



Rhys Pirie (second from right) with University of Queensland Vice-Chancellor and President Professor Peter Høj, and Australian Academy of Science representatives Professor Hans Bachor and Professor Andrew Holmes.

Message from the President— November 2019

November 27, 2019

There is a lot of activity at the Academy as we head toward the end of the year.

Leading this month's achievements is a fantastic win by Australian Rhys Pirie at the international Falling Walls Lab in Berlin. Rhys, from the University of Queensland, is the first Australian to win the **Young Innovator of the Year** at the event—competing against 100 finalists from more than 60 countries. I warmly congratulate him. Australia was also represented at Falling Walls Lab by Dr Elena Schneider-Futschik from the University of Melbourne and Kate Secombe from the University of Adelaide. Falling Walls is one of the Academy's most exciting national and international engagements for young researchers.

The Academy was also well represented at Berlin Science Week, with a lot of interest in our successful strategies for taking science to a broad audience through social media.

This month has seen the publication of a guide for increasing the diversity of those who nominate for and receive prizes and awards in STEM. This

valuable resource was created by the Early- and Mid-Career Researcher (EMCR) Forum with the support of the Academy and is essential reading for everyone who manages and promotes prizes and awards—including the Academy. We would like to see this guide shared globally.

I hope you enjoy reading about these achievements and more in this month's newsletter.

John Shine

Australian scientist claims Young Innovator of the Year at Falling Walls Berlin

November 11, 2019

An Australian scientist has won Young Innovator of the Year at one of the world's premier conferences for research and innovation, the first time an Australian has won the Falling Walls Lab award.

Rhys Pirie from the University of Queensland won the prestigious competition with his presentation 'Breaking the wall of broken glass'. In his winning pitch, Rhys explained how his work took the broken glass currently unable to be recycled and



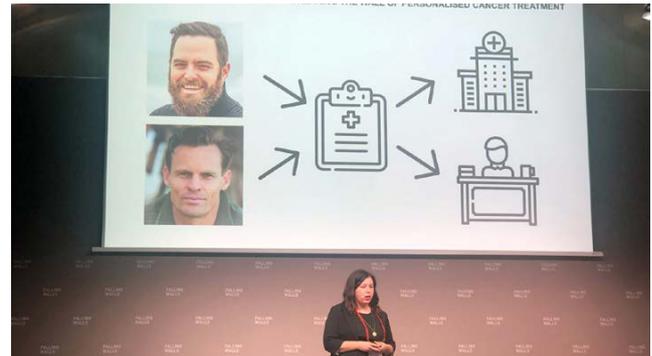
Watch the Falling Walls Lab 2019 video on Youtube: youtu.be/WXt97s4o2fM



Dr Elena Schneider-Futschik on 'Breaking the wall of cystic fibrosis pharmacology'



Mr Pirie had just three minutes to show how he is 'breaking the wall' of broken glass.



Kate Secombe on 'Breaking the wall of personalised cancer treatment'

headed to landfill to create the valuable product sodium silicate.

The **Falling Walls Conference**¹ is a global gathering of innovators and scientists, brought together to share their breakthroughs and plans to impact science and society. Each year the conference is held on the anniversary of the fall of the Berlin Wall, with this year celebrating the 30th year since the wall fell. On the first day of the conference, Falling Walls Lab showcased 100 young innovators from more than 60 countries, who presented their ideas to the high-level jury in just three minutes. This year, Falling Walls Lab featured three Australian innovators.

Dr Elena Schneider-Futschik from the University of Melbourne presented her talk titled 'Breaking the wall of cystic fibrosis pharmacology'. Elena riveted the audience with her work in developing a test which can monitor medication interactions for patients with cystic fibrosis, who take as many as 40 different medications every day.

Kate Secombe from the University of Adelaide challenged the audience to think about the value of their poo in her talk 'Breaking the wall

of personalised cancer treatment'. Kate's work looks at the gut microbiome of patients receiving chemotherapy treatment, with the aim of reducing side effects that can reduce quality of life and prevent patients from being able to work.

In a separate event, Paul Richards, Director of Communications at the Australian Academy of Science, was selected as a judge for **Falling Walls Engage**², the international forum for breakthroughs in science engagement. Paul was selected as a result of the unique success of the Academy in communicating science to the general public.

Past President of the Academy, Professor Andrew Holmes, noted that what makes Falling Walls unique is "the opportunity to meet and discuss challenging topics in the physical, mathematical and social sciences with world leaders". Secretary Education and Public Awareness Professor Hans Bachor sees the event as "a powerful gathering of minds. I saw so many stimulating ideas and was filled with a sense of urgency to act. Falling Walls presents many ideas and techniques for change."

1 <https://www.falling-walls.com/>

2 <https://www.falling-walls.com/engage>



The Academy's Paul Richards (left), judging Falling Walls Engage, which aims to highlight the scientific community's responsibility for the common good and spread scientific literacy, with a special focus on 'hard-to-reach' target groups



There was standing room only at the talk about the Academy's secret to creating engaging science communication, with Dr Hayley Teasdale one of the presenters



The Australian competitors Rhys Pirie, Dr Elena Schneider-Futschik and Kate Secombe with Academy representatives Professor Andrew Holmes and Paul Richards



Dr Hayley Teasdale and Paul Richards with Museum Director General Professor Johannes Vogel

The conference had a huge impact on the young Australian researchers, Dr Schneider-Futschik said. "The days we got to spend here felt like a rapid bootcamp where like-minded creative and innovative people get to compete but also motivate and support each other. We were able to show how we tackle scientific problems and Falling Walls gave us an international platform to share our ideas. This truly was an incredible experience."

Each year, the Academy hosts **Falling Walls Lab Australia**³ to select the Australians to participate in the international finale in Berlin.

Academy features at Berlin Science Week

November 11, 2019

A team from the Academy travelled to Germany in early November to participate in **Berlin Science Week**⁴. 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 ten-year plans and Q&A documents were also displayed and visitors were given the chance to sample some Vegemite to take home. The Academy's exhibit was one of 14 set up throughout the museum.

Visitors to the exhibition ranged from Museum Director General Professor Johannes Vogel and colleagues from the European Research Council to members of the public.

The Australian Embassy in Germany hosted a 'Science in the Pub' networking event one evening, with more than 40 members of the Berlin science community taking part. Australia's

³ <https://www.science.org.au/opportunities/travel/grants-and-exchange/falling-walls-lab-australia>

⁴ <https://berlinscienceweek.com/>



Australia's Ambassador to Germany H.E. Ms Lynette Wood (centre right) with Australian participants and Academy representatives at the 'Science in the Pub' networking event



Paul Richards with a captivated audience in the Museum für Naturkunde Berlin

Ambassador to Germany H.E. Ms Lynette Wood introduced the Academy team and each Falling Walls Lab presenter was given the opportunity to explain their science. Professor Hans Bachor also interviewed National Committees Project Manager Dr Hayley Teasdale and Director of Communications and Outreach Paul Richards about their work at the Academy.

On the second day of the Berlin Science Week exhibition, Professor Bachor, Dr Teasdale and Mr Richards gave a presentation to an audience of more than 70 visitors. There was standing room only to hear about the Academy's secret to creating engaging science communication. The team spoke for an hour with a further 30 minutes of questions from the audience.

After a successful exhibition at Berlin Science Week, the Academy team switched focus to

Falling Walls Lab where three young Australian scientists presented at the Lab competition with **Australian Rhys Pirie**⁵ winning the competition. Professor Hans Bachor led the team, having helped to establish the Academy's relationship with Falling Walls five years ago. Dr Teasdale presented at Falling Walls last year and was invited back to support and advise the Australian team. Mr Richards was invited to judge entries to **Falling Walls Engage**⁶ as a member of the jury.

Margaret Middleton Fund supports innovative ecology projects

November 19, 2019



L–R: Penelope Pascoe, Jackie O'Sullivan and Dympna Cullen.

Three early-career ecology researchers have been awarded funding for 2020 projects thanks to the Australian Academy of Science's Margaret Middleton Fund for endangered Australian native vertebrate animals.

The recipients are:

- Dympna Cullen, PhD candidate, UNSW Sydney
- Jackie O'Sullivan, PhD candidate, Australian National University
- Penelope Pascoe, PhD candidate, University of Tasmania

Ms Cullen's research focuses on a desert-dwelling mammal species, the crest-tailed mulgara. She will use the grant to conduct surveys in the Strzelecki Dunefields to figure out where mulgaras find refuge during periods of drought—knowledge that will inform management of this threatened species.

"I feel very privileged to have the support of the Margaret Middleton Fund," Ms Cullen said. "The funding will contribute considerably to the scope of my research and I am excited by the potential of what I am now able to accomplish."

5 <https://www.science.org.au/news-and-events/news-and-media-releases/australian-scientist-claims-young-innovator-year-falling-walls-berlin>

6 <https://www.falling-walls.com/engage>

Ms O’Sullivan is studying the role of surface rocks as reptile habitat in agricultural landscapes. Many threatened species, such as the striped legless lizard, rely on rocky habitats for survival. However, rocks are often removed from grazing paddocks. Ms O’Sullivan’s experiments will investigate the effects of restoring surface rocks on reptile abundance and diversity.

“The funding will allow me to collect additional environmental data to maximise the scientific and practical value of this restoration experiment,” Ms O’Sullivan said. “I feel incredibly honoured and grateful for the opportunity and recognition.”



Dymrna Cullen holds a crest-tailed mulgara.



Jackie O’Sullivan holds a Cunningham’s skink.



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

Ms Pascoe is undertaking a large-scale evaluation of ecosystem recovery on islands where rodents have been eradicated. She plans to gather data from 30 islands across Australia and New Zealand to assess changes in the whole ecosystem.

“The funding will enable me to collect data from some study sites more regularly, and to include more sites,” said Ms Pascoe. “It was a nice surprise to get it and very beneficial at this early stage in my project.”

Rodent eradication programs are expensive, so monitoring effectiveness is important to ensure the best conservation outcomes. “Islands are both biodiversity and extinction hotspots, which means island conservation efforts have the potential to disproportionately benefit global biodiversity.”

The Margaret Middleton Fund for endangered Australian native vertebrate animals provides grants to support emerging researchers with ecology projects that have tangible conservation outcomes. The fund was established in 2000 with Dr Margaret Middleton, a long-time supporter of the Academy and early-career scientists, who passed away in March this year.

More information about the Margaret Middleton Fund for endangered Australian native vertebrate animals⁷

New resource for increasing diversity in awards

November 20, 2019

A new resource published by the Academy aims to increase the diversity of prize and award recipients in the Australian science, technology, engineering and mathematics (STEM) sector.

Prepared by the EMCR Forum, Australia’s voice for early- and mid-career researchers, the comprehensive publication identifies barriers faced by under-represented groups and provides solutions to overcome them.

It is a practical guide to assist awarding organisations improve their practices and increase diversity among both applicants to and recipients of prizes and awards.

“We are really excited about the positive responses we have received so far,” says the

7 <https://www.science.org.au/opportunities/research-funding/margaret-middleton-fund>

Academy's Manager Diversity and Inclusion, Ms Louise Moes. "This resource demonstrates the Academy's leadership and its commitment to supporting the next generation of science leaders."

The seven-page guide and a one-page summary are available on **the Academy website**⁸.

Prizes and awards are an important component of a scientist's career, potentially affecting their chances of promotion, recruitment and general career progression.

But many awards schemes across Australia display low diversity compared to the broader STEM sector, with women and minority groups consistently under-represented.

"The persistent exclusion of women and minority groups in research cultures has led to an image of successful scientists with which people from diverse backgrounds do not identify," write the authors of the guide.

Key recommendations include:

- reaching a diverse pool of applicants with advertising and messaging that is visually inclusive and avoids elitist language
- using diverse role models and 'champions' to encourage applicants
- ensuring the call for applications is timed appropriately
- incorporating questions about career interruptions into the standard application form
- ensuring selection criteria is sufficiently flexible and that the selection panel is diverse.

The paper arose out of a series of workshops at the EMCR Science Pathways conference and Science at the Shine Dome in 2018, and was a collaborative effort of the EMCR Forum Executive and the Australian Academy of Science.

Read 'Increasing diversity in prizes and awards'⁹

Read the one-page summary¹⁰



Inaugural recipients of the Academy's Aboriginal and Torres Strait Islander Scientist Travelling Research Award (L–R) Amy Searle, Bradley Moggridge and Tui Nolan (see video below). Photo: Bradley Cummings.



Watch the Aboriginal and Torres Strait Islander Scientist Travelling Research Award Curious video on Youtube: youtu.be/77APyCq3yJl

Fellowship recipients for 2020 Australia–India research collaborations announced

November 22, 2019

The Academy has announced the successful recipients of the **Australia–India Strategic Research Fund Early- and Mid-Career Researcher 2020 Fellowships**¹¹.

Each recipient receives up to \$16,500 in funding to conduct research at some of India's leading research institutions.

The fellowship opens doors for connections with global experts within an early- or mid-career researcher's field, provides leadership opportunities and paves the way for long-term international collaborations.

8 <https://www.science.org.au/supporting-science/early-and-mid-career-researchers-0/emcrs/emcr-forum-resources>

9 <https://www.science.org.au/files/userfiles/support/emcr/documents/emcr-improving-diversity-web.pdf>

10 <https://www.science.org.au/files/userfiles/support/emcr/documents/one-page-summary-emcr-improving-diversity-web.pdf>

11 <https://www.science.org.au/opportunities/travel/grants-and-exchange/australia-india-strategic-research-fund-emcr-fellowships>



Dr Alison Pearce of the University of Sydney is one of the recipients of the 2020 AISRF fellowship recipients announced by the Academy.

Fellowship recipients work on a diverse range of subject areas. The Australian National University's Dr Sergey Kruk is one of the researchers heading to India next year. He is working on developing new technologies in photonics to create miniaturised optical systems for use in the telecommunications industry, collaborating with scientists at the Tata Institute in Mumbai.

Deakin University's Dr Fiona McKay will investigate the roles of Punjab women in food production, and the wider issue of global food security. Dr McKay is interested in how people from different groups across the world react to adversity, and her research and collaborations in India with researchers at Chitkara University will build on this. The long-term aim of her work is to influence policy changes to improve food security and gender equity.

Dr Alison Pearce from the University of Sydney has previously led a research project on the impact of cancer across a range of nations. With the fellowship funding she will study the loss of productivity that results from cancer in an Indian population. She will collaborate with the Healis Public Health Institute in Mumbai and the Public Health Foundation India.

The full list of 2020 recipients are:

- **Dr Sumeet Walia, RMIT University**—Harness atomically thin materials for pollution sensors and efficient industrial lubricants
- **Dr Nagendrakumar Singanallur Balasubramanian, CSIRO**—Systems-immunology based approach to study early immune responses to foot-and-mouth disease vaccination in Asian buffalos

- **Dr Ravinesh Deo, University of Southern Queensland**—Developing resilience to climate change and variability for water resources management and food security with artificial intelligence
- **Dr Sergey Kruk, Australian National University**—Photonics at the nanoscale: new disruptive ways to control light with nanotechnology
- **Dr Morteza Saberi, University of Technology Sydney**—Scholarly solution support system
- **Dr Fiona McKay, Deakin University**—Documenting the food insecurity experiences and nutritional status of women in India
- **Dr Suvash Saha, University of Technology Sydney**—Respiratory particle transport: ageing effect and targeted drug delivery
- **Dr Jegadesan Subbiah, University of Melbourne**—In-situ vibrational spectroscopic studies on the electrode interfacial process for renewable energy storage devices
- **Dr Alison Pearce, University of Sydney**—The cost of cancer in India: local estimates of lost productivity due to premature cancer mortality
- **Dr Shuaifei Zhao, Deakin University**—Closing the CO₂ loop in biogas production by innovative membrane technology
- **Dr Siva Krishna Karuturi, Australian National University**—New-generation materials for low-cost and high efficiency solar hydrogen generation
- **Dr Thanh Thi Nguyen, Deakin University**—A human-machine teaming framework based on deep reinforcement learning for disaster management
- **Dr Sonika Tyagi, Monash University**—Using machine learning to develop robust and reproducible miRNA biomarkers to detect preterm labour
- **Dr Sanjay Nimbalkar, University of Technology Sydney**—Sustainable performance of future high-speed rail and heavy haul freight corridors: effect of climate change and mitigation measures
- **Dr Christina Aggar, Southern Cross University**—A mobile digital learning program to support nurses' leadership and

communication skills in chronic disease management: a primary healthcare initiative

- **Dr Rebecca Zwart, University of Southern Queensland**—A genomics approach to understanding root-lesion nematode resistance in chickpea
- **Dr Jency Thomas, La Trobe University**—Metabolic syndrome influencing neurodegenerative disorder (MIND project)
- **Dr Ashmita Sengupta, CSIRO**—Developing functional environmental flows framework to enhance resilience and improve water security under climate change and urbanisation scenarios
- **Dr Kaya Klop Toker, University of Newcastle**—Identification of frog and disease diversity in a remote part of India (Nagaland).

This program is supported by the **Department of Industry, Innovation and Science**¹².

Researchers to study ‘fairy circles’, tree rings and smoke signals with Academy support

November 27, 2019

A collage of recipients of the Thomas Davies Research Grant

Unlocking climate secrets in tree rings, understanding smoke signals and unearthing ‘fairy circles’ are the aims of some of the researchers awarded the Australian Academy of Science’s

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

Seven researchers are recipients of the award this year.

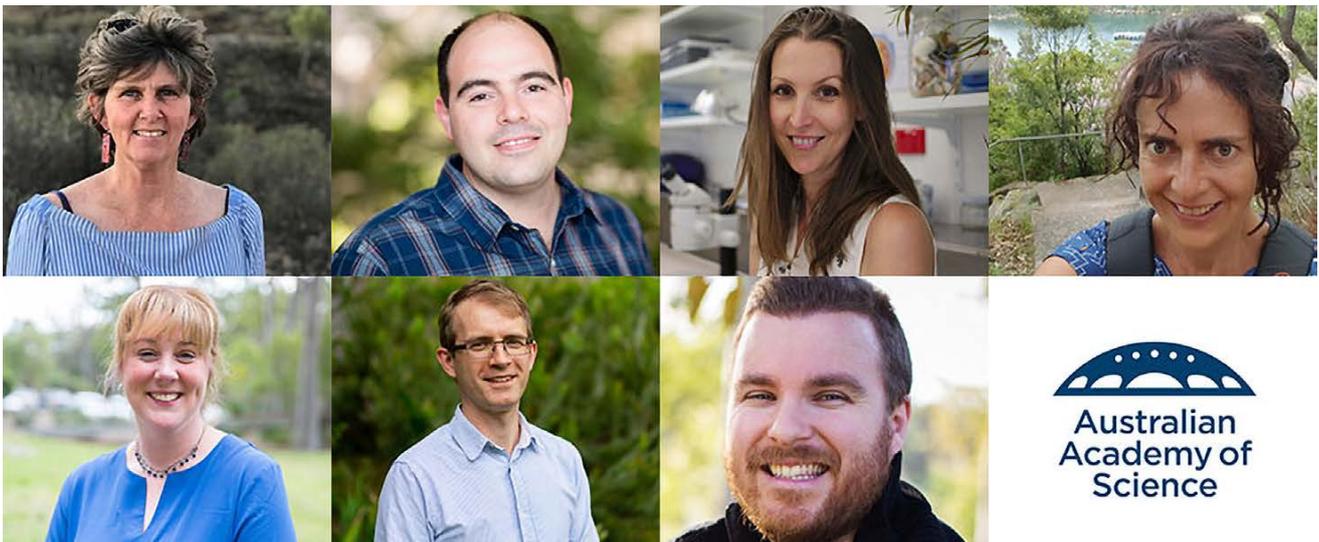
Dr Danielle Verdon-Kidd from the University of Newcastle will use mangroves (*Avicennia marina*) to help reconstruct the climate record in east coast Australia. While Australia only has a short history of instrumental climate data, it does have natural archives—such as corals, tree rings and cave formations—that can be exploited to show our past climate.

Mangroves can live for hundreds of years and record environmental information in their wood, including wood density, vessel arrangement and isotopic composition. By studying the species, scientists have the potential to reconstruct the pre-instrumental record of rainfall and streamflow events and help unlock the flood and drought history of Australia’s east coast.

Dr Mark Waters from the University of Western Australia will study interactions between light and smoke signals in plant development, using mutant seedlings of rockcress, a small flowering plant related to cabbage and mustard.

“This project is fundamental in nature and will increase our knowledge of how plants sense changes in their environment and respond accordingly,” said Dr Waters.

Dr Fiona Walsh, consultant ethno-ecologist from the Northern Territory, will investigate the patterns



Recipients of the Thomas Davies Research Grant in 2019. Top (from left): Dr Fiona Walsh, Dr Edwin Lampugnani, Dr Jennifer Lavers and Dr Elisabeth Strain. Bottom (from left): Dr Danielle Verdon-Kidd, Dr Mark Waters and Dr Simon Williams.

¹² <https://www.industry.gov.au/funding-and-incentives/collaborating-with-india-on-science-and-research>

of bare circular patches known as ‘fairy circles’¹³. Widespread across desert spinifex grasslands, these patches are pavements over the top of active or inactive termite colonies.

Desert termites are fundamental to the structure of soils, grasslands and the ecology of deserts. Termites convert dry spinifex and bulk grasses to animal foods and are described as the ‘kill of the desert’ as food for reptiles, echidnas, birds and small mammal species.

The project draws on ecological methods and the knowledge of Aboriginal desert people, who used termites and termite pavements in many complex ways.

Dr Elisabeth Strain from the University of Melbourne will investigate the role of kelp in mitigating ocean acidification and its capacity to dampen nearshore waves—a key ecosystem service that could help reduce coastal erosion.

Dr Jennifer Lavers from the 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 from the University of Melbourne will study plant cell wall biology using the common liverwort *Marchantia* as a model for how flowering plants make cellulose—the main substance that gives plant cell walls strength and stiffness and is also used to make paper and cloth.

Dr Simon Williams from the 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 infection by plant diseases.

The Thomas Davies Research Grant for Marine, Soil and Plant Biology is funded through a generous philanthropic bequest from the estate of the late Thomas Lewis Davies to the Academy.

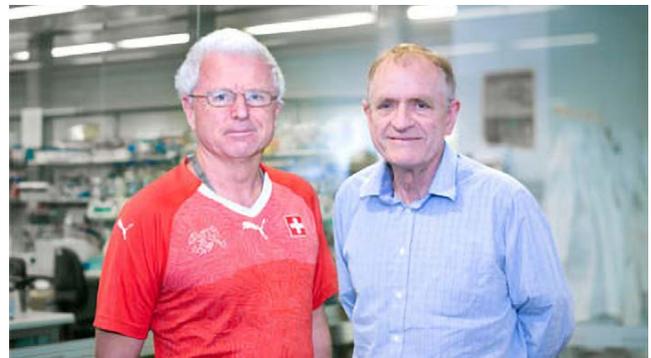
The award will open for applications for the 2021 round early next year. Science grants of up to \$20,000 are available for early- and mid-career

researchers in the fields of marine, soil and plant biology.

More about the Thomas Davies Research Grant¹⁴



The role of BCL-2 in cell survival was explored in the early years by a research team including Jerry Adams, Suzanne Cory, Andreas Strasser and David Vaux.



Academy Fellows Professor Andreas Strasser and Professor David Vaux.

Academy Fellows awarded 2019 CSL Florey Medal

November 27, 2019

Academy Fellows Professor David Vaux and Professor Andreas Strasser have been awarded the 2019 CSL Florey Medal for their research toward understanding the role of programmed cell death, known as apoptosis, in cancer and autoimmune disease.

The molecular biologists work at the Walter and Eliza Hall Institute of Medical Research where they have been making important discoveries over the last 30 years into the control of apoptosis and how this knowledge can be exploited to develop new medical treatments for cancer and other diseases.

Apoptosis ensures that old or damaged cells die and don't remain to cause disease. It is an

¹³ <https://www.flickr.com/photos/133774061@N07/sets/72157668732621304/>

¹⁴ <https://www.science.org.au/opportunities/research-funding/thomas-davies-research-grant-marine-soil-and-plant-biology>

important process in living organisms, both during development and for ensuring homeostasis.

Work by the researchers identified that the function of a protein named Bcl-2 was to stop apoptosis and keep cells alive. By studying the role and regulation of Bcl-2, they showed that not all cancer is caused by uncontrolled cell multiplication, it can also be caused by cells that do not follow the normal program of cell death—effectively they ‘fail to die’.

New field of investigation

The findings of Professor Vaux and Professor Strasser have sparked a whole new field of investigation into apoptosis and the origins of cancer and autoimmune disease. Their work has also led to the development of new treatments based on drugs designed to inhibit Bcl-2 and its relatives and thus encourage normal cell death.

On the basis of their findings, a potent new inhibitor of Bcl-2, developed by others at the Walter and Eliza Hall Institute in collaboration with US pharmaceutical companies Genentech (a member of the Roche Group) and AbbVie, is now being used to treat leukaemia around the world. Other group leaders at WEHI who were also involved in the generation of this powerful new treatment for cancer include Jerry Adams, Suzanne Cory, David Huang, Philippe Bouillet, Peter Colman, Keith Watson, Guillaume Lessene, Andrew Roberts, Ben Kile and Peter Czabotar.

The Australian Institute of Policy and Science established the Florey Medal in 1998, named in honour of Sir Howard Florey, the Australian Nobel Prize-winning scientist who developed penicillin. Academy Fellows feature strongly: the inaugural award in 1998 was made to Professor Barry Marshall and Professor Robin Warren, who since became Academy Fellows and Nobel Laureates. Another six Fellows have also received the award.

The medal is awarded biennially to an Australian researcher or researchers for significant lifetime achievement in biomedical science or human health advancement. In addition to the silver medal, there is a prize of \$50,000 thanks to the support of CSL Limited.

See the full list of past Florey Medal recipients¹⁵

International news

November 28, 2019



Professor Frances Separovic with Dr Liang-Gee Chen, Taiwan's Minister of Science and Technology

Fellow represents Academy at Taiwan celebration

Academy Fellow Professor Frances Separovic recently attended the 2019 Global Science and Technology Leaders Forum in Taipei to celebrate the 60th anniversary of the establishment of Taiwan's Ministry of Science and Technology. The event was attended by more than 300 academics, business representatives and officials from 18 countries and territories including Australia, France, Germany, India, Japan, the UK and the USA.

Discussions focused on areas such as artificial intelligence, biotechnology, and information and communication technology, as well as strategies for furthering cooperation on global research projects.

Professor Separovic spoke at the forum, giving an Australian perspective of the role of academies of science in promoting global research cooperation and networking. She also participated in a roundtable discussion on how to strengthen science, technology and innovation cooperation between nations and encourage future academic and industry talents in science and technology.

As part of a program of site visits, Professor Separovic toured the NTU Cancer Center, the Taiwan Semiconductor Manufacturing Company Ltd (TSMC) and the National Applied Research Laboratories (NARLabs-Space).

¹⁵ <https://aips.net.au/florey-award/the-florey-medal/>



At the symposium were (from left) Professor Melanie Bahlo from the 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.

Australia–China symposium on precision medicine a success

The Academy, in collaboration with the Australian Academy of Technology and Engineering (ATSE) and the Chinese Academy of Sciences, held the 15th symposium between Australia and China at Werribee in October on the topic of precision medicine.

Academy Fellow Professor Bob Williamson and Dr Anna Lavelle and Professor John Skerritt from ATSE were the Australian co-convenors of the symposium. Twenty-five Australian and Chinese experts in areas related to precision medicine delivered presentations on current research and challenges in this important field under seven sub-themes.

Seven early- and mid-career researchers (EMCRs) from Australia and China were supported to attend the event to observe the proceedings and present posters on their own research. Dr Shafagh Waters from UNSW and Professor Daming Gao from the Shanghai Institutes for Biological Sciences won best poster presentations.

Professor Jiarui Wu from the Shanghai Institutes for Biological Sciences of the Chinese Academy of Sciences led the Chinese delegation. Academy President Professor John Shine and ATSE President Professor Hugh Bradlow opened the symposium and welcomed the participants.

Chinese delegates visited facilities at Murdoch Children’s Research Institute, the Walter and Eliza Hall Institute of Medical Research and Dementia Australia to further understand the emerging



Participants of the 2019 Australia–China symposium on precision medicine.

developments in this field from an Australian perspective. See the full symposium program.

The annual symposia series promotes scientific engagement between eminent researchers from the two countries. This event has been funded by the Australian Government Department of Industry, Innovation and Science under the Australia–China Science and Research Fund.

Sign up to receive science policy and diplomacy news

November 28, 2019

The Academy has responded to feedback from stakeholders and is producing a new **Science Policy and Diplomacy newsletter**¹⁶, which highlights important science policy discussion and events in Australia and around the globe. It reports on the involvement of science in national and international policy and diplomacy, and the Academy’s contributions to these discussions.



The first issue of the newsletter links to the International Science Council’s action plan for advancing science as a global public good.

The big challenges and opportunities for nations around the world in the 21st century—economic, environmental, scientific and social—

are inherently global in nature and science has a critical role to play in helping to understand and respond to challenges and realise opportunities.

16 <https://www.science.org.au/news-and-events/newsletters/science-policy-and-diplomacy-newsletter>

The newsletter is aimed at people working in STEM and policy with an interest in science, technology and emerging research to inform discussion and assist evidence-based policy development and decision-making. It is also for those who engage in soft power activities through their national and global science networks.

The first issue includes links to the International Science Council's action plan for advancing science as a global public good; an InterAcademy Partnership report on addressing Africa's challenges; and an ACOLA report on the impact of artificial intelligence in Australia.

The newsletter also highlights the ongoing work of the National Committees for Science and the Academy's policy team, who regularly provide feedback to government consultations. National Committees have recently made submissions on the Australian agricultural sector growth target, the inquiry into prerequisites for nuclear energy in Australia, and proposals to the reform of the government's data sharing and release legislation.

The Science Policy and Diplomacy newsletter will be produced three times per year.

Subscribe to the Science Policy and Diplomacy newsletter¹⁷



Registrations open for Catalysing Gender Equity 2020

November 28, 2019

Registrations are now open for **Catalysing Gender Equity 2020**¹⁸ on Thursday 20 and Friday 21 February at the Adelaide Convention Centre.

Catalysing Gender Equity 2020 will bring representatives of research, industry, education

and government organisations to celebrate success, showcase impact and growth potential, highlight key action areas and foster collaboration to achieve change, all guided by the six opportunities of the **Women in STEM Decadal Plan**¹⁹.

Delegates will hear from inspiring speakers and participate in a variety of workshops, seminars, gallery submissions and panels, each focused on progressing and implementing strategic recommendations and opportunities in the decadal plan.

The event is a unique opportunity to connect leaders and contributors from across the STEM ecosystem. This conference will be a key national moment to advance gender equity in STEM, while strengthening collaborations, building new networks and sharing evidence-based best practice.

The registration fee for the full two days is \$450 and a reduced rate of \$350 is available for students (undergraduate, PhD and masters), not-for-profit organisations, and small businesses of less than 15 employees.

In addition, all delegates can join SAGE in celebrating recipients of the Athena SWAN Institutional Bronze Awards at the SAGE Awards Dinner on 20 February being held at the Adelaide Town Hall. Dinner tickets are \$165 per person.

Opportunities to support attendance

STEM Women²⁰, a database of women in STEM developed by the Academy, is offering funding to support exceptional and diverse changemakers in the STEM Women community to attend Catalysing Gender Equity 2020. **STEM Women Changemaker**²¹ applications close 13 January 2020.

To facilitate delegate attendance at the conference, onsite child minding, carers grants and accessibility provisions such as closed captioning can be made available. We encourage those requiring support to outline their requirements during the registration process.

¹⁷ <https://newsletter.science.org.au/h/i/B556CA49FE52FE92>

¹⁸ <https://aas.eventsair.com/catalysing-gender-equity/>

¹⁹ <https://www.science.org.au/support/analysis/decadal-plans-science/women-in-stem-decadal-plan>

²⁰ <https://www.stemwomen.org.au/>

²¹ <https://aas.eventsair.com/catalysing-gender-equity/changemakers>

The Academy has **partnership opportunities available**²² for organisations to support discounted attendance rate for students and small businesses, and the inclusion of accessibility provisions throughout the conference.

Opportunity to contribute

The Equity Action Gallery provides a space to share the knowledge and experience gained from the abundance of equity projects in Australia. Space is available for organisations and individuals to provide a poster or flyer outlining the goals and impacts of their projects.

We encourage all interested organisations and individuals to contribute. You do not need to attend Catalysing Gender Equity 2020 to display your project.

This event is hosted by the Academy in collaboration with Science in Australia Gender Equity (SAGE).



Watch the Women in STEM Decadal Plan Curious video on Youtube: youtu.be/3HQwualcdC8²³

Young researchers benefit from genomes and biodiversity workshop

November 28, 2019

A recent successful research and career development workshop, **Genomes and Biodiversity: Research and Career Development**²⁴, has supported young researchers and assisted them to make connections with others that will strengthen their work.

Fifty early- and mid-career researchers (EMCRs) and PhD students in the life sciences joined the three-day event at the University of Sydney, which included hands-on training in managing big data, professional development and opportunities to present their research.

Academy Fellow Professor Steve Simpson from the University of Sydney opened the event, followed by Fellow Professor Edward Holmes, also from the university, who made the keynote presentation. Dr Ida Moltke from the University of Copenhagen presented on highlights from genetic studies of the Greenlandic population, and the event concluded with a public talk by Dr Rebecca Johnson from the Australian Museum.

Attendees provided very positive feedback and made the most of the opportunity to network with other researchers from different backgrounds, reinforcing how important it is to their careers that the Academy supports these types of activities. Several mobility grants were offered to make it possible for a diversity of participants to attend.



EMCRs and PhD students in the life sciences made the most of the opportunity to network with other researchers from different backgrounds

²² <https://aas.eventsair.com/catalysing-gender-equity/partnerships>

²³ <https://youtu.be/3HQwualcdC8>

²⁴ <https://aas.eventsair.com/genomes-and-biodiversity/>

This was the second event of this round of the Theo Murphy Initiative. The **Theo Murphy Initiative (Australia)**²⁵ supports activities which provide tangible benefits to Australia's EMCR community, with the overall goal of furthering scientific discovery. Activities are managed by the Academy and funds are made available by the generous support of the Royal Society through the Theo Murphy (Australia) Fund.

The Genomes and Biodiversity workshop was supported by the Academy through the Theo Murphy Initiative, the University of Sydney and the University of Copenhagen.

Submissions to government— September to November 2019

November 28, 2019

The National Committee for Antarctic Research made a submission for the revision of the Australian Antarctic Science Strategic Plan, taking into account new scientific developments and changes in national strategy, capability and resourcing.

The Academy has made the following **submissions to government**²⁶ since September.

Inquiry into evidence-based regulation of farm practices that impact water quality outcomes in the Great Barrier Reef

The Academy made a **submission to the Inquiry into the identification of leading practices in ensuring evidence-based regulation of farm practices that impact water quality outcomes in the Great Barrier Reef**²⁷. It expressed its strong support for the principle that public policy should be informed by the best available evidence, in this case evidence synthesised in the *2016 Reef Report Card*, expert advice as represented by the *2017 Scientific Consensus Statement: Land use impacts on Great Barrier Reef water quality and ecosystem condition*, and the *Great Barrier Reef Outlook Report 2019*.

Consultation on Data Sharing and Release Legislative Reform

The Academy made a joint submission with the Australian Academy of Technology and Engineering to the **consultation on Data Sharing and Release Legislative Reform**²⁸ addressing proposed changes to legislation on the sharing of public data collected through government services.

Inquiry into the prerequisites for nuclear energy in Australia

The Academy made a **submission to the Inquiry into the Prerequisites for Nuclear Energy in Australia**²⁹. It identifies key areas of concern for small modular reactors including waste management, public health, and energy affordability and reliability.

Inquiry into growing Australian agriculture to \$100 billion by 2030

The Academy's National Committee for Agriculture, Fisheries and Food made a joint submission with the Australian Academy of Technology and Engineering to the **House of Representatives Standing Committee on Agriculture and Water Resources**³⁰. They commend the target but acknowledge it will not be achieved without addressing the threat of climate change.

Square Kilometre Array Observatory Treaty

The Academy's National Committee for Astronomy made a submission to parliament in support of the **convention establishing the Square Kilometre Array Observatory**³¹, a key aspect of the international 'big science' project to establish the world's largest radio telescope.

Space Infrastructure Fund (SIF): Mission Control Centre Consultation Paper

The Academy's National Committee for Space and Radio Science made comments on the **proposed funding scheme for the SIF: Mission**

25 <https://www.science.org.au/opportunities/conference-and-lecture-funding/theo-murphy-initiative-australia>

26 <https://www.science.org.au/supporting-science/science-policy-and-analysis/submissions-government>

27 <https://www.science.org.au/supporting-science/science-policy-and-analysis/submissions-government/aas-submission-reef-science>

28 <https://www.science.org.au/supporting-science/science-policy-and-analysis/submissions-government/aas-atse-submission-data-sharing-and-release>

29 <http://www.science.org.au/supporting-science/science-policy-and-analysis/submissions-government/aas-submission-nuclear-power>

30 <http://www.science.org.au/supporting-science/science-policy-and-analysis/submissions-government/ncaff-atse-submission-growing-australias-agriculture>

31 <https://www.science.org.au/supporting-science/science-policy-and-analysis/submissions-government/convention-establishing-ska-observatory>

Control Centre³² to ensure the centre can be regarded as a national facility supporting operational, educational and research opportunities in space and radio science.

Revision of the Australian Antarctic Science Strategic Plan 2011–12 to 2020–21

The Academy's National Committee for Antarctic Research made a submission of **10 recommendations to the Australian Antarctic Science Council**³³ for the revised strategic plan, taking into account new scientific developments and changes in national strategy, capability and resourcing.



New Foreign Member of the Russian Academy of Sciences, Professor Yuri Estrin (left), and Professor Margaret Reid receiving the Moyal Medal. Image (right) courtesy of Macquarie University

Fellows update—November 2019

November 28, 2019

Honours and Awards to Fellows

Professor David Vaux and Professor Andreas Strasser—jointly awarded the CSL Florey Medal by the Australian Institute of Policy and Science for their research toward understanding the role of programmed cell death in cancer and autoimmune disease. **Read about this award**³⁴

Emeritus Professor Patrick De Deckker AM FAA—awarded the Brady Medal by the Micropalaeontological Society for a major influence on micropalaeontology by means of a substantial body of excellent research

Professor Margaret Reid FAA—awarded the Moyal Medal and Lecture by Macquarie University for outstanding contributions to the field of physics

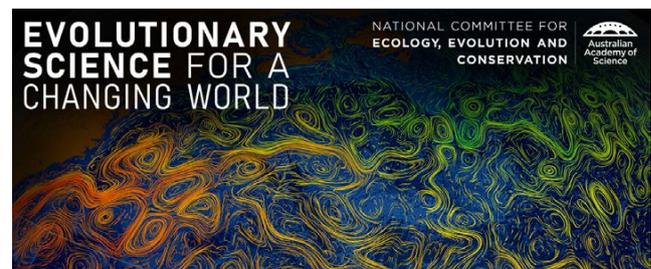
Professor Lois Salamonsen—awarded a Lifetime Achievement Award by Monash University

for leading major advances in the field of endometrial biology

Professor Yuri Estrin FAA—elected as a Foreign Member of the Russian Academy of Sciences

Professor Chennupati Jagadish AC FAA FTSE—appointed Editor-in-Chief of Applied Physics Reviews

Coming events



Evolutionary science for a changing world

Evolutionary science has helped us to understand the world in many ways. Exploring how aspects of dynamic biological and socio-economic systems have evolved allows us to predict and manage change, especially in more simple systems. Evolutionary science has contributed to rescuing endangered species, improving crops and livestock, informing strategies to increase resilience to climate change, and slowing the evolution of resistance to control measures in pathogens and pests. The evolvability—or capacity for a system to adapt—has been manipulated in all of the above examples.

Understanding evolvability in multilayered, interacting systems remains a challenge, but it is key to understanding innovation and to managing responses to accelerating environmental change. Potential solutions to this challenge—evolutionary science theory and tools—have emerged in different sciences but have been largely disconnected. This event brings together experts from multiple disciplines to discuss how evolutionary science can benefit our changing world.

Refreshments served from 5.30 pm, with the talk 6.00 pm to 7.30 pm.

³² <https://www.science.org.au/supporting-science/science-policy-and-analysis/submissions-government/sif-mission-control-centre-consultation-paper>

³³ <https://www.science.org.au/supporting-science/science-policy-and-analysis/submissions-government/revision-antarctic-strategic-plan>

³⁴ <https://www.science.org.au/news-and-events/news-and-media-releases/academy-fellows-awarded-2019-csl-florey-medal>

Chair:

Professor Craig Moritz ³⁵, Australian National University

Speakers:

Professor Lindell Bromham ³⁶, Australian National University

Professor Paul Griffiths ³⁷, University of Sydney

Professor Adrienne Nicotra ³⁸, Australian National University

Professor Nina Wedell ³⁹, University of Exeter

Professor Bob Williamson ⁴⁰, Australian National University and CSIRO DATA61

Date: Monday 2 December

Time: 5.30pm – 7.30pm

Venue: The Shine Dome



Changing lives with science— Innovating the everyday: our built environment and transport

Dr Danielle Moreau ⁴¹ (UNSW Sydney), and John Noble from **Seeing Machines** ⁴²

Features of our everyday lives such as driving, flying and noise, are constantly being researched and reconfigured. Join us to hear from two speakers designing, innovating and changing our everyday.

Dr Danielle Moreau is a member of UNSW's Flow Noise Group. She investigates how the flow of fluids creates sound, and how this noise can be controlled. Danielle's research aims to quieten modern technologies such as submarines, wind turbines and aircraft.

Mr John Noble is from Seeing Machines, a Canberra-based company leading the world in driver-machine interaction. He leads a team of more than 40 people in the Advanced Engineering Group. This team is responsible for developing the algorithmic and optical assets of Seeing Machines' core technology, as well as supporting business development activities with system performance simulation and validation tools, technology demonstrators and field support engineering services.

Refreshments served from 5.30pm, with the talk 6.00pm-7.00pm.

With thanks to our Exclusive Presenting Partner, University of Canberra.

This is the final event in a six-part series. Throughout this series we will hear remarkable untold science stories. Join us for tales of innovation, research, breakthroughs, and how science is solving the big challenges of our time. Visit the academy's event page for more information and tickets to other talks.

Date: Tuesday 10 December 2019

Time: 5.30pm–7.00pm

Location: The Shine Dome

Price: \$15 per person

Empowering regional research

Early- and mid-career researcher (EMCRs) in science, technology, engineering and mathematics (STEM) working for employers located in regional Australia face unique challenges that can affect their career development.

Opportunities to access professional development and networking with potential collaborators can be limited compared to the opportunities EMCRs in metropolitan areas can have access to.

The Empowering Regional Research conference aims to provide EMCRs with an opportunity for

³⁵ <https://biology.anu.edu.au/people/craig-moritz>

³⁶ <https://biology.anu.edu.au/people/lindell-bromham>

³⁷ <https://sydney.edu.au/arts/philosophy/staff/profiles/paul.griffiths.php>

³⁸ <https://biology.anu.edu.au/people/staff-profiles/adrienne-nicotra>

³⁹ https://biosciences.exeter.ac.uk/staff/profile/index.php?web_id=nina_wedell

⁴⁰ <https://people.csiro.au/W/B/Bob-Williamson>

⁴¹ <https://www.engineering.unsw.edu.au/mechanical-engineering/staff/dr-danielle-joy-moreau>

⁴² <https://www.seeingmachines.com/about/>



professional development, focussing on building skill in key areas that are applicable to industry, academia and other areas, and transferrable across different fields.

The event will be held on 12-13 February 2020 at the University of New England in Armidale, NSW.

Early bird registrations are now open.

Who should join?

EMCRs working in academic institutions or research organisations outside of major cities are invited to register. EMCRs are defined as researchers who have received their PhD within the last 15 years (excluding any periods of career interruption).

The program of the conference might be most useful for early career stage researchers. PhD and masters

Why should you join?

The program for the conference is designed to empower attendees with the key skills required to build successful careers in academia, industry and/or government through professionally facilitated sessions.

Topics include:

- Time management and prioritisation
- Communicating Research to diverse audiences and stakeholders
- Building a professional profile and online presence
- Key leadership skills and strategic planning

Mobility grants

Through the Theo Murphy Initiative (Australia), the Australian Academy of Science is offering a number of mobility grants to support a diversity of EMCRs to attend the conference.

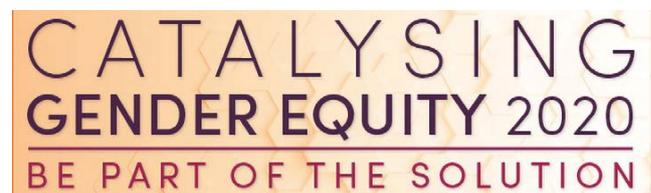
The mobility grants are designed to offset the expenses associated with attending for those participants who may not be able to attend without support, and/or people from traditionally underrepresented demographics.

The mobility grants can be used to cover costs associated with attendance to the event, such as caring responsibilities, travel, accommodation and other support required to facilitate your attendance.

To be considered for a mobility grant **complete the application form by Sunday 5 January 2020**⁴³.

The Theo Murphy Initiative (Australia)

The **Theo Murphy Initiative (Australia)**⁴⁴ supports activities which provide tangible benefits to Australia's early- and mid-career researcher (EMCR) community, with the overall goal of furthering scientific discovery. Activities are managed by the Australian Academy of Science and funds are made available by the generous support of the Royal Society through the Theo Murphy (Australia) Fund.



Catalysing Gender Equity 2020

The Australian Academy of Science, in collaboration with Science in Australia Gender Equity (SAGE), invites you to join us at Catalysing Gender Equity 2020, a two-day outcome-driven conference guided by the **Women in STEM Decadal Plan**⁴⁵.

Representatives from across higher education and research, industry, education and government will be provided space to celebrate success, showcase impact and growth potential, highlight key action areas and foster collaboration to achieve change, all guided by the six opportunities of the decadal plan.

⁴³ <https://aas.eventsair.com/empowering-regional-research/mobility-grants>

⁴⁴ <https://www.science.org.au/opportunities/conference-and-lecture-funding/theo-murphy-initiative-australia>

⁴⁵ <https://www.science.org.au/support/analysis/decadal-plans-science/women-in-stem-decadal-plan>

Delegates will participate in a variety of workshops, seminars, gallery submissions and panels, each focused on progressing and implementing strategic recommendations and opportunities in the decadal plan.

Catalysing Gender Equity 2020 is an excellent opportunity to connect leaders and actors from across the STEM ecosystem, including SAGE members. It will enable them to strengthen collaborations, build new networks and share evidence-based best practice.

In addition, all attendees can join SAGE in celebrating recipients of the Athena SWAN Institutional Bronze Awards at the SAGE Awards Dinner on 20 February.

Please visit the **event website**⁴⁶ for more information and to secure your place.

Date: 20 – 21 February 2020

Venue: Adelaide Convention Centre

Fenner conference on the environment: Managing wild and weedy Australia across boundaries and disciplines

8:00 AM February 17 - 1:00 PM February 23

This innovative conference has been designed for a select group of expert researchers, policy makers and practitioners to devise a transformation in Australian weed management. We will be driven by the question:

What are the highest priority actions we can commit to, working together across boundaries and disciplines, that will deliver the greatest contribution to radically improved weed management research, policy and practice in Australia?

The conference will use creative formats and methods delivered by a professional facilitator that encourage deep discussion and debate rather than presentations of research results. This will be aided by the involvement of two eminent Australian social and ecological scientists, Professor Lesley Head and Professor Richard Hobbs FAA.

Book online⁴⁷



Science at the Shine Dome 2020

9:15 AM May 26 - 4:30 PM May 28

Science at the Shine Dome is a three-day event in May each year where Australia's most influential scientists gather at the Shine Dome in Canberra to celebrate science and to honour outstanding achievements in science.

Science at the Shine Dome is an event for researchers from all disciplines and career levels to come together and share knowledge. This includes the admission of new Fellows to the Australian Academy of Science, national awards to honour excellence at all career levels, a networking gala dinner with industry and political representatives, and a high-powered symposium on an issue of national importance. A major focus at Science at the Shine Dome is giving early- and mid-career researchers professional development and the opportunity to engage with senior scientists.

Science at the Shine Dome attracts a national and international audience of over 400 people and boundless networking opportunities with Australian Academy Fellows, chief scientists, Nobel Prize winners, early and mid-career researchers, government representatives, politicians, media, science associated organisations, and the science interested general public. Online, Science at the Shine Dome reaches audiences of over 500,000 people on a range of social media and digital technology platforms to make the event truly global in every sense.

Join us to celebrate the excellence of Australian science!

Day 1 | Tuesday 26 May

Annual Symposium – Science and the Public Good

Science affects every aspect of our lives. Our health, education, transport, environment, food, communications, work and recreation all benefit from scientific discoveries.

⁴⁶ <https://aas.eventsair.com/catalysing-gender-equity/>

⁴⁷ <https://wild-and-weedy.com/>

Scientific knowledge is a public good: it is generated for the benefit of society and underpins technological and social advancement. Some discoveries are the result of wanting to know more about ourselves and the world, others solve a problem or improve our capacity to live sustainably with our planet.

Join us at the Australian Academy of Science's annual symposium in May 2020 as we explore the value of science to everyone. At 'Science and the public good', Australian and international speakers will help us explore the critical importance of studying mathematics, chemistry, biology and physics, and how this fundamental knowledge is essential to scientific advances.

We will also tackle some big questions, such as where should we focus our efforts and resources? How do we set boundaries for scientific discovery while allowing the freedom to take risks? And how can people have a say in the future of science?

The speakers are as follows:

- Professor Naomi Oreskes
- Payne-Scott Professor Nalini Joshi
- Professor Wendy Hoy
- Dr Matt Agnew
- Professor Michelle Simmons
- Dr Darryl McGill
- Dr Ben Greene
- Professor Andrew Holmes
- Associate Professor Justin Chalker
- Sophia Hamblin Wang
- Professor Andrew Cockburn
- Professor Neena Mitter
- Dr Liz Barbour
- The Hon Dr Annabelle Bennett

New Fellows Admission Ceremony

Our newest Academy Fellows will be formally admitted to the Australian Academy of Science, followed by a cocktail reception. All are invited to join us celebrate the significant achievements of the Academy's New Fellows.

Day 2 | Wednesday 27 May

New Fellows seminars

Following their Admission on Tuesday evening, each New Fellow will present their work and achievements in the Ian Wark Theatre. All talks are 10 minutes and aimed at a general science audience. This is a unique opportunity to hear from leading scientists from a wide range of disciplines at the one event, in the one room, as well as network extensively.

Annual gala dinner

The gala dinner, to be held at Hotel Realm, is an opportunity to celebrate and network, as well as hear from special guest speakers. The Macfarlane Burnet Medal will also be presented on the night.

Day 3 | Thursday 28 May

Awards presentations

Each year, researchers receive highly sought-after honours for outstanding achievements in their specific fields. These awardees will be presented with their medals and recognised for their work.

EMCR workshops

Four workshops will be available to EMCRs on a range of professional development topics, such as media, presentations skills and more. EMCRs are invited to join us for these workshops to develop important skills relevant to their careers.

Annual general meeting

The AGM is a closed session for Fellows of the Academy.