



Left: Professor Lyn Beazley with her choice read of 2019, 'Darwin's Backyard: How Small Experiments Led to a Big Theory'. Photo: Murdoch University. Right: Professor The Honourable Barry Jones with his favourite book of this year, 'Thomas Cromwell: A Life'. Photo: Paul Burston/University of Melbourne.



Message from the Acting Chief Executive

December 18, 2019

At the end of 2019, we thank you for your readership and support. This year has been a busy one for the

Australian Academy of Science, and I would like to acknowledge our Fellows who dedicate their time, efforts and expertise to advance science in Australia and internationally. Thank you.

As always, this month's newsletter provides a diverse snapshot of the Academy's work—from science policy and recognising excellence with awards, to international engagement and diversity and inclusion.

We are delighted to announce our new publication, Science Matters, which features stories from philanthropy and partnerships at the Academy. We invite you to enjoy these heart-warming tales and discover the incredible impact of giving.

As we move into a new decade, the Academy is looking back at our rich history. We are reinvigorating our Interviews with Australian Scientists program in a new podcast format and

we ask you to support our efforts to conserve the stories of our fantastic Fellows.

If you're looking to escape with a good story, we've compiled our annual list of book and podcast recommendations from our Fellows. This year's list features more than 50 recommendations to inject more wit, wisdom and wonder into your summer holidays.

And while on the subject of podcasts, SAGE has a new podcast where you'll hear from individuals and institutions about their gender equity, diversity and inclusion journey.

Wishing you and your loved ones a safe and happy holiday season.

David Perceval

Academy Fellows recommend books and podcasts to enjoy this summer

December 12, 2019

What are the biggest questions facing humanity? What are the secrets and motivations behind Darwin's scientific journey? How might a small Australian country town react to a terrible crime event? These questions, and many more, are tackled in the Annual Fellows' Christmas book and podcast list 2019.

As we have for the past four years, we asked our Fellows to provide their top book suggestions for the year—and this time we've included a few podcasts in the list too.

Of the 51 recommendations, there is sure to be something of interest for everyone. Many of the books are of a scientific bent, but they range from new release fiction and classic pieces of literature to biographies and other non-fiction.

Some are inspirational, some are eye-opening, thought-provoking or nostalgic, and others are purely great entertainment.

Download the Fellows' book and podcast list¹

To inject more wit, wisdom and wonder into your summer holidays, following is a sample of the 2019 list contributed by some of Australia's most outstanding minds.

Books

Thomas Cromwell: A Life, by Diarmaid MacCulloch

Recommended by Professor The Honourable Barry Jones AO FAA FTSE

MacCulloch is Professor of Church History at Oxford, author of *The History of Christianity* and an accomplished television presenter. Hillary Mantel who knows a thing or two about Thomas Cromwell writes 'this is the biography we have been waiting for for 400 years'. MacCulloch's scholarship, analytical and narrative gifts are outstanding and—despite the grim outcome for Cromwell and so many major characters—often amusing, even hilarious. I read it twice, first very fast, then slowly to savour every line. Don't miss it.

Darwin's Backyard: How Small Experiments Led to a Big Theory, by James T. Costa

Recommended by Professor Lyn Beazley AO FAA FTSE

This book is a truly engaging journey from Darwin's childhood through to Down House, his bustling home of forty years, where he kept porcupine quills at his desk to dissect barnacles, maintained a flock of sixteen pigeon breeds in the dovecote, and cultivated climbing and carnivorous plants in the study. He was truly the first 'community scientist', engaging naturalists, friends, neighbours, family servants, and even family as

assistants in his experiments. It was from the results of these experiments that he plumbed the laws of nature and evidence for the revolutionary arguments of *On the Origin of Species* and his other watershed works.

The Overstory, by Richard Powers

Recommended by Professor David Celermajer AO FAA

This powerful book is about the importance of trees to the planet but is so much more than this; beautiful literature, stunning insights into what motivates humans to join a cause and some wonderful science about botany. Of the stories describing the several main characters in Part One of the book, the (partly fact-based) story of the shy but committed scientist who discovers the way that trees communicate with each other and finds love despite her isolation is one of the most splendid short stories you will ever read.

Also recommended by Professor Ian Dance FAA

Winner of the Pulitzer Prize in Fiction 2019.

A collection of interlocking fables, with a central theme of trees. A fact-filled panegyric for old-growth forests in the US, and stories about those who want to preserve them.

Also recommended by Professor John Evans FAA

A weird mix of stories about trees and how humans fail to comprehend what trees achieve because our lives operate at completely different speeds.

Scrublands, by Chris Hammer

Recommended by Professor Roger Tanner FAA

Set in a fictional Riverina town at the height of a devastating drought, *Scrublands* is one of the most powerful, compelling and original crime novels to be written in Australia. In an isolated country town brought to its knees by endless drought, a charismatic and dedicated young priest calmly opens fire on his congregation, killing five parishioners before being shot dead himself.

The Best Australian Science Writing 2019, edited by Bianca Nogrady

Recommended by Professor Helene Marsh FAA FTSE

Thought-provoking stories, essays and poetry by Australian scientists and science writers.

¹ <https://www.science.org.au/files/userfiles/events/news/documents/Fellows-Christmas-reading-list2019-07.pdf>

Topics range from astronomy to disease but concerns about the impacts of climate change dominate the book.

Podcast

Bedside Rounds, hosted by Adam Rodman MD
Recommended by Emeritus Professor Neville Nicholls FAA

Bedside Rounds is an engaging and well-researched monthly podcast on the development of modern medicine, told from a historical perspective. Recent episodes have discussed anaesthesia, syphilis, and smoking and lung cancer. The overarching focus is on epistemology—how we know.

Research on Australia's cities and regions: siloed, lacking vision and underfunded

December 04, 2019



Watch the Sustainable cities of the future video on Youtube:
<https://youtu.be/ZqyYPEpJ62w>

The sustainable transformation of Australia's cities and regions is being hampered by institutional silos, perennial underfunding and lack of a national vision according to a new report by Future Earth Australia, a program of the Australian Academy of Science.

The **report**², developed through an extensive consultation process and overseen by leading urban research, practice and policy experts from around Australia, is being launched today at the **State of Australian Cities conference**³ in Perth.

It lays out a 10-year plan to transform Australia's cities and regions and to address urban problems including transport congestion, inflated housing

markets, the loneliness crisis, inequity in opportunities and biodiversity loss.

The report responds in part to the **CSIRO National Outlook 2019 report**⁴, which identified cities and regions as critical sites for change.

Director of the Centre for Urban Research at RMIT University, Professor Jago Dodson, chaired the report's Expert Reference Group.

Professor Dodson said that conversations with stakeholders highlighted the rich variety of local transformation and innovation taking place in suburbs and cities around Australia that is driven by individuals, small businesses, community groups and local government.

"However, these groups felt disconnected from each other across sectors and disciplines," Professor Dodson said.

"Meanwhile Australia's urban researchers are stifled by institutional silos and disciplinary or sector-specific remits.

"The report recommends that Australia sets a national vision for cities and establishes a national network of knowledge hubs to empower local innovation."

It also recommends the establishment of new partnerships across urban sectors and capacity building among researchers, practitioners and policy makers.

"Implementing this strategy would set Australian cities on track for future prosperity and sustainability, Professor Dodson said.

The report makes eight recommendations (see page nine of the report) for addressing the barriers preventing Australia's urban and regional areas from achieving sustainable development.

Project lead and Director of **Future Earth Australia**⁵, Dr Tayanah O'Donnell, said each Australian city and region has a distinct character, as well as strengths and challenges when it comes to delivering wellbeing for its inhabitants.

"These distinct qualities help us understand what drives sustainable development in different urban contexts. Future Earth Australia **held workshops**

² <https://www.futureearth.org.au/publications/sustainable-cities-strategy>

³ <http://soac2019.com.au/>

⁴ <https://www.csiro.au/en/Showcase/ANO>

⁵ <https://www.futureearth.org.au/>

around the country⁶ to make sure the plan reflects Australia's diversity and innovation," Dr O'Donnell said.

"The report is a bottom-up, cross-sectoral plan for achieving sustainable cities and communities across Australia by 2030. Government, industry, the research sector, peak bodies, the philanthropic sector and civil society all have parts to play in driving this change.

"We're clever enough, there's enough science and enough knowledge to say: 'We can have green spaces and affordable, plentiful housing, and thriving cities and regions' so that everybody benefits from that."

Read the report.⁷

Researcher who uncovered the sex life of marsupials awarded Academy's most prestigious medal

December 09, 2019



Professor Marilyn Renfree AO FAA has been awarded the Academy's highest honour in the biological sciences - the Macfarlane Burnet Medal and Lecture.

A scientist whose research has transformed our understanding of Australia's iconic mammals has been recognised by the Australian Academy of Science. Professor Marilyn Renfree AO FAA has been awarded the Academy's highest honour in the biological sciences—the Macfarlane Burnet Medal and Lecture.

For half a century the committed reproductive and developmental biologist and conservationist from the University of Melbourne has been using the tammar wallaby, a small macropodid marsupial native to South and Western Australia, to study their reproduction and development.

Professor Renfree has developed contraceptive strategies for kangaroos and koalas and established marsupials as unique biomedical models for understanding human reproduction.



Watch the Macfarlane Burnet Medal: Marilyn Renfree video on Youtube: <https://youtu.be/5kWWdc6MFVU>

World authority

She is now a world authority on marsupial reproduction and development and has pioneered research on some of Australia's most iconic creatures including kangaroos, koalas and now echidnas.

And with passion for her work as strong as ever, she has no plans of slowing down. Professor Renfree has just embarked on the world's first study of the development of the embryo and newly hatched pouch young from the echidna.

Professor Renfree said hardly anything was known about marsupials when she started out.

"I'm passionately Australian and I really wanted to work on something Australian but when I started honours I said to my prospective supervisors: 'I wanted to do biochemistry and fieldwork.' And they laughed at me. Well, I'm still really doing biochemistry and fieldwork."

Her first paper published from her PhD in 1972 was a Nature publication.

In her distinguished career Professor Renfree has made numerous research breakthroughs. In research with colleagues Professor Renfree conducted the first genome sequencing of an Australian marsupial, the tammar wallaby, providing new information on their evolution.

She also showed that certain genes directly control sexual development during pregnancy and even after birth in marsupials, providing a new understanding of the relative influence of genes versus hormones in sexual differentiation in all mammals. With colleagues she also discovered a new hormone pathway that explains some human disorders of sexual development.

⁶ <https://www.futureearth.org.au/initiatives/sustainable-australian-cities-and-communities>

⁷ <https://www.futureearth.org.au/publications/sustainable-cities-strategy>

A biological goldmine

Professor Renfree said Australia is sitting on a biological goldmine because it is home to a unique assembly of mammals—the marsupials and monotremes.

“The impact of Australia’s recent bushfires on Australian mammals has highlighted Australia and the world’s fascination with these special animals. We really need to put more effort, time and money into conserving and doing research on them,” Professor Renfree said.

“Australia has the distinction of having the worst record of mammal extinctions of any developed country and that’s not a record you want to be proud of.”

Professor Renfree said the Academy award is a huge honour.

“I’m receiving it on behalf of all of my students, PhD students and postdocs and collaborators. Without them I could have only done a fraction of what I’ve done,” Professor Renfree said.

She was nominated for the medal by Professor James Angus FAA from the University of Melbourne.

“Professor Renfree is a pioneer and forward thinker who has an ability to excite and inspire scientists from around the world by providing new insights through the study of the unique evolutionary innovations in the reproductive systems of marsupials and monotremes,” Professor Angus said.

“The basic science and the clinical impact of her work for humans are as important as the direct benefits of her work for Australia’s marsupials. Her research has undoubtedly opened the eyes of the academic world and beyond to the value of these iconic Australian mammals both for their intrinsic interest and as unique biomedical models.”

Professor Renfree will receive the medal and give a lecture at the Academy’s Science at the Shine Dome event in May 2020. The Macfarlane Burnet Medal and Lecture honours the contributions to science by Sir MacFarlane Burnet OM KB MD FAA FRS Nobel Laureate.

Primary Connections features at international conference on children’s STEM education

December 10, 2019



Australians at the conference included (from left) Project Director of Little Scientists in Australia, Sibylle Seidler; Academy Education Director Claudette Bateup; Associate Professor Coral Campbell from Deakin University; and Academy Fellow Emeritus Professor Hans Bachor.

Two education experts from the Academy promoted the Primary Connections program at an important international conference on children’s STEM education in Berlin recently.

The Academy’s Secretary Education and Public Awareness Emeritus Professor Hans Bachor, and Director Education Claudette Bateup, represented the Academy at the **International Dialogue on STEM Education 2019**⁸, the second in a series of biennial conferences on early STEM education. Professor Bachor was co-chair of the event program committee.

The event on 5 and 6 December brought together 100 scientists, representatives of leading STEM initiatives, and decision-makers in politics, economics, civil society and culture, all focusing on early childhood STEM education for sustainable development.

According to the conference organisers, global developments such as digitisation, climate change, increasing social inequality and migration will impact the lives of people still in pre-school today. The aim of early education should be to help children become self-determined adults who can help shape global challenges.

Primary Connections⁹ was one of seven education programs from six continents—and the only Australian one—specifically selected as highlights of the conference. Ms Bateup presented a workshop on ‘Not just numbers—how can we make the most of monitoring and

⁸ <https://www.haus-der-kleinen-forscher.de/en/international-dialogue-on-stem-education/idos2019/>

⁹ <https://primaryconnections.org.au/>

measurement to drive change and improvement in STEM education for sustainable development?"

"Our hope is that the young generation, starting at just a few years old, will be better informed and develop a healthy critical but constructive and positive attitude to our rapidly changing world," Emeritus Professor Bachor said.

"At the conference we discussed how this can be achieved across the world. We showcased and compared examples with great impact, including Primary Connections from Australia."

The International Dialogue on STEM Education 2019 was a joint conference of the Haus der kleinen Forscher Foundation and Siemens Stiftung. It took place under the auspices of the German Commission for UNESCO.

2272 women and an abundance of opportunity

December 20, 2019

Australian women in STEM are now more visible than ever with 2272 women joining **STEM Women**¹⁰ in the past five months. Many are now using the new resource to showcase the depth of talent of those working in the field.

The database was developed by the Australian Academy of Science in partnership with the CSIRO, Science & Technology Australia, and the Australian Science Media Centre, with financial support from the Australian Government.

Users of the database can search for women in STEM based on their expertise, location and other search fields. Freelance science journalist Bianca Nogrady was one of the first to use the database. She contacted **Professor Jenny Pringle**¹¹ for her article on the **future of battery technology**¹² for environmental magazine, Enisa.

The 2019 Women for Media Report found **women only appear as a source for news or provide expert comment in the media 24% of the time**¹³. With other journalists welcoming the database on Twitter, STEM Women is positioned as a powerful tool to help increase the visibility of STEM women in the media.



STEM Women 2019 achievements: There were 2272 profiles created; 15,020 searches were made, leading to the discovery of STEM experts Australia wide (number of searches: WA 511, NT 36, QLD 609, NSW 1077, ACT 404, VIC 940 and TAS 95). Connections to opportunities included conference presenting, mentoring, speaking to students, media articles, game design, sitting on advisory panels, video appearances, building networks, careers days, career advice, panel appearances, advice to teachers and job opportunities.

STEM Women is also designed to become a key resource for conference and event organisers across Australia. Thanks to STEM Women, the National Computational Infrastructure (NCI) delivered an all women plenary session at the **Australasian Leadership Computing Symposium**¹⁴.

Insights into STEM careers

STEM Women has also become a go-to for teachers looking to offer their students real life insights into STEM careers. Teacher Deanna Cammisotto of Prospect Primary School used the database to organise a visit by **Kaitlyn Bayly** from

¹⁰ <https://www.stemwomen.org.au/>

¹¹ <https://www.stemwomen.org.au/profile/jenny-pringle>

¹² <https://ensia.com/features/battery-innovations-renewable-energy/>

¹³ https://docs.wixstatic.com/ugd/ee1ce5_88c20ce959044aab84737b1993c326ca.pdf

¹⁴ <https://opus.nci.org.au/display/Help/Australasian+Leadership+Computing+Symposium+2019>

Accenture¹⁵, so her students could discover what a career in technology looks like.

ACT teacher Ryan Elwell's searched 'geology' on STEM Women. He discovered **Stephanie McLennan**¹⁶ and offered her the opportunity to share with students how science and mathematics skills can be turned into a successful and exciting career.

The database also allows users to find a mentor or search for expert insight. Seven early career women have gained great advice and insight into a variety of STEM careers from clinical trials to cyber security. Co-founder of **Little Literature Co**¹⁷, Annabel Blake discovered a number of space experts whose research will help shape a set of STEM storytelling games and workshops.

Manager of Diversity and Inclusion at the Australian Academy of Science, Ms Louise Moes, said the opportunities available through STEM Women are endless.

"More than 15,000 searches have occurred on STEM Women with 'chemistry' and 'engineering' some of the most searched terms," Ms Moes said.

"We're also seeing a gradual increase in the number of users as they use the database to discover what is happening across the STEM ecosystem and to find opportunities to collaborate and gain knowledge."

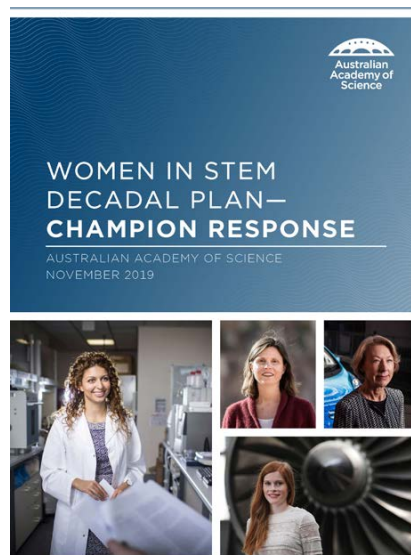
To find out more about gender equity in STEM actions and initiatives register for the **Catalysing Gender Equity 2020 Conference**¹⁸.

Academy becomes a Women in STEM Decadal Plan Champion

December 20, 2019

The Academy has released a **formal response**¹⁹ to the Women in STEM Decadal Plan, joining a group of 22 organisations championing change in gender equity.

The **Women in STEM Decadal Plan Champions program**²⁰ was launched alongside the plan itself



organisations as they are received²¹, providing a source of ideas and inspiration for everyone who would like to support girls and women in STEM.

The Academy's own response, published in November, outlines the steps being taken to recognise women in STEM and celebrate and embrace diversity and inclusion.

This includes increasing the diversity of the Fellowship; recognising diversity in awards, education programs and communication strategies; and, as demonstrated by co-authoring the decadal plan and launching the **STEM Women database**²², through national leadership to increase opportunities for women and girls in STEM.

Becoming a champion of the decadal plan has given the Academy valuable insight into how gender equity is already supported, as well as a deeper understanding of where and how equity can be further promoted.

The Academy encourages all interested organisations to become a champion.

For more information about the decadal plan, champions of the plan, or gender equity at the Academy, please contact **diversity@science.org.au**

in August this year. It enables any STEM organisation to publicly align their gender equity journey with the principles and actions of the ten-year plan.

The Academy is **publishing the responses of all**

15 <https://www.stemwomen.org.au/profile/kaitlyn-bayly>

16 <https://www.stemwomen.org.au/profile/steph-mclennan>

17 <https://littliliterature.co/>

18 <https://www.science.org.au/news-and-events/events/catalysing-gender-equity-2020>

19 <https://www.stemwomen.org.au/sites/default/files/2019-11/Australian-Academy-of-Science.pdf>

20 <https://www.stemwomen.org.au/champions>

21 <https://www.stemwomen.org.au/champions>

22 <https://www.stemwomen.org.au/>

SAGE launches new podcast – Think Difference

December 15, 2019



Ben Knott and his daughter Evie, who featured in the first ‘Think Difference’ podcast.

A new podcast launched by SAGE will showcase the SAGE Athena SWAN journey, exploring

transformative stories in STEMM and sharing learnings and insights from practice.

In each episode, you’ll hear from individuals and institutions about their own gender equity, diversity and inclusion journey.

With many men still feeling uncomfortable taking parental leave, the inaugural episode of the ‘Think Difference’ podcast, titled ‘Dads are parents too’, explores Monash University’s initiatives to shift the culture. You’ll also hear from two fathers, one starting his primary carer’s leave and one reflecting back on the experience.

Listen to episode one now²³

Science Matters: new publication highlights partnerships and philanthropy at the Academy

December 19, 2019



Academy Fellow and Chief Defence Scientist Professor Tanya Monro features in the first issue of Science Matters.

“Thank you”—that’s the message of a new publication, Science Matters, produced to highlight the impact of partnerships and philanthropic giving at the Australian Academy of Science.

From supporting early-career researchers to staging world-class science events, the magazine delves into stories of discovery and inspiration from the past year.

Academy Fellow and Chief Defence Scientist Professor Tanya Monro is the inaugural cover star and an accompanying feature article gives insight into her journey in science and her research philosophy.

Housed in the new Philanthropy and Partnerships section of the website, Science Matters is available to read now online.

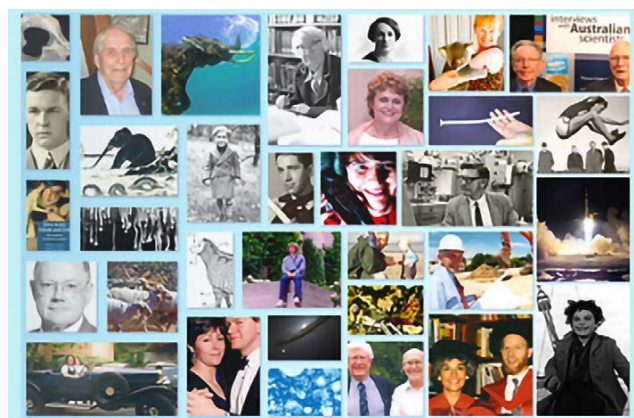
Printed copies of Science Matters will be available in early 2020. Please contact Partnerships Manager Tracey Murray at partnerships@science.org.au to request a copy.

Read Science Matters online²⁴

Find out about the Academy’s Philanthropy and Partnerships work²⁵

Support Interviews with Australian Scientists and make history with us

December 19, 2019



The Academy is committed to reinvigorating Interviews with Australian Scientists in audio (podcast) format.

From 1995 to 2012, the Australian Academy of Science documented the remarkable stories of Australian scientists through the Interviews with Australian Scientists program.

The Academy recorded interviews with nearly 150 researchers, from Dame Bridget Ogilvie, the ‘girl from the bush’ who became Director of the Wellcome Trust, to pioneering microbiologist

²³ <https://think-difference.zencast.website/episodes/1>

²⁴ <https://www.science.org.au/about-us/philanthropy-and-partnerships/science-matters-2019>

²⁵ <https://www.science.org.au/philanthropy-and-partnerships>

Professor Frank Fenner who oversaw the eradication of smallpox.

But there are still so many fascinating tales waiting to be told.

You can help us capture them before they're lost to the mists of time.

The Academy is committed to reinvigorating Interviews with Australian Scientists in audio (podcast) format. Join us to support this project recording stories that will enrich and inspire the next generation of exceptional scientists.

"It's investing in our future," said Academy Fellow Professor Robyn Williams, ABC science journalist and broadcaster. "When you hear these stories about how things can be transformed, you are both inspired and excited."

Interviews with Australian Scientists goes beyond the soundbite to delve deep into the extraordinary lives and achievements of our best and brightest. "All of these stories show how marvellously human and broad are our scientists."

"You need to know when something's important and worth paying attention to, and if it's from the Academy, it will be," he adds.

The Academy has committed \$25,000 to the project and invites you to add to this worthy venture to preserve our shared history.

Your donation will contribute toward the costs of preparing for and conducting the interviews of Fellows of the Academy.

In the fast-paced age of technology and endless emails, the importance of taking the time to document our scientists' amazing lives cannot be underestimated, Professor Williams said. "The number of science media publications and broadcasts is getting smaller and smaller, so if you don't do it, no one else will."

Donate to Interviews with Australian Scientists today²⁶

Marine researchers receive Max Day Awards

December 16, 2019

A new study on the Great Barrier Reef assessing how the elemental signatures of coral reefs can



Watch the 2020 Max Day Award video on Youtube:
<https://youtu.be/kPcEOU66ZXc>



Dr Emma Camp, University of Technology Sydney, is one of the winners of the 2020 Max Day Environmental Science Fellowship Award. Photo: Rolex/Franck Gazzola.

Ms Allison Broad, a PhD candidate from University of Wollongong also received the 2020 Max Day award.



signal stress from pollution will be carried out by one of the recipients of the Australian Academy of Science's 2020 Max Day Environmental Science Fellowship Award.

Dr Emma Camp will conduct her research at the University of Technology Sydney using samples of three different coral species that will be subjected to conditions mimicking polluted and non-polluted reef environments.

Dr Camp will use the award to investigate the elemental signatures of corals and how changes in these signatures might be diagnostic of environmental pollution on the Great Barrier Reef. An elemental signature is the unique proportion and concentration of elements in an organism or object and can change as the environment changes.

²⁶ <https://www.science.org.au/donate>

“This project will explore how the elemental signatures of each part of the coral responds to environmental change with the aim of identifying unique stress signatures in corals”, Dr Camp said.

“The project will enhance our understanding of biogeochemical cycling across coral environments, and how this influences coral traits and the associated costs of survival, thereby revealing the processes that govern coral reef resilience.”

The other recipient of the 2020 award is PhD student Ms Allison Broad from the University of Wollongong. Ms Broad will study the impacts of anchor scour on the seafloor near Wollongong.

Seabed environments are the foundations for biodiversity in the marine domain and are at risk of damage from the heavy anchors and chains used by shipping vessels.

For Ms Broad’s research, specific study sites within a rocky reef habitat will be identified and assessed using remotely operated vehicles and underwater video. Assessments will be done both before and after an anchoring event by a large merchant ship (greater than 200 m in overall length) to monitor and quantify both the disturbance from anchor drop, drag and chain scour and the recovery of invertebrates, algal forests and fish assemblages.

“With the rise of the Blue Economy, it is vital that we identify how marine industries may be interacting with these seabed environments and that we manage them sustainably wherever possible,” Ms Broad said.

The award provides up to \$20,000 for early-career researchers working on the conservation of Australia’s flora and fauna, the ecologically sustainable use of resources and the protection of the environment and ecosystem services.

It is named in honour of Academy Fellow, the late Dr Maxwell Frank Cooper Day AO FAA, who spent a lifetime championing entomology, conservation and forestry, as well as helping other scientists.

Four researchers were also ‘highly commended’ for the Max Day Environmental Science Fellowship Award:

- Dr Catherine Price from the University of Sydney for her project: *When it takes one bite: deceiving herbivores to protect rare and threatened orchids*;
- Ms Emily Scicluna from La Trobe University for her project: *Using personality and cognitive assessment of individuals as a conservation tool for improving reintroduction/translocation success*;
- Ms Georgia Sinclair from RMIT University for her project: *Developing biomarkers of environmental exposure to poly- and perfluoroalkyl substances to improve environmental policy and health*; and
- Dr Tatiana Soares da Costa from La Trobe University for her project: *Fighting herbicide resistance with vitamin deprivation*.

More information about the Max Day Environmental Science Fellowship Award²⁷

Academy’s 2020 event calendar is stacked with goodies—so save the dates!

December 19, 2019



Catalysing Gender Equity 2020: Be part of the solution

20–21 February 2020, Adelaide

The Academy, in collaboration with Science in Australia Gender Equity (SAGE), invites you to join us at **Catalysing Gender Equity 2020**²⁸, a two-day landmark conference that will advance the **Women in STEM Decadal Plan**²⁹.

An exciting line up of speakers has now confirmed their participation including Women in STEM Ambassador, Professor Lisa Harvey-Smith, along with Dr Catriona Wallace and Alison Johns from the UK. Dr Elizabeth Broderick will facilitate a panel of STEM leadership and with SA Chief Scientist, Professor Caroline McMillen, as the MC.

²⁷ <https://www.science.org.au/opportunities/research-funding/max-day-environmental-science-fellowship-award>

²⁸ <https://aas.eventsair.com/catalysing-gender-equity/>

²⁹ <https://www.science.org.au/support/analysis/decadal-plans-science/women-in-stem-decadal-plan>

Delegates from all parts of the STEM community will participate in a variety of workshops, seminars, gallery submissions and panels. They will be able to strengthen collaborations, build new networks and share evidence-based best practice.

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

Register today for **Catalysing Gender Equity 2020**³⁰



Food for Thought: Canberra Speaker Series 2020

Shine Dome, Canberra

Join the Academy in 2020 for a delectable journey of taste, health and food innovations at the home of Australian science excellence, the Shine Dome. Together we will explore the hidden world of your gut's microbiome, discover the truth and promise of genetic modification and check out some crunchy insect snacks.

Engaging experts from across Australia will present a diverse array of science stories: from tackling our mountains of food waste, to introducing the Aussie palate to native foods and contemplating the future of nutrition.

Feed your curiosity in 2020 with the Academy and exclusive presenting partner, the University of Canberra.

Series dates and topics

- Food waste—Tuesday 11 February 2020
- GM foods—Tuesday 14 April
- Gut health—Tuesday 9 June
- Alternative food sources—Tuesday 11 August
- Nutrition decisions—Tuesday 13 October
- The future of nutrition—Tuesday 8 December

Find out more about the Food for Thought Canberra Speaker Series³¹

Looking for a sweet last-minute gift? The Food for Thought series pass is the perfect present for your scientifically curious or food-favouring loved one.

Buy your series pass now³²



Food for Thought: Edible insects

1 April 2020, National Wine Centre, Adelaide

Intrigued by eating insects? You've come to the right place. Take a scientific and culinary journey in a workshop that's sure to get you thinking.

Professor Kerry Wilkinson from the University of Adelaide will join local producers of edible insects to talk about how and why insects are increasingly on the menu. From native green ant gin to cricket pasta, appetites for this alternative protein source are growing.

Book your ticket to Edible Insects now³³



Science at the Shine Dome 2020

26–28 May 2020, Shine Dome, Canberra

Join us to celebrate Australian science excellence at the Academy's premier event. 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.

This is an event for STEM-interested people from all industries, disciplines and career levels to come together and share knowledge, meet

³⁰ <https://aas.eventsair.com/catalysing-gender-equity/>

³¹ <https://www.science.org.au/news-and-events/events/public-speaker-series/food-thought>

³² <https://events.humanitix.com.au/food-for-thought-series-pass>

³³ <https://tastingaustralia.com.au/events/food-for-thought>

outstanding scientists, and be inspired for the future.

Register now to secure your place³⁴

Academy supports participation of Indigenous scientists at Science meets Parliament

December 19, 2019



Back row (from left): Mr Djarra Delaney, Bureau of Meteorology; Ms W. Y. Sarah Lau, University of Queensland; Dr Andrew Harford, Department of the Environment and Energy; and Professor Tom Stace, University of Queensland.

Front row: Dr Razia Shaik, Charles Sturt University; Academy Fellow Professor Jim Williams; Professor Chris Matthews, University of Technology Sydney; and Academy Manager Diversity and Inclusion Ms Louise Moes.

Two Indigenous scientists attended the 2019 Science meets Parliament conference held in late November with the support of the Academy and the ARC Centre of Excellence for Engineered Quantum Systems.

Science meets Parliament is an annual event led by Science & Technology Australia that brings together decision-makers and STEM professionals at Parliament House in Canberra. Delegates meet with members of parliament and senators to discuss and promote the role of STEM in politics.

The Indigenous STEM scholarship recipients were:

- Professor Chris Matthews, Associate Dean Science Faculty at the University of Technology Sydney, and a member of the Aboriginal and Torres Strait Islander Mathematics Alliance (ATSIMA)
- Mr Djarra Delaney, Aboriginal and Torres Strait Islander Community Engagement

Coordinator at the Bureau of Meteorology and a member of the Australian Meteorological and Oceanographic Society (AMOS).

The Indigenous STEM scholarships covered registration costs, the gala dinner, travel, accommodation, transfers and meals.

The Academy's Secretary Physical Sciences Emeritus Professor Jim Williams, and Ms Louise Moes, the Academy's Diversity and Inclusion Manager, met with both scholarship winners.

Academy representatives attended an address at the National Press Club by Professor Lisa Harvey-Smith, the Australian Government's Women in STEM Ambassador. The Academy also had a presence among the 400 attendees at the gala dinner, with Future Earth Australia Director Dr Tayanah O'Donnell and Senior Policy Analyst Stuart Barrow in attendance.

Researchers gather to strengthen reproducibility in science

December 19, 2019



The Re:produce workshop included sessions designed to empower researchers to make their research more open, transparent and verifiable.

More than 60 early- and mid-career researchers (EMCRs) from across Australia met in Brisbane on 10–11 December 2019 to learn ways to strengthen reproducibility in science.

The lack of reproducibility of scientific claims has emerged as a hot topic in recent years, with the outcomes of some high-impact studies unable to be reproduced.

The **Re:produce workshop**³⁵, part of the Theo Murphy Initiative administered by the Academy, included sessions designed to empower researchers to make their research more open, transparent and verifiable.

³⁴ <https://aas.eventsair.com/2020-science-at-the-shine-dome/>

³⁵ <https://www.science.org.au/news-and-events/events/theo-murphy-initiative-australia/reproduce-workshop>

The program featured topics such as open science, the statistical foundations of reproducible science, and open code and documentation tools. A panel discussed the challenges of increasing the reproducibility of research and how to overcome them.

Valuable insights

The Academy's presence at the event included Fellow Professor Christine Beveridge from the University of Queensland, who welcomed attendees to the event. Professor Ginny Barbour, a member of the Academy's National Committee for Data in Science, shared valuable insights with the attendees during the panel session and led a training session on open access.

The Re:produce workshop was the third event of this round of the Theo Murphy Initiative. The Theo Murphy Initiative (Australia) 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.

More about the Theo Murphy Initiative³⁶



EMCRs at the Theo Murphy Initiative workshop explored how to address reproducibility in science.

Planning for the future with the Academy at GEO Summit 2019

December 19, 2019

The Academy hosted an event at the international **Group on Earth Observations (GEO) Ministerial Summit³⁷** in Canberra, part of GEO Week 2019.

GEO is a partnership of 105 national governments and more than 120 participating organisations—a global collaboration of experts working in sustainable development and sound environmental management. Earth observations are measurements of our planet and how it is changing: its land, atmosphere and oceans; its cities, towns and villages. This data is collected by satellites, aircraft, ships and observatories on the ground.

The Academy's event explored the role of learned academies in strategic and long-term planning, with a panel discussion moderated by the Academy's Director Science Policy, Chris Anderson.

The discussion focused on decadal plans as a mechanism for advocating for, engaging in and delivering the GEO Strategic Plan, with the Academy's **Decadal plan for Australian Geoscience³⁸** and **Space Science Vision Statement³⁹** presented as case studies.

The panel included representatives of the Australian Space Agency, National Computational Infrastructure, AusScope and National Committees for Earth Sciences and Space and Radio Science.



Earth observations are measurements of our planet and how it is changing: its land, atmosphere and oceans; its cities, towns and villages. Image by Rob Lynch from Pixabay

Science policy update— December 2019

December 19, 2019

Scientific experts meet with Minister for the Environment

The Academy's Science Policy team facilitated a roundtable scientific briefing for the Commonwealth Minister for the Environment, the Hon Sussan Ley MP, on 10 December.

The Commonwealth is conducting a ten-year review of the *Environment Protection and*

³⁶ <https://www.science.org.au/opportunities/conference-and-lecture-funding/theo-murphy-initiative-australia>

³⁷ <https://www.earthobservations.org/geoweek19.php?t=home>

³⁸ <https://www.science.org.au/supporting-science/science-policy-and-sector-analysis/decadal-plans-science/australian-geoscience>

³⁹ <https://www.science.org.au/support/analysis/decadal-plans-science/space-science-vision>

Biodiversity Conservation Act 1999 (EPBC Act)—the national environmental laws.

The discussion with the Minister covered a wide range of topics in environmental science and policy. Minister Ley was interested in how the insights of scientific experts can help the government to improve the efficacy of the laws and focus on positive outcomes.

The Academy and experts in attendance were very clear that science needs to be at the heart of the EPBC Act and that good science should be embraced to help the government meet its objectives. The Academy and experts emphasised that science should be a part of the solution to over-regulation, not the enemy of red tape reduction.



At the briefing were (from left): Academy Fellows Professor Craig Moritz and Professor David Lindenmayer; the Hon Sussan Ley MP; Associate Professor Emily Nicholson, Deakin University; Professor Robert Harcourt Macquarie University; Professor Richard Fuller, University of Queensland; Professor John Zichy-Woinarski, Charles Darwin University; and Professor Martine Maron, University of Queensland

Academy response to PISA results

The OECD recently released results from its 2018 Program for International Student Assessment (PISA). The program evaluates the performance of education systems across 79 countries and economies.

The results showed that Australian students are on a **downward trajectory in literacy, numeracy and science**⁴⁰. Australia ranks 11th for reading, 13th in science and 24th in mathematics.

In response to the results, Academy President Professor John Shine wrote to all state and Commonwealth education ministers on 11 December 2019. The letter outlined the ways in which the Academy and our education programs can be part of the national solution—positioning the Academy as a constructive voice in science education reform in Australia.

Read the letter from Professor John Shine⁴¹

Fellows update—December 2019

December 19, 2019

Honours and awards to Fellows

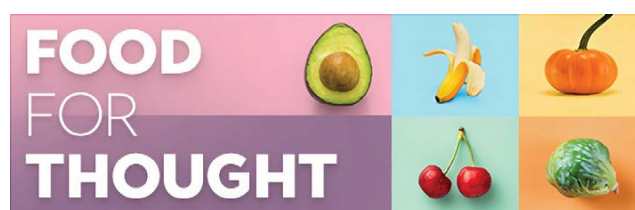
Professor Sally Smith FAA and Professor Tanya Monro FAA FTSE—recognised by the University of Adelaide as trailblazers for gender equality to mark the 125th anniversary of suffrage in South Australia.

Scientia Professor Matthew England FAA—awarded the 2019 James Cook Medal by the Royal Society of NSW for outstanding contributions to both science and human welfare in and for the Southern Hemisphere.

Professor Dietmar Müller FAA—awarded the 2019 Clarke Medal by the Royal Society of NSW for distinguished research in the natural sciences (this year, geology) conducted in Australia.

Coming events

Food for Thought: Food waste



Food waste occurs across the entire food supply chain from production on the farm, to consumption by customers.

Food waste costs families: between \$2,200 and \$3,800 a year – one in five shopping bags you purchase ends up in the bin.

It costs Australia: 7.3 million tonnes of food is wasted every year and nearly four million tonnes of food is sent to landfill, at an estimated loss of \$20 billion to the Australian economy each year.

Food waste costs the hungry: five million Australians experienced food insecurity last year, according to Foodbanks 2019 Hunger Report. Reducing food waste can help to get safe, healthy food to those that need it most.

And it also costs the Earth: if global food waste were a country, it would consume 32% of global food supply by weight (at a cost of \$1.8 trillion),

40 <https://theconversation.com/aussie-students-are-a-year-behind-students-10-years-ago-in-science-maths-and-reading-127013>

41 https://www.science.org.au/files/userfiles/support/submissions/2019/10Dec19_AAS_COAG_Edu_Council_Tehan.pdf

25% of all water used in agriculture, 23% of all the fertilizer used on Earth, and 1 in 4 of all food calories available on the planet. It would also be the third biggest emitter of greenhouse gases after China and the USA (8% of global greenhouse gas emissions); and utilize a crop land area the size of China.

Join us to explore the world of waste—minus the bad smells. We will get a whiff of the solutions that scientists are cooking up to address our perished produce problem.

Dr Polly Burey is a senior lecturer in food science and a chemical engineer at the University of Southern Queensland. She believes that food waste is an untapped resource with many potential applications beyond just landfill. Her core research focuses on the microstructure and composition of food, to determine its use in shelf stable products. Her practical focus is on transforming horticultural food and its byproducts into useful ingredients, products and materials such as bioplastics.

Mark Barthel is a special advisor at the Fight Food Waste Cooperative Research Centre. He has 25 years' experience of sustainable innovation in the agri-food sector, with a strong focus on tackling food waste. The Fight Food Waste CRC brings together industry, research and the community to reduce food waste, transform unavoidable waste into new products, and engage with the community and business to drive change.

This is the first event in a six-part series. Throughout this series, experts from around Australia, will cover a range of topics relating to food and nutrition, including food waste, gut health, Australian native foods, edible insects, GM foods, the future of nutrition and more! **Visit the series page**⁴² for more information and tickets to other talks.

Date: Tuesday 11 February 2020

Time: 5.30pm–7.00pm. Refreshments served from 5.30pm, with the talk 6.00pm–7.00pm.

Location: The Shine Dome

Price: \$75 for a season pass, \$15 for single tickets

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 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.

Visit the **event website**⁴³ to **register**⁴⁴.

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.

42 <https://www.science.org.au/news-and-events/events/public-speaker-series/food-thought>

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

44 <https://aas.eventsair.com/empowering-regional-research/register>

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 Monday 13 January 2020.

The Theo Murphy Initiative (Australia)

The Theo Murphy Initiative (Australia) 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.

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.

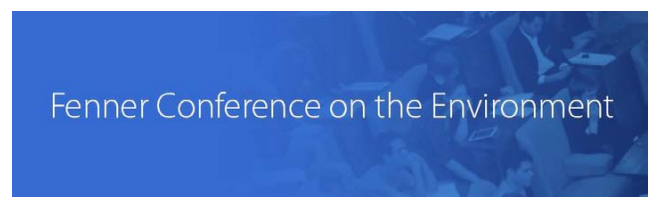
In addition, all attendees can join SAGE in celebrating recipients of the Athena SWAN Institutional Bronze Awards at the SAGE Awards Dinner on 20 February.

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

Date: 20 – 21 February 2020

Venue: Adelaide Convention Centre

Managing wild and weedy Australia across boundaries and disciplines



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

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

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

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.

For more information visit the [event website](#)⁴⁷ or contact the conference organisers: Sonia Graham (sonia.graham@unsw.edu.au) or Nick Gill (ngill@uow.edu.au)

Time and date: 8:00 AM February 17 – 1:00 PM February 23, 2020

Food for Thought: Edible Insects



Intrigued by eating insects? You've come to the right place. Take a scientific and culinary journey in a workshop that's sure to get you thinking.

Professor Kerry Wilkinson from the University of Adelaide will join local producers of edible insects to chat about how and why they're increasingly on the menu. From native green ant gin to cricket pasta, appetites for this alternative protein source are growing.

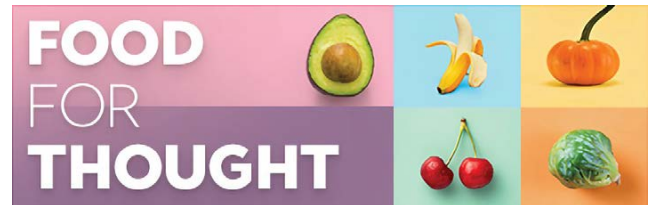
Food for Thought will begin with drinks and canapés before the workshop gets under way. Tastings will be offered throughout; come with an open mind and discover something new.

Professor Wilkinson and her university colleagues are working with the CSIRO to find the best Australian insects for commercial production and create new trade opportunities. The global edible insect industry is tipped by the UN to be worth \$1.5 billion over the next four years, along with improving food security and reducing waste.

Time and date: 5:30 PM April 01 - 7:30 PM April 01, 2020

For more information visit the [event website](#)⁴⁸ or contact us at events@science.org.au or **02 9201 9400**

Food for Thought: GM foods



What's the difference between a selectively bred banana and a banana that has been genetically engineered?

From enhanced nutrition to pesticide resistance, GM has the potential to transform agriculture. As the world's population balloons and the impacts of climate change become keenly felt by farmers, we will need tools that help us nourish more people more efficiently. Will GM be one of them?

While the science may be sound, the practicalities of GM evoke diverse public opinions: from philosophical considerations about changing DNA to concerns about the involvement of multinational corporations.

Separate fact from fiction with two leading experts on the science and ethics of genetic modification (GM). We will learn about the cutting-edge GM research currently happening in Australia alongside perspectives on ethics and safety.

Dr Surinder Singh FAA is a world-leading researcher in plant oil engineering based at CSIRO. He and his team made a breakthrough by genetically engineering a canola crop that has the same oil profile as fish oil—creating a sustainable source of healthy omega-3.

Professor Rachel Ankeny is an interdisciplinary researcher at the University of Adelaide. Her work intersects with bioethics, food studies, science policy and the history and philosophy of science. Rachel's major ongoing project is called 'Organisms and us: How living things help us to understand our world'.

⁴⁷ <https://wild-and-weedy.com/>

⁴⁸ <https://tastingaustralia.com.au/events/food-for-thought>

This is the second event in a six-part series. Throughout this series, experts from around Australia, will cover a range of topics relating to food and nutrition, including food waste, gut health, Australian native foods, edible insects, GM foods, the future of nutrition and more! **Visit the series page**⁴⁹ for more information and tickets to other talks.

Date: Tuesday 14 April 2020

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

Location: The Shine Dome

Price: \$75 for a season pass, \$15 for single tickets

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!

Visit the **event website**⁵¹ for more information and to register.

Time and date: 9:15 AM May 26 – 4:30 PM May 28, 2020

Science at the Shine Dome 2020



Science and the Public Good Symposium and Livestream⁵⁰

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,

49 <https://www.science.org.au/news-and-events/events/public-speaker-series/food-thought>

50 <https://aas.eventsair.com/2020-science-at-the-shine-dome/symposium>

51 <https://aas.eventsair.com/2020-science-at-the-shine-dome/>