Maria Arabia (second from right) with Academy staff celebrating the Shine Dome's 60th anniversary.

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 seven times.

The Finance Committee met four times. It is one of seven governance committees of Council that have an advisory role.

science.org.au/about-us/governance

ABOUT COUNCIL

Officer of Council (EXCOM) who retired



Dr TJ Higgins AO FAA FTSE,
Vice-President and
Secretary Biological Sciences

Ordinary members of Council who retired



Professor Sam Berkovic AC FAA FRS



Dr Steve Rintoul FAA



Professor Scott Sloan AO FAA FRS FTSE,
who passed away one month prior
to his term ending on Council

Fellow elected to Council Officer (EXCOM) positions



Professor Helene Marsh FAA FTSE,
Secretary Biological Sciences

Fellows elected to Ordinary Member positions



Professor Ian Chubb AC FAA FTSE



Professor Ivan Marusic FAA



Professor Malcolm Sambridge FAA



Professor Carola Vinuesa FAA

Council appointments



Professor Bob Williamson AO FAA FRS,
to fill a casual vacancy on Council



Professor Sue O'Reilly AM FAA,
co-opted onto EXCOM to assist
Secretary Education and Public
Awareness and Observer at Council.

EMPLOYEES

78

staff at the
end of the year

57

full time

21

part time

53

female

25

male

7

interns hosted
for various periods

FINANCIAL REPORT 2018–19

Please see the Academy's full report for the 2018–19 financial year at [science.org.au/finreport-18-19](https://www.science.org.au/finreport-18-19)

INVESTMENT PORTFOLIO

In February 2018, Council approved the appointment of Evans & Partners to advise on and manage the Academy's investments. Council also accepted the recommendation from its Finance Committee, on the advice of Evans and Partners, that the Academy's portfolio should be restructured to achieve greater diversification while maintaining returns. The goal was set of achieving an annual return of 7% (over the business cycle) while restricting the drawdown from the portfolio to fund Academy operations to no more than 5%. In FY 2018/19, the first full year of operation of the new arrangements, the portfolio returned 8.65% (including franking credits). However, the drawdown was slightly higher at 5.7% due to shortfalls in projected revenue.

SPECIAL PURPOSE FUNDS

A comprehensive review of the Special Purpose Funds held by the Academy was undertaken taking into consideration sponsor and donor wishes and agreements and the Academy's Standing Orders and Bye-laws. As a result Council agreed to consolidate, where possible, existing funds into three overarching funds:

- the Australian Futures Science Fund with the broad objective of contributing to the promotion of scientific excellence relevant to Australia, now and into the future
- the Science Education Fund with the broad objective of funding science education programs within Australia
- the Academy Awards Fund including all of the Special Purpose Funds that support honorific or other awards (with a few exceptions).

In adopting this restructuring, Council reinforced that the existing funds would remain and their donors would continue to be appropriately acknowledged.

