



Newsletter 110, October 2017

Message from the Chief Executive—October 2017

October 06, 2017

Dear Fellows and friends of the Academy

I'm delighted to present you with the Academy of Science's October newsletter. Our newsletter will now be published on a monthly basis and it is our hope that you will enjoy reading the latest news about the activities of the Academy.

In this month's edition we have included a snapshot of one of the Academy's education programs, Science by Doing, some highlights of our international activities showing some of the many ways we work across the globe and in collaboration with our international partners, and a range of awards that are open for application. We also mourn the passing of Academy Fellows Dr Keith Norrish ^{AO FAA} and Professor Neville Fletcher ^{AM FAA FTSE}.

The Academy works hard to be a strong and effective voice on STEM matters, often making representations to parliamentarians and keeping the lines of communication open with decision makers. This month has been no exception, as we have stepped up our advocacy efforts regarding the proposed abolition of the Education



Anna-Maria Arabia

Investment Fund (EIF). Historically, the EIF has provided important funding for research infrastructure in NCRIS facilities and within universities. The Parliament is likely to debate this Bill in October and the Academy has made both written and oral submissions, most recently giving evidence at a Senate inquiry on this matter.

Lastly, join us at the next event in the Academy's Plastic Fantastic National Speaker Series—Making Better Humans—to be held in Adelaide on Thursday 2 November. The presenters explore the world of polymers and how they are being used to improve health and well-being. The 2017 National Speaker Series is presented with the generous support of Academy Fellow and developer of the polymer banknote, Professor David Solomon ^{AC FAA}. Tickets will be on

sale soon—see more about this event www.science.org.au/news-and-events/events/public-speaker-series/making-better-humans.

I hope you enjoy the October newsletter and please be free to contact me at any time annamaria.arabia@science.org.au.

Best wishes
Anna-Maria Arabia
Chief Executive

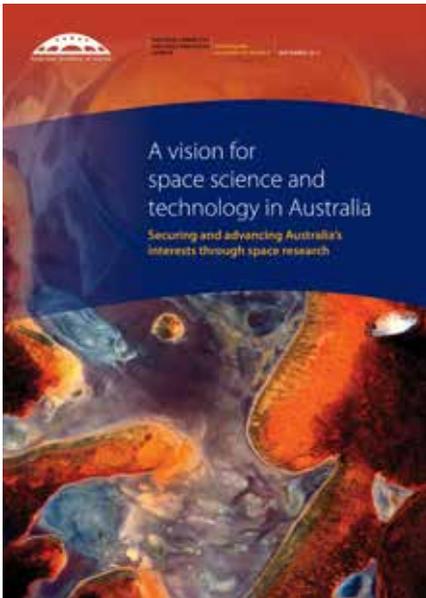
Coordination framework essential to the success of an Australian space agency

September 27, 2017

Leading scientists say bringing together the space industry under a strategic coordination framework must be the first order of business upon the establishment of a home-grown space agency.

The conclusion forms part of the Australian Academy of Science's Vision for Space Science and Technology in Australia, launched today at the International Astronautical Congress (IAC2017) in Adelaide.

Professor Fred Menk, Chair of the Academy's National Committee for Space and Radio Science, which compiled the vision statement, said much of the recent public



discussion has focused on whether Australia should have a space agency.

“We certainly envisage a future—by 2027 or sooner—in which Australia will have a vibrant space sector and space industry, underpinned by a national space agency. Establishing a coordination framework for space science and technology in Australia must be a first order priority for our space agency,” Professor Menk said.

“Australia has already developed many of the ingredients required to reap the benefits of a space industry—indeed, some areas are excelling. Substantial progress has also already been made within and between some organisations including the Bureau of Meteorology, Geoscience Australia and the Department of Defence.”

“However, these contributors, including the smaller actors and organisations, do not yet form a cohesive and unified sector that is able to provide the full depth and breadth of rigour necessary to underpin operational sovereign space capabilities. They must be

nurtured and grown in strategically prioritised and assisted ways. A key missing ingredient is a national space coordination framework,” Professor Menk said.

Professor Menk said Australia’s space industry is currently fragmented and comparatively small relative to opportunity.

“This is exposing scientific and technical gaps that are inconsistent with our sovereign interests,” Professor Menk said.

The vision statement cites the Chinese-based International Space Weather Meridian Circle Program, as an example. The program is proposing to establish space-based weather measurement instruments along the 120E/60W meridian, which passes through Australia and Antarctica, in order to provide a global picture of unfolding space weather events.

“The lack of a national coordination framework for space weather activities impacts on Australia’s engagement with and capacity to respond to strategic programs such as this one,” Professor Menk said.

“A national framework, advised by an expert panel, would provide coordination, priority setting, and a degree of strategic funding, to assist the Australian space sector to mature and flourish.

“A comprehensive earth systems science approach to the observation of the Australian continent, the Southern Ocean and the Southern Hemisphere will enable Australia to deliver good science policy and practice in a region where we are regarded as the custodians,” Professor Menk said.

The vision statement suggests priorities for the Australian space sector could include leading the development of CubeSats as a national capability, understanding and managing the impacts of space weather and tracking and managing space junk.

“With the right policy support Australia can mobilise the sector to create a significant space industry, based on innovative and niche products, in a relatively short time,” Professor Menk said.

Primary school learning resources win Educational Publishing Award

September 21, 2017

The Australian Academy of Science’s innovative approach to primary school science education has been recognised with a win at the Australian Publishers Association (APA)’s 2017 Educational Publishing Awards.

The winners were announced at a ceremony at the Arts Centre in Melbourne last night.

The Academy’s Primary Connections team took out the award category Primary: Student Resource—Arts/Science/Humanities/Social Sciences/Technologies/Health and Physical Education/Languages for their Student Science Journals (Years 3 and 4).

In awarding the prize, the judging panel said ‘the student science journals are functional and accessible, incorporating hands-on activities and a collaborative approach, allowing students to take



Amy Stoneham of Primary Connections accepts the award.



Primary Connections' Amy Stoneham (left) and the Academy's Secretary Education and Public Awareness, Professor Pauline Ladiges, with the Among the Gum Trees resource.

ownership of their work. They are particularly helpful in building teachers' confidence and competence in teaching science.'

Primary Connections was also highly commended in the Primary Teacher Resource category for its Among the Gum Trees curriculum pack, which has sparked students' interest in learning about gum trees.

The Primary Connections: Linking science with literacy program is an approach to teaching and learning which aims to improve students' learning outcomes by building teachers' confidence and competence for teaching science

More information about Primary Connections <https://primaryconnections.org.au/>

Academy awards travelling fellowships to international researchers

September 21, 2017

Prominent international scientists Dr Christina Kellogg, Professor Stefanie Dimmeler and Dr Graham Nugent have been awarded Australian Academy of Science Travelling Fellowships. The Fellowships foster the international exchange of scientific ideas and support lectures for the general public.

Professor Stefanie Dimmeler, a cell biologist based at Goethe University in Germany, has been awarded the Academy's 2018 Selby Fellowship. Her research is focused on understanding the basic mechanisms underlying cardiovascular disease and vessel growth.

The Fellowship will see Professor Dimmeler based at the Victor Chang Cardiac Research Institute in Sydney. From there she will present lectures in Brisbane, Canberra, Melbourne, Perth and Sydney.

Dr Christina Kellogg, a research microbiologist with the United States Geological Survey, has been awarded the 2018 Rudi Lemberg Travelling Fellowship.

Dr Kellogg studies microorganisms within deep water coral ecosystems. As part of her Fellowship she plans to compare US deep sea coral samples with those found on the Great Barrier Reef to better understand bacterial organisms on coral reefs.

Dr Kellogg will work with coral reef experts at James Cook University, The Australian Institute of Marine Science, and the ARC Centre of Excellence for Coral Reef Studies



(from left) Dr Christina Kellogg, Professor Stefanie Dimmeler and Dr Graham Nugent

and present lectures in Townsville, Brisbane and potentially also in either Canberra, Sydney or Melbourne.

Dr Graham Nugent, a wildlife ecologist with Landcare Research in New Zealand, has been awarded the 2018 Graeme Caughley Fellowship. His research is focused on the management, control, and eradication of introduced mammals in New Zealand, particularly deer, pigs, brush tail possums and rats.

Dr Nugent will travel to Canada, Mexico, Spain and the USA to collaborate on wildlife management and ecology in the fields of large scale mammal pest disease surveillance and eradication, primarily in relation to bovine tuberculosis.

Plant scientist first Australian to win top American award

September 14, 2017

Australian Academy of Science Fellow Professor Stephen Powles has won the American Chemical Society International Award for Research in Agrochemicals.

Professor Powles, an internationally recognised authority on herbicide resistance in plants, is the first Australian to win the award. It is given to a scientist who has made outstanding contributions to the field of agrochemicals at the international level, with their vision and sustained contribution having opened new horizons for investigators in their field and beyond.

Director of Australian Herbicide Resistance Initiative at the University of Western Australia's School of Agriculture and Environment, Professor Powles was recognised for his long-standing research contribution to identifying the role of cytochrome P450 enzymes in endowing herbicide resistance in plants.

Professor Powles is one of the world's most highly cited agricultural scientists and is widely regarded as a foremost expert in herbicide resistance in plants. Professor Powles and his team have more than 250 research papers published on herbicide resistance.



Academy Fellow Professor Stephen Powles is widely regarded as a foremost expert in herbicide resistance in plants.

Professor Powles was nominated for the award by Dr Todd Gaines of Colorado State University. Dr Gaines is a former postdoctoral student of Professor Powles who spent three years as a researcher at UWA before returning to the US.

Professor Powles will receive the award at a special symposium organised in his honour at the meeting of the American Chemical Society in Boston in August 2018.

This is an amended version of a story originally published by the University of Western Australia

Academy hosts Belmont Forum through Future Earth Australia

September 14, 2017

A meeting hosted by the Australian Academy of Science this week, through its Future Earth Australia initiative, has reinforced the importance of close collaboration across Australia's research sector both domestically and internationally.

The Academy hosted a meeting of the Belmont Forum, an international partnership that brings together key international funding agencies and the International Council of Science.

The Forum's core focus is to mobilise the funding of environmental change research and accelerate its delivery to remove critical barriers to sustainability.

Australia is currently a member of the Forum, with this meeting exploring how its commitment could be increased and focused.

The meeting was chaired by Academy Fellow Professor Ian Chubb, who is Chair of the Future Earth Australia Advisory Council.

The meeting heard from the Forum's Dr Maria Uhle (co-chair) and Dr Erika Key (Executive Director) about the work and influence of the group in encouraging collaborative research and communication efforts across borders to address common country, regional and international needs.

They emphasised the critical role that stakeholders play not only in the identification of issues but also in the co-design of the solutions. Other speakers included Professor Andrew Holmes, President, Australian Academy of Science; Dr Paul Bertsch, Acting Director Land and Water, CSIRO who currently manages Australia's Belmont Forum relationship; and Professor Stephen Dover, Chair of the Future Earth Australia Steering Committee.

Participants included members of the learned academies,

representatives of federal government departments and research funding agencies, and universities and research institutes.

Participants agreed that Australia should continue to extend its involvement in the Belmont Forum. The next step is to further explore and finalise the Australian representation on the Belmont Forum.

Read the communique www.science.org.au/files/userfiles/events/documents/belmont-forum-roundtable-communique.pdf

Australian maths teaching champions come together for ground-breaking program

October 05, 2017

More than 300 mathematics teachers across the country are meeting this month to begin a 12-month journey to become Champions of reSolve: Maths by



Participants at the Belmont Forum meeting included members of the learned academies, representatives of federal government departments and research funding agencies, and universities and research institutes.



At the NSW Champion's workshop in Sydney, one of eight nationally, were (from left) Senator the Hon Marise Payne representing the Minister for Education and Training, Academy Fellow Professor Nalini Joshi, Executive Director of reSolve Dr Steve Thornton, Ms Karen McDaid from the AAMT, and reSolve Champion Ms Shannon Ruskin.

Inquiry, a new national program designed to transform the way the subject is taught in Australian schools.

A 2015 international assessment measuring 15 year-olds' ability to use their maths knowledge and skills to meet real life challenges found Australia ranked equal 20th compared to the rest of the world, with Australian achievement in this area on a continuous downward trend since 2003.

The program, an initiative of the Australia Government Department of Education and Training, is managed by the Australian

Academy of Science in collaboration with the Australian Association of Mathematics (AAMT). It provides Australian school teachers in Foundation to Year 10 with resources to help students learn mathematics in an innovative and engaging way.

Academy President Professor Andrew Holmes said the workshops, which are being rolled out across the country, mark an important milestone in the program.

"The workshops will provide an opportunity for the Champions to come together, learn from each

other, and utilise the excellent reSolve resources," Professor Holmes said.

"The Academy is delighted with the progress of the reSolve project to date. It has produced teaching and professional learning resources that are innovative, engaging and that promote a spirit of inquiry in school mathematics".

The President of AAMT, Ms Allason McNamara, said AAMT is proud to partner with Australia's leading scientific organisation to deliver the Champions element of the reSolve project.

According to Ms McNamara, the reSolve Champions have volunteered to undertake this program because they are committed to sharing their knowledge with colleagues as well as ensuring that all their students enjoy the best mathematics teaching.

AAMT counts among its members thousands of Australia's leading mathematics teachers and university educators. It has a long history of promoting excellence in mathematics teaching and learning.

Executive Director of reSolve: Maths by Inquiry, Dr Steve Thornton, said the resources have been developed by Australian teachers and academics and informed by world best practice.

"Resources alone do not make the difference. That is why the Champions are such an important part of this project. They will promote the reSolve spirit of inquiry across Australia now and into the future," Dr Thornton said.

Opportunities for scientists—October 2017

October 05, 2017

Australian researchers invited to apply for Japan fellowships

The Academy invites applications from Australian researchers to undertake Postdoctoral Fellowships in Japan during 2018–19. The fellowships are for a period of 12 to 24 months.

Researchers in any field of natural sciences, including mathematics, technology, engineering and medicine, may apply. Medical doctors without a doctorate are not

eligible to apply for the Postdoctoral Fellowship.

Applications close 5pm (AEDT) Monday 30 October 2017. Funding for this program has been provided by the Department of Industry, Innovation and Science.

More information on the Japan fellowships www.science.org.au/opportunities/travel/grants-and-exchange/japan-society-promotion-science-fellowships

External awards

In addition to the Academy's opportunities for scientists, there are many opportunities to nominate for prizes and awards managed by other organisations. The following are currently open.

See our full calendar of external awards and prizes www.science.org.au/opportunities/recognition/external-sources-recognition

Dan David Prize

The prize covers three time dimensions—past, present and future:

- The 2018 Dan David Prize in the Past Time Dimension will be awarded to an outstanding individual or organization whose ongoing, ground-breaking research is making a significant contribution to the field of History of Science.
- The Dan David Prize in the Present Time Dimension will be awarded to an outstanding individual or organization in any field of the humanities or social sciences who have transformed our understanding of the moral and ethical significance of biological and medical innovations in our times.

- The 2018 Dan David Prize for the Future Time Dimension will be awarded to an outstanding individual or organization who has made pioneering and ground-breaking discoveries in the field of personalized medicine.

Closing date: 30 November 2017

More information on the Dan David Prize www.dandavidprize.org

Gruber Prizes

The Gruber Prizes honours individuals in the fields of cosmology, genetics and neuroscience, whose ground-breaking work provides new models that inspire and enable fundamental shifts in knowledge and culture—US\$500,000 for each category

Closing date: 15 December 2017

More information on the Gruber Prizes <http://gruber.yale.edu/gruber-prizes>

Albert Einstein World Award of Science

The 'Albert Einstein' World of Science Awards recognises those who have accomplished scientific and technological achievements which have brought progress to science and benefit to mankind - US \$10 000

Closing date: 18 December 2017

More information on the Albert Einstein World Award of Science www.consejoculturalmundial.org/news/2018-nominations/

José Vasconcelos World Award of Education

The José Vasconcelos World Award of Education is granted to a renowned educator, an authority in

the field of teaching, or to a legislator of education policies who has had a significant influence on the advancement in the scope of culture for mankind—US\$10,000

Closing date: 18 December 2017

More information on the José Vasconcelos World Award of Education www.consejoculturalmundial.org/news/2018-nominations/

International news— October 2017

October 05, 2017

Sustainable Development Goals the focus of presentation to Asian academies

The Academy is an Executive Board member of the Association of Academies and Societies of Sciences in Asia (AASSA).

Academy Professor Michael Barber recently represented the Academy at an international symposium in

the Philippines on ‘Realizing the full cycle of research and development: from bench to the community’, organised by the AASSA and the National Academy of Science and Technology of the Philippines. He delivered a presentation on an InterAcademy Partnership project, ‘Improving scientific input to global policy making: with a focus on the Sustainable Development Goals (SDGs)’. He also attended a meeting of the Executive Board.

Measurement challenges explored in Australia–China workshop

The electrical energy industries in Australia and China rely on measurement science and technology to solve current and emerging challenges. These needs are only expected to increase in the future.

A workshop in September explored these challenges, showcased current scientific achievements, and

formulated a roadmap of future requirements for measurement research in electrical energy security. The roadmap is expected to inform future research project opportunities to address industry needs.

See the outcomes from the workshop www.science.org.au/news-and-events/events/international-events/australia-china-workshop-measurement-challenges

Fellows update—October 2017

October 05, 2017

Honours and awards to Fellows

The Australian Mathematics Trust has named a medal in honour of Professor Cheryl Praeger AM FAA. Top performing girls in the Australian Mathematics Competition will now be awarded the Cheryl Praeger Medal.

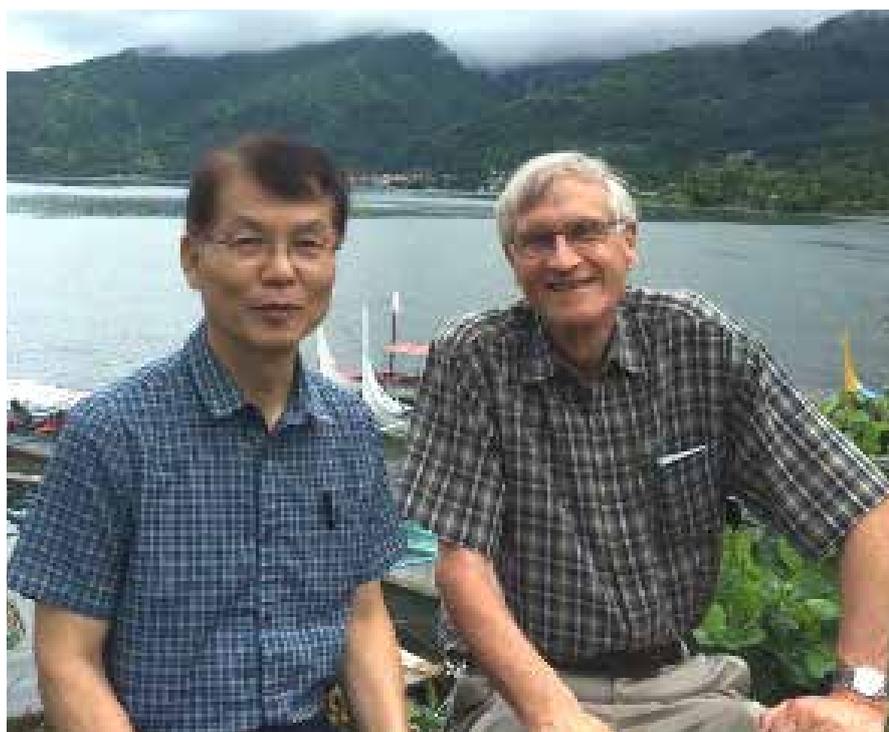
Professor Stephen Powles FAA FTSE has won the American Chemical Society International Award for Research in Agrochemicals.

Professor Geoffrey Burnstock FAA FRS has been awarded the Academy’s Macfarlane Burnet Medal in recognition of his outstanding scientific research in the biological sciences.

Obituaries

*Dr Keith Norrish AO FAA
1924 to 2017*

Dr Keith Norrish was elected to the Academy in 1977. He was distinguished for his contributions to soil and clay mineralogy which led to new insights into problems in agriculture, geochemistry and



AASSA President, Professor Yoo Hang Kim (left), with Professor Michael Barber at the Philippine Volcanic Monitoring Station, Lake Taal.



Dr Keith Norrish was acknowledged by the naming of the mineral 'Norrishite' in his honour.

colloid chemistry. Dr Norrish was regarded as the pre-eminent pioneer of wavelength dispersive X-ray spectrometry for the analysis of minerals. He made a major contribution to the development of world-class analytical methods for the mining sector in Australia, and his methods are widely used in Australia and overseas.

Dr Norrish's distinguished career in science was recognised by various scientific bodies and he was appointed to Officer of the Order of Australia in 1989. His many contributions to the field of X-ray spectrometry were acknowledged by the naming of the mineral 'Norrishite' in his honour.

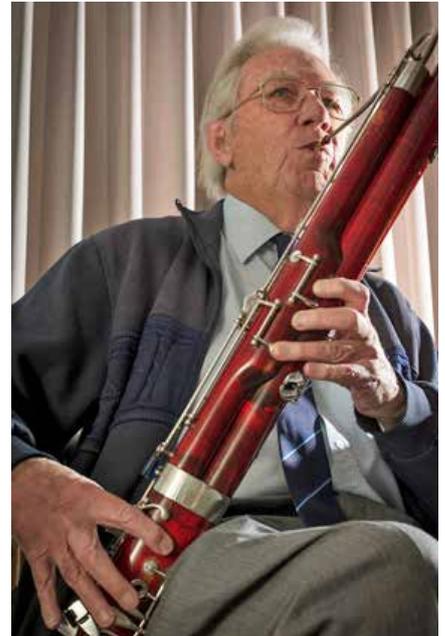
Dr Norrish was actively involved in the Academy, serving on a sectional committee and on the Academy's Council. He also served on the Hannan Medal and the Jaeger Medal selection panels. He was a member of the joint CSIRO–Academy Australian Scientific Research Board of Standards and was Chair of the Australian Journal of Soil Research.

Professor Neville Fletcher AM FAA FTSE 1930 to 2017

Professor Neville Fletcher was awarded the University Medal in Mathematics and Physics from the University of Sydney (Armidale campus) and gained his PhD in 1955 from Harvard University for his research on impurity levels in semiconductors. He then worked in the Radiophysics Division of CSIRO until 1960 when he was appointed to the role of Senior Lecturer, and then Professor in Physics at the University of New England. From 1983 to 1987, Professor Fletcher was Director of CSIRO's Institute of Physical Sciences and then a Chief Research Scientist at CSIRO until 1995. He joined the Australian National University in 1988 as a Visiting Fellow and then Adjunct Professor. He worked full days in his ANU office every day until just a few months ago.

Professor Fletcher's research interests included the application of physics to many areas, such as acoustics (including biological acoustics and musical instruments), materials (including semiconductors and solid-state devices, ice and water) and environmental science (particularly ice and clouds). His books on the physics of ice and of musical instruments have had a huge impact on the fields. He was also a musician and writer of short poems. He received the Academy's Thomas Ranken Lyle Medal in 1993 for his outstanding research in physics.

Professor Fletcher was elected to the Academy in 1976 and was elected to the Council in 1979, serving as Secretary (Physical Sciences) from 1980 to 1984. He



Professor Neville Fletcher was a musician, poet and esteemed scientist.

served on more than 30 committees sectional, policy and award committees and was the Honorary Editor of the Academy's Newsletter for more than two decades. He was also involved in many of the Academy's international activities and often assessed applications for the Academy's programs with Europe, North America and Asia. He co-convoked a 2006 Australia–Japan Symposium on Earth Systems Science and Nanomaterials.

With a strong interest in writing about science and in science education, Professor Fletcher was Chair of the Academy's Steering Committee for the Primary Investigations program (1991–1995). The success of this endeavour laid the foundation for the Academy's subsequent involvement in teacher resources and professional learning programs and led to the establishment of Primary Connections, Science by Doing and resolve: Mathematics by Inquiry. He recently made a substantial

donation to the Academy's Futures Fund and his valuable contribution will ensure that children today and in the future will benefit from his generosity.

Read the transcript of an interview conducted with Professor Fletcher in 1999 www.science.org.au/learning/general-audience/history/interviews-australian-scientists/professor-neville-fletcher

Events and outreach— October 2017

October 05, 2017

Journeying to the centres of the planets

Dr Helen Maynard-Casely will take us on a journey to get to know the

planets of our solar system more intimately through understanding their varied and downright dangerous insides.

5.30pm, 17 October at the Shine Dome in Canberra

More information www.science.org.au/news-and-events/events/public-speaker-series/dawn-new-space-age/journeying-centres-planets

Making better humans

Join us in Adelaide on 2 November where we will delve into the world of polymers and how they are being used to make better humans. Our presenters will explore how polymers are being used in everything from cancer treatments, to tackling antibiotic resistance and in 3D printed body parts.

More information www.science.org.au/news-and-events/events/public-speaker-series/making-better-humans

Brains at the Dome

This one-day program will feature presentations and panel discussion with senior representatives from each of the international brain science programs, along with Australian brain scientists and representatives from Australian and international neurotechnology and industry groups.

7 December at the Shine Dome, Canberra

More information www.science.org.au/news-and-events/events/brains-dome

Newsletter 111, November 2017

Message from the Chief Executive—November 2017

November 09, 2017

Dear Fellows and friends of the Academy

This month we are delighted to share with you news of the Academy's recently elected incoming President, Professor John Shine AC FAA. Professor Shine will commence in the role in May 2018 and we very much look forward to working with him to continue to advance science in Australia. Read about Professor Shine's work, as well as the newly elected Council members who will commence at the same time on page 11.



Anna-Maria Arabia delivering the keynote address at the 2017 L'Oréal-UNESCO For Women in Science Awards.

Joint meeting of the International Council for Science (ICSU) and the International Social Sciences Council (ISSC)

I attended the ICSU–ISSC joint meeting in Taipei at the end of October together with President Andrew Holmes, Foreign Secretary Cheryl Praeger, and colleagues Nancy Pritchard and Imran Ahmad.

It was a historic occasion as the meeting agreed to merge two international organisations to form the International Science Council (ISC) whose vision will be to advance all sciences as a global public good. The new council brings together some 40 international scientific unions and associations, and more than 140 national and regional organisations such as academies and research councils.

The newly formed organisation will continue to be involved in safeguarding the rights of scientists to undertake science freely, without discrimination and with integrity. The global organisation will also maintain a research program on global scientific matters.

ISC will continue to work closely with the Global Young Academy—a global network of early- and mid-career researchers who are genuinely inspirational. The future is in safe hands with young leaders like these!

I believe ISC's outcomes will be greater by working with social scientists than by working alone and I very much look forward to maintaining and growing the Academy's engagement with the newly formed body. Read the Academy's story welcoming the merger on page 13.

Prime Minister's Prize for Science

We have celebrated the awarding to Academy Fellow Professor Jenny Graves AO FAA of the Prime Minister's Prize for Science. Professor Graves is the first woman to win this prize in her own right. Her transformational scientific work in understanding how humans and all vertebrate animals evolved and function has been accompanied by a deep commitment to training and mentoring the next generation of scientists; progressing the science education agenda; and making progress towards gender equity in science. Congratulations Jenny! Learn more about Jenny's work on page 14.

Professor Graves has won many international awards including the 2006 L'Oréal-UNESCO Laureate Fellowship for Women in Science. Recently I had the opportunity to deliver the keynote address at the 2017 L'Oréal-UNESCO For Women in Science Awards.

This month's newsletter also includes a snapshot of Australia's involvement in the neutron star collision detection and lots of information about forthcoming opportunities for scientists and events.

I hope you enjoy reading this edition and please be free to contact me at any time annamaria.arabia@science.org.au.

Anna-Maria Arabia
Chief Executive

'Father of gene cloning' to head Australian Academy of Science

November 07, 2017

Australian biochemist and molecular biologist Professor John Shine AC has been elected President of the Australian Academy of Science.

Professor Shine became world-renowned for a series of discoveries he made between 1975 and 1985 that furthered our understanding of genes.

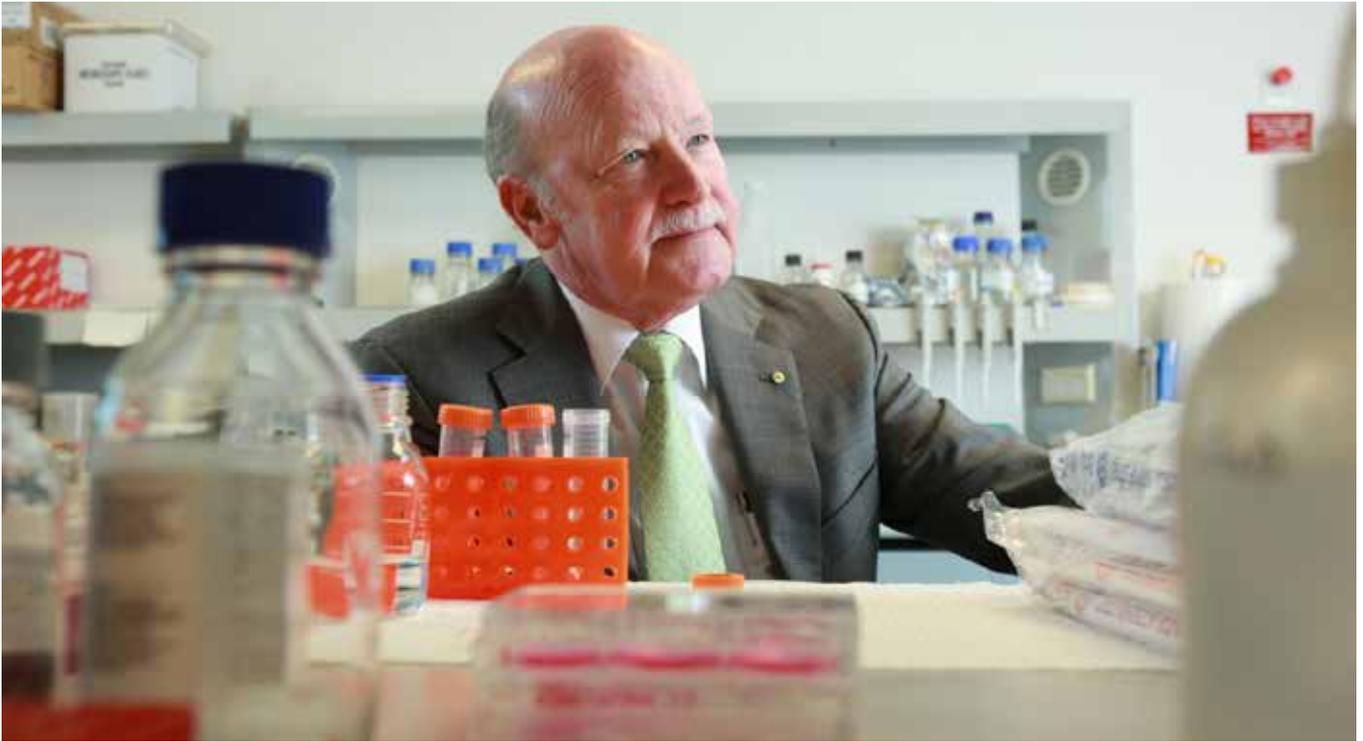
He cloned the first human hormone genes, and in the process developed sophisticated gene cloning techniques that helped transform the world of biotechnology.

Professor Shine said he is both daunted and proud of his election.

"The role of President comes with great prestige and big footsteps to follow in. I want to ensure that the Academy continues to be the first place government, politicians and industry come to when they are looking for learned scientific advice," Professor Shine said.

"Communicating the science behind immunisation is a great recent example of where the Academy has helped inform the public and addressed renewed concerns around this important health issue."

In his earlier roles in the US biotechnology industry and as Chairman of CSL for the past six years, Professor Shine has a long standing commitment to the translation of research discoveries into advances in health care for the social and economic benefit of the community.



Professor John Shine AC has been elected President of the Australian Academy of Science.

“I’ve always had a strong interest in communicating the importance of science to the broader community which I will continue to do in this role,” Professor Shine said.

“The importance of science to Australia’s future cannot be emphasised enough. As Australian science undergraduates and postgraduates attend their respective graduation ceremonies over the coming weeks, I would say to them, you will be in high demand and we need you to put your bright minds to the many challenges facing society.”

Professor Shine was elected to the Academy in 1994. The Academy’s home, previously known as Becker House, was named the Shine Dome in 2000 in recognition of a \$1 million donation made by Professor Shine to help restore the building, one of the most iconic and distinctive in Australia.

Professor Shine was also Executive Director of the Garvan Institute of

Medical Research from 1990 to 2012. He still runs his own lab at the institute, investigating the gene mutations responsible for inherited kidney disorders.

Outgoing President of the Academy, Professor Andrew Holmes AC, said he was delighted Professor Shine has been elected as the next President of the Academy.

“He combines the highest level of scientific knowledge and achievement with an extensive understanding of the corporate world. We look forward to the next chapter of the Academy under his wise leadership,” Professor Holmes said.

There have been 18 Presidents of the Academy since its founding President, Sir Marcus Oliphant AC KBE FAA FRS FTSE was elected in 1954. The President of the Academy is elected by its Fellows.

Other Fellows elected to the Academy’s Council include:

- Professor Elaine Sadler—Foreign Secretary
- Professor Hans Bachor AM—Secretary Education and Public Awareness
- Professor Wendy Hoy AO—Member (Biological Sciences)
- Professor Marilyn Anderson AO—Member (Biological Sciences)
- Professor Frances Separovic—Member (Physical Sciences)
- Professor Halina Rubinsztein-Dunlop—Member (Physical Sciences)

Positions will commence after the AGM at the Academy’s annual signature science event ‘Science at the Shine Dome’ on 24 May 2018. Read more about Professor John Shine’s research discoveries www.garvan.org.au/research/genomics-epigenetics/inherited-kidney-disorders/research-discoveries.

Media contact: Dan Wheelahan
ph: 0435 930 465
dan.wheelahan@science.org.au

Academy welcomes global alliance of the natural and social sciences

October 27, 2017

The Academy has welcomed the merger of the world's leading organisations representing the natural and social sciences, saying it will lead to a stronger and united global voice for science.

Members of the world's leading international science bodies this week agreed in a historic vote to merge and create a unified, international organisation, the International Science Council, whose vision will be to advance all sciences as a global public good.

The new council brings together the current members of International Council for Science (ICSU) and International Social Science Council (ISSC), including 40 international scientific unions and associations, and more than 140 national and regional organisations such as academies and research councils. Academy Fellow, Professor

David Black, is currently Secretary-General of the International Council for Science.

The agreement took place at a landmark joint meeting of ICSU and ISSC at the 32nd ICSU General Assembly, hosted by the Academy of Sciences in Taipei.

Australia was formally represented at the meeting by the President of the Australian Academy of Science, Professor Andrew Holmes and Foreign Secretary, Professor Cheryl Praeger.

Professor Holmes said the new council will see a unified and strengthened voice for science at the global level.

'There are few major policy issues whose framing can do without major social science input. A merged ISSC and ICSU will build on recent positive initiatives, such as Future Earth, and see greater coordination and funding of research between the natural and social sciences,' Professor Holmes said.

The final vote count in favour of the merger for ICSU was 97.6% and 90% for the ISSC. It came at the end of two days of intensive discussions on issues ranging from the new strategy, statutes and governance arrangements and the legal framework.

The International Science Council will be launched at a founding General Assembly to be held in Paris, France in 2018.

More information about the merger www.icsu.org/current/press/worlds-leading-bodies-of-social-and-natural-sciences-to-merge-in-2018-becoming-international-science-council



Australia was represented by Professor Andrew Holmes and Professor Cheryl Praeger



And the ayes have it!

Academy uses Facebook to combat fake news

October 17, 2017

Do baby simulators reduce pregnancies? What can Viking poo reveal about our past? Does the world have enough food? Could a black hole swallow Earth?

These are just some of the everyday questions the Australian Academy of Science will ask (and answer!) as it launches an ambitious new initiative to connect more people with science. Increasingly the public needs a trusted, credible source they can rely on for scientific information to inform their decisions.

Academy President, Professor Andrew Holmes, said no matter your background, age or education level, every person should be able to access and appreciate the wonders of science.

'Science is all around us and we want people to discover that. However, we recognise that often the way science is presented can be hard to understand and somewhat dull—we're about to change that,' Professor Holmes said.

Using the latest digital grammar and a social-first publishing approach, the highest quality Australian and international science will be delivered globally on the Academy's Facebook page. The Academy is the brains trust of science in Australia, meaning the best scientists in the country are ensuring content quality. Chinese speaking audiences will be able to access translated content on social media platforms Weibo and Toutiao.



The Academy is launching an ambitious new social media initiative to connect more people with science.

The ANU's 2017 Australian Beliefs and Attitudes Towards Science survey found just over half the Australian population (54%) reported having a conversation about science most days.

'Through entertaining and informative content we hope to spark many more conversations about science—an engaged public is so important at a time when science is at the centre of so many critical public policy decisions,' Professor Holmes said.

'The rise of 'fake news' has also caught audiences in the middle of a tug-of-war between authenticity and click-bait. We believe credible and verified content has never been more important, to meet a renewed public appetite for scientifically sourced information.'

The Academy is working in partnership with Adam Boland, who reinvented Australian breakfast television and was head of video at NewsDNA (NewsCorp). Boland joins the Academy as Executive Producer of the Academy's video content.

Paul Richards, former Supervising Producer at Channel Seven's Sunrise, has also joined the Academy and has thrown his talent and skill behind this project.

Find the new content on the Academy's Facebook page or at www.science.org.au/curious.

Academy Fellow wins Prime Minister's Prize for Science

October 18, 2017

Academy Fellow Professor Jenny Graves AO has been awarded the prestigious 2017 Prime Minister's Prize for Science for her pioneering investigations of the genetics of sex.

Professor Graves has transformed our understanding of how humans and all vertebrate animals evolved and function. She has kick-started genomic and epigenetic research in Australia, and predicted the disappearance of the male chromosome.



Professor Jenny Graves has used marsupials and monotremes, birds and lizards to understand the complexity of the human genome. Photo: Prime Minister's Prizes for Science/WildBear

She has used marsupials and monotremes, birds and lizards to understand the complexity of the human genome and to reveal new human genes. She has transformed our understanding of how sex chromosomes work and how they evolved, predicting the decline of the Y chromosome.

Her research has contributed to a deeper understanding of the immune system, prion diseases and blood proteins, and helped understanding of the tumour driving the Tasmanian devil to extinction.

The wider scientific impacts of Professor Graves's include deepening the understanding of animal chromosome and genome evolution and its relationship with speciation, finding the chromosome changes involved in the fatal transmissible facial tumour of the Tasmanian devil, and discovering 14 novel human genes, including one which is critical for brain development.

She has also pioneered the fields of comparative genomics and epigenetics globally, been the driving force behind sequencing the first marsupial and monotreme genomes, published more than 440 scholarly works which have been cited more than 17,000 times, and won many international awards.

Many of the scientists she has trained now occupy senior positions in science, medicine, industry and academia.

Knowing that engagement with science starts early, Professor Graves used her position as Secretary of Education at the Academy to advance inquiry-based school science programs in Australia. As the Academy's Foreign Secretary and a member of international boards, she advocated progressive approaches in Asia.

She has been a role model for girls and women in science in Australia. She was first to introduce measures into the Academy to remove gender bias from election to Fellowship. This was the forerunner

of several highly effective equity programs spearheaded by the Academy. Her Academy positions also allowed her to agitate for gender equity internationally.

Academy award winners recognised

Two recipients of Academy awards were also recognised in the Prime Minister's Prizes for Science.

Professor Jian Yang, winner of the Academy's 2015 Ruth Stephens Gani Medal, won the Frank Fenner Prize for Life Scientist of the Year for creating ways to understand inherited traits and the human genome, while Distinguished Professor Dayong Jin, winner of the Academy's 2017 John Booker Medal, won the Malcolm McIntosh Prize for Physical Scientist of the Year for creating new technologies to image the processes of life.

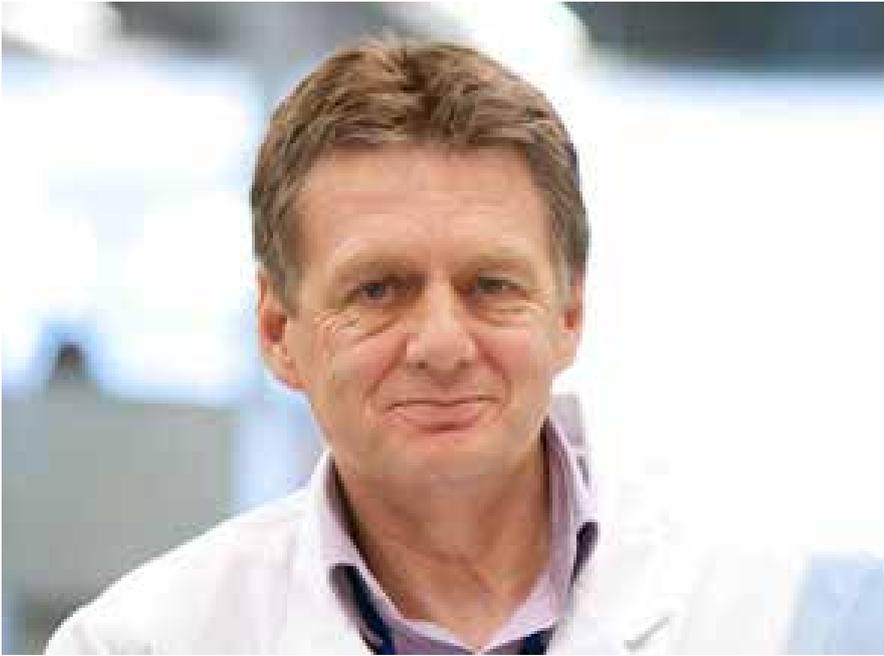
Professor Jin and Professor Yang are both former participants in the long-running Australia–China symposia series, and Professor Jin was the Australian nominee for the 2017 ASPIRE Prize.

More about the recipients of the 2017 Prime Minister's Prizes for Science <http://science.gov.au/community/PrimeMinistersPrizesforScience/Recipients/2017/Pages/default.aspx>

Asia–Pacific research and industry collaborations to address shared challenges

October 11, 2017

Australian-led collaborative projects to help address the Asia–Pacific affordable housing crisis, tackle hepatitis B and monitor the impact of coastal climate changes are



Academy Fellow Alan Cowman's team will work with Indonesia and Japan to research malaria and dengue fever.

amongst five research organisations to receive \$897,210 collectively in Australian Government funding today.

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

The grants will support Australian researchers and businesses who are collaborating with partners in our immediate region to develop innovative solutions to shared challenges.

The projects will build strong regional partnerships across a wide range of fields including agricultural and environmental sciences, transport and construction, health, manufacturing and materials sciences.

The biggest grant, \$379,210 over three years, goes to Academy Fellow Alan Cowman FAA FRS and

his team at the Walter and Eliza Hall Institute of Medical Research. Together with partners in Indonesia and Japan they will use the grant to understand mechanisms leading to immunity and resistance to malaria and severe dengue fever.

Other grants include collaborative projects between:

- the University of Melbourne, and partners in Vietnam, Papua New Guinea, India, Sri Lanka, Indonesia, Thailand and China to establish an Asia–Pacific research network on sustainable materials and prefabricated systems to address the housing crisis in the region through resilient affordable housing (\$210,000 over two years).
- the University of South Australia, and partners in New Zealand and Japan to overcome barriers to the mass production of biomedical devices to promote improved health care outcomes for ageing populations (\$180,000 over three years).

- the University of Melbourne, together with partners in China, Singapore, USA, Canada and France to establish an international coalition to support the discovery of a safe, affordable, scalable and effective cure for hepatitis B (\$83,000 over 15 months).
- the University of Wollongong, and partners in Indonesia and the United Kingdom to develop regional monitoring of coastal climate change impacts using remote sensing technologies (\$45,000 over three years).

The Regional Collaborations Programme is designed to build strong linkages between Australian researchers and businesses and their Asia–Pacific regional counterparts by supporting multi partner science, research and innovation collaboration activities that address issues of significance to our nation and the region.

The programme also supports greater mobility among our technical and research workforce, and builds Australia's research capability by linking to global science and research networks and infrastructure.

More information on the Regional Collaborations Programme <https://www.science.org.au/opportunities/travel/grants-and-exchange/regional-collaborations-programme>

Macfarlane Burnet Medal awarded to 'Smooth Muscle Man'

October 04, 2017

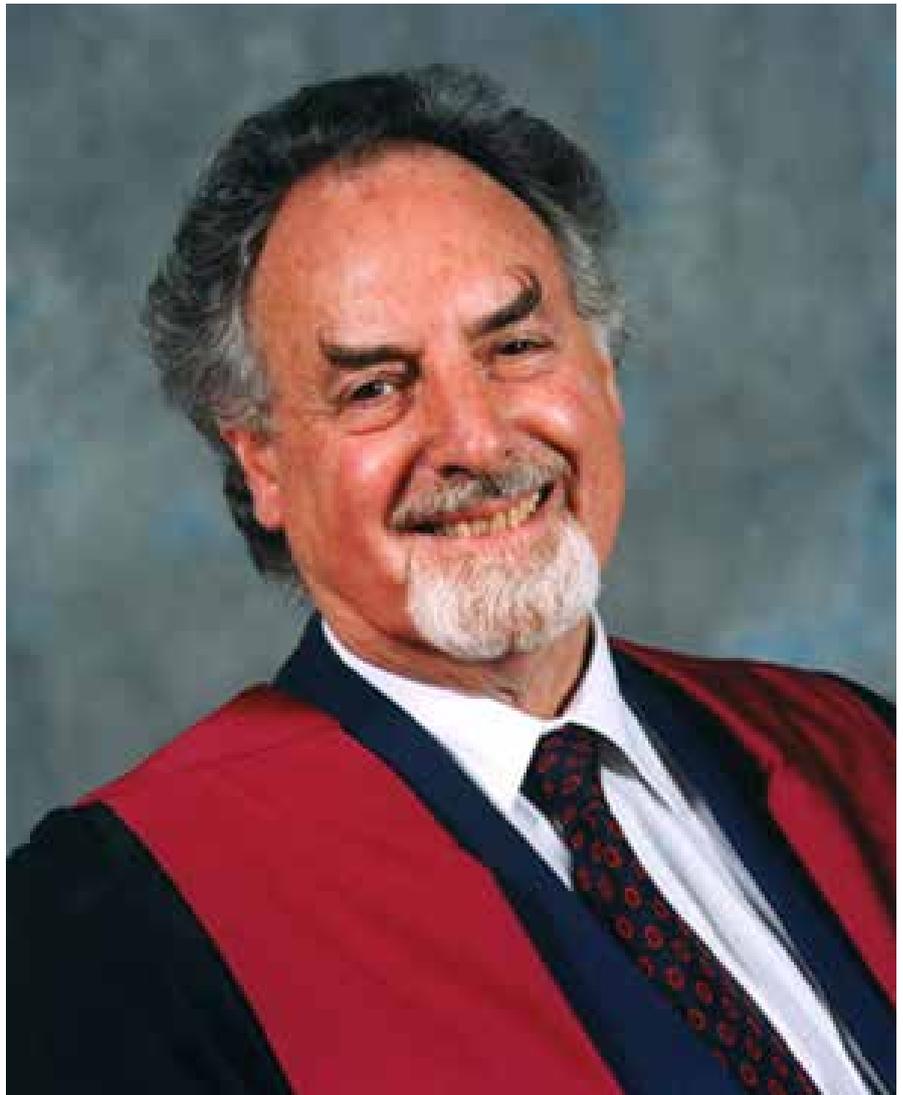
Australian and British neurobiologist Professor Geoffrey Burnstock has been awarded the Australian Academy of Science's Macfarlane Burnet Medal in recognition of his outstanding scientific research in the biological sciences.

Professor Burnstock, who was elected as a Fellow of the Academy 1971, is internationally recognised for the discovery of purinergic neurotransmission (i.e. ATP as an extracellular signalling molecule), a novel signalling system between cells that is of central importance for many biological processes.

His 1972 discovery, and later 1976 commentary in *Neuroscience* on cotransmission*, challenged established concepts of the biology of cell messengers and neurotransmission. The purinergic concept was not initially accepted by the scientific community, and it took twenty years for Professor Burnstock to prove his hypothesis.

More recently, Professor Burnstock has focused on the pathophysiology and therapeutic potential of purinergic signalling. This research has had an impact on the understanding of pain mechanisms, osteoporosis, chronic cough, hypertension, cancer, bladder, kidney and neurodegenerative diseases.

One drug to result from Professor Burnstock's research is clopidogrel, which is used to reduce the risk of heart disease and stroke in high risk patients. Global sales are in the billions of dollars.



Professor Geoffrey Burnstock has been awarded the Macfarlane Burnet Medal.



Geoffrey Burnstock with the late Mollie Holman looking at the records of their electrophysiology experiments of neuromuscular transmission in the guinea pig vas deferens in Melbourne in 1960. Photo: Supplied

Emeritus Professor Derek Denton from the University of Melbourne, who nominated Professor Burnstock for the award, says he has been, and continues to be an inspiration for many.

“His vision and creativity have enabled and driven the research of a very large number of laboratories around the world,” Emeritus Professor Denton said.

“He has personally supervised over 100 PhD and MD students and over 60 post-doctoral fellows and since his first report published in 1957 in the journal *Nature*, he has published more than 1500 papers, which have been cited more than 101,000 times.”

The 88 year-old is returning to Australia later this year to continue his scientific investigations after a 42-year career at University College London. Between 1959 and 1975, Professor Burnstock also worked at the University of Melbourne.

“It is a particular pleasure on my return to live in Melbourne to have been honoured in this way,” Professor Burnstock said.

Professor Burnstock is known as the ‘smooth muscle man’ due to his early research which focused on the

biology of smooth muscle. In 1957 he developed a new method for recording the electrophysiology of smooth muscle cells.

Smooth muscle refers to a muscle of the human body that is part of an involuntary muscle group. They can be found in the walls of the stomach and blood vessels, intestines, bladder, veins, and prostate, among other places.

Professor Burnstock will deliver a lecture on his lifetime’s work at the Australian Academy of Science’s Science at the Shine Dome in May 2018. More information about Professor Burnstock www.science.org.au/learning/general-audience/history/interviews-australian-scientists/professor-geoffrey-burnstock.

The Macfarlane Burnet Medal and Lecture is named after Nobel Laureate and virologist Sir Frank Macfarlane Burnet. Past winners include Nobel Laureate Barry Marshall, former Academy president and molecular biologist Suzanne Cory, Sir Gustav Nossal and Emeritus Professor Derek Denton.

* The concept of cotransmission, in contrast to the generally held belief that one nerve only utilised one neurotransmitter, was formulated in a Commentary in

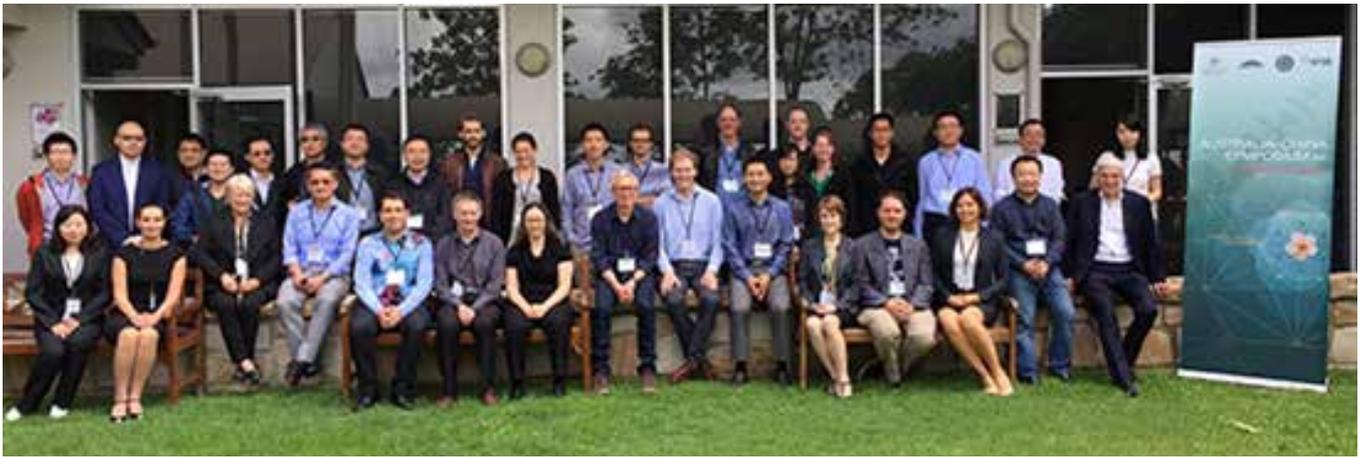
Neuroscience in 1976. Initially, ATP was shown to be a cotransmitter with noradrenaline in sympathetic nerves, but it is now known that ATP is a cotransmitter with classical transmitters in most, if not all, nerves in both the peripheral and central nervous systems.

Australia–China symposium on synthetic biology

Some of Australia’s and China’s leading experts on synthetic biology met in Brisbane in mid-October to share the latest research. The Australia–China symposium on synthetic biology was the 13th in a series of annual scientific symposia jointly organised in collaboration with the Chinese Academy of Sciences (CAS) and the Australian Academy of Technology and Engineering (ATSE).

Synthetic biology is essentially the application of engineering principles to biology. It involves the design and construction of biological components for useful purposes, and has wide applicability across medical, agricultural and environmental biotechnology. At the symposium, Chinese and Australian researchers discussed their research on macromolecular design, engineering of biochemical





Participants at the Australia-China symposium on synthetic biology.

pathways and genome-scale re-design of living organisms, as well as the ethical and regulatory implications of synthetic biology research.

The Australia–China Science Academies Symposia Series is one of three elements that make up the Australia–China Science and Research Fund (ACSRF). The ACSRf is jointly managed by the Australian Government Department of Industry, Innovation and Science and the Chinese Ministry of Science and Technology and its objective is to facilitate stronger collaborative ties between the two countries.

The symposium steering committee members were Professor Simon Foote^{FAA FTSE FAHMS}, Professor Peter Gray^{AO FTSE} and Professor Ian Small^{FAA} who ably selected the Australian speakers. Professor Gray and Professor Small also attended the symposium to chair sessions.

The Australian academies were represented by Professor Andrew Holmes, President of the Australian Academy of Science, and Professor Kaye Basford, Vice-President of ATSE. Professor Jinghua Cao, Deputy Director of the CAS Bureau of International Cooperation led the Chinese delegation. In addition, the

Embassy of the People’s Republic of China was represented by Mr Wang Qiang, Counsellor for Science and Technology, and representatives from the Australian Government Department of Industry, Innovation and Science also attended.

A key feature of this symposium was the participation of early- and mid-career researchers (EMCRs) from both countries. EMCRs were able to share some of their own research during a poster presentation session. The symposium also included visits to the Australian Institute for Bioengineering and Nanotechnology and the CSIRO Synthetic Biology Future Science Platform.

Synthetic biology aims to provide sustainable solutions to many grand challenges of modern society via innovations in therapeutics, agriculture, pharmaceuticals, energy, and bioremediation. There is considerable potential for China and Australia to cooperate and provide regional and international leadership for researching responses to these challenges. The conclusions of the participants and our Academies, Chinese and Australian, will provide a platform for enhancing collaboration

between the two countries through innovative scientific, technological and engineering solutions.

The next symposium in this series will be held in Changchun, China at the CAS Institute of Optics, Fine Mechanics and Physics (CIOMP) on the topic ‘Light changes our life’.

Japan Society for the Promotion of Science Alumni Association in Australia

The Japan Society for the Promotion of Science Alumni Association in Australia (JSPSAAA) held its first science symposium on 9 and 10 October at the Academy’s Shine Dome. Formally established in February 2017, the JSPSAAA membership consists of former and current JSPS fellowship recipients. Its aims are to engage Australian scientists with collaborative links to Japan and to enhance the strong bilateral science and research relationship between Australia and Japan. The Australian Academy of Science was involved in the establishment of the JSPSAAA and now supports the executive committee with the association’s operations and in preparation for



Participants at the official launch of the JSPSAAA Credit: Bradley Cummings Photography

the launch. Currently the JSPSAAA membership totals more than 220.

The symposium was opened by the inaugural chair of the JSPSAAA, Associate Professor Graziella Caprarelli. Then the Academy's Vice-President Jim Williams gave a welcome address, acknowledging the history of collaboration between Australian and Japanese researchers. Professor Williams was followed by Minister Takashi Katae, from the Embassy of Japan, and Dr Mariko Kobayashi, the Director of the JSPS International Program Department, who both recognised the strong relationship between Australia and Japan in the context of science, trade and industry.

Two keynote talks were delivered by Japanese and Australian researchers. Professor Fumitoshi Ishino from the Tokyo Medical and Dental University talked about the



From left: Australian Ambassador to Japan, The Hon Richard Court AC and the President of the JSPS, Dr Yuichiro Anzai

gene traits acquired by marsupial mammals. Professor Graham Farquhar from the Australian National University, who is this year's Kyoto Prize awardee, gave a talk on water efficient crops analysed by mathematical model. Sixteen JSPSAAA members delivered presentations on topics

ranging from molecular biology, fisheries and space science, reflecting the variety of research fields the members engage in. It is hoped that the symposium will enhance the role of members to act as a bridge between the two countries.

Prior to this symposium the Australian Ambassador to Japan, The Hon Richard Court AC, hosted a reception at the Australian Embassy in Tokyo to celebrate the establishment of the JSPSAAA and the inaugural science symposium in Canberra. Dr Yuichiro Anzai, President of the JSPS, highlighted the long-term nature of research collaboration between Australian and Japanese researchers, as evidenced by the fact that 2017 is the 40th anniversary of the signing of a Memorandum of Understanding between the Academy and JSPS. More than 50 representatives from the public sector and universities attended to celebrate the occasion.

More information: <https://aas.eventsair.com/jspsaagm-science-symposium/2017>

Opportunities for scientists—November 2017

November 09, 2017

External awards

In addition to the Academy's opportunities for scientists, there are many opportunities to nominate for prizes and awards managed by other organisations. The following are currently open.

See our full calendar of external awards and prizes www.science.org.au/opportunities/recognition/external-sources-recognition

Dan David Prize

The Dan David Prize covers three time dimensions—history of science, humanities or social sciences, and personalised medicine.

Closing date: 30 November 2017

Gruber Prizes

The Gruber Prizes honour individuals in the fields of cosmology, genetics and neuroscience, whose ground-breaking work provides new models that inspire and enable fundamental shifts in knowledge and culture—US\$500,000 for each category

Closing date: 15 December 2017

Albert Einstein World Award of Science

The 'Albert Einstein' World Award of Science award recognises those who have accomplished scientific and technological achievements, which have brought progress to science and benefit to mankind—US\$10,000

Closing date: 18 December 2017

José Vasconcelos World Award of Education

The José Vasconcelos World Award of Education award is granted to a renowned educator, an authority in the field of teaching, or to a legislator of education policies who has had a significant influence on the advancement in the scope of culture for mankind—US\$10,000

Closing date: 18 December 2017

AOGS Axford Medal

The AOGS Axford Medal awards outstanding achievements in geosciences and unselfish cooperation and leadership in Asia and Oceania

Closing date: 5 January 2018

The Volvo Environment Prize

The Volvo Environment Prize is awarded to people who have made outstanding scientific achievements

within the area of environment and sustainability—US\$215,000

Closing date: 10 January 2018

A.M. Turing Award

The A.M. Turing Award is given for major contributions of a technical nature to the computing community—US\$1 million

Closing date: 15 January 2018

Welch Award in Chemistry

The Welch Award in Chemistry is awarded for important clinical research contributions which have a significant positive influence on mankind—US\$500,000

Closing date: 31 January 2018

International news—November 2017

November 09, 2017

International forum makes progress on science and technology in society

An international forum in early October brought nearly 1400 global leaders in science, technology and other areas to address major societal challenges.

The Science and Technology in Society forum in Kyoto attracted science leaders from academia, government and industry. Academy President Professor Andrew Holmes represented the Academy at the forum.

The forum themes focused on:

- energy, resources and environment
- life sciences and health care
- digitised society
- research and innovation
- cooperation in science and technology.



The Japanese Prime Minister, Shinzo Abe, addressing the forum in Kyoto.

The meeting attracted a large number of Nobel Laureates and other senior science leaders, and provided opportunities for younger science leaders to attend.

The Japanese Prime Minister, Shinzo Abe, addressed the meeting and the Crown Prince and Princess attended the closing session.

Professor Holmes also attended a special session for Presidents of Science Academies where the topic of transdisciplinary research was discussed.

More about the forum outcomes www.stsforum.org/wp-content/uploads/STS_2017_Statement_EN.pdf

Australian researcher with French colleagues detect the neutron star merger kilonova

In August this year Associate Professor David Coward, from the University of Western Australia, was part of a team that discovered the neutron star merger kilonova, while working with French collaborators.

Associate Professor Coward was awarded a 2016 France–Australia Science Innovation Collaboration (FASIC) grant for early- and mid-career researchers to conduct research on new robotic telescope technologies for the discovery of optical counterparts to gravitational waves, fast radio bursts and space debris tracking, with researchers

from the Cote d’Azur Observatory in Nice, France.

The FASIC grant was administered by the Academy and funded by the Embassy of France in Australia.

Fellows update— November 2017

November 09, 2017

Honours and awards to Fellows

Professor Jenny Graves AO FAA—2017 Prime Minister’s Prize for Science for her pioneering investigations of the genetics of sex.

Professor Jane Visvader FAA—Victoria Prize for Life Sciences, jointly with Geoffrey Lindeman

Professor Geoffrey Lindeman FAA—Victoria Prize for Life Sciences, jointly with Jane Visvader

Professor Maria Forsyth FAA—Victoria Prize for Physical Sciences

Professor Gordon Wallace AO FAA FTSE—NSW Scientist of the Year, Premier’s Prizes for Science and Engineering

Professor Trevor McDougall FAA FRS—Excellence in Mathematics, Earth Sciences, Chemistry and Physics, Premier’s Prizes for Science and Engineering

Professor Edward Holmes FAA FRS—Excellence in Biological Sciences, Premier’s Prizes for Science and Engineering



(from left) Jenny Graves, Jane Visvader, Geoffrey Lindeman, Maria Forsyth, Gordon Wallace, Trevor McDougall, Edward Holmes, John Mattick and Sam Berkovic.

Dr Graham Farquhar AO FAA FRS—ACT Senior Australian of the Year

Professor John Mattick AO FAA FTSE—Elected as a Fellow of the Australian Academy of Technology and Engineering

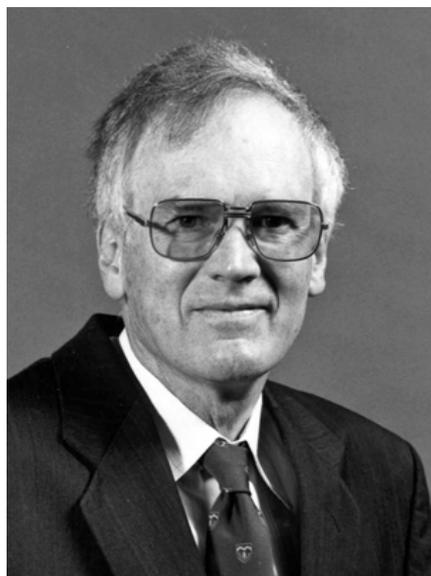
Professor Samuel Berkovic AC FAA FRS—Made an international member of the National Academy of Medicine (US)

Professor C Jagdish AC FAA FTSE—Elected as a Foreign Fellow of the Indian National Science Academy and as an Honorary Fellow of the Andhra Pradesh Akademi of Sciences

Obituary

Professor Arthur McComb FAA FAIBiol 1936 to 2017

Professor Arthur McComb was a distinguished marine scientist and highly regarded expert on the control of plant growth in aquatic systems. He was elected to the Academy in 1995. Initially focused on plant physiology with interests in gibberellins, his research then moved onto the detailed functioning of aquatic systems



Professor Arthur McComb.

using field, laboratory and modelling techniques to examine the interrelationships of benthic, epiphytic and planktonic plant components under conditions of increasing eutrophication. Much of his work contributed to solving applied problems for government agencies, including the demise of seagrass meadows and algal nuisances in marine embayments or estuaries. As well as an extensive range of research papers and chapters for books, Professor McComb edited or co-authored major treatises on seagrass biology and Australian wetlands.

Professor McComb received many prestigious prizes and awards in recognition of his contributions to the understanding and management of marine, estuarine and freshwater systems. These include the Kelvin Medal of the Royal Society of Western Australia in 1997; the Prime Minister's Centennial Medal for Environmental Science in 2001; a DSc from Murdoch University in 2007; and the Silver Jubilee Award from the Australian Marine Sciences Association in 2002. From 1996 to 2000, Professor McComb also served on one of the Academy's Sectional Committees.

Events and outreach— November 2017

November 09, 2017

Australia's role in looking for life on Mars

In the final fascinating event of this year's Canberra speaker series, the Deputy Director of UNSW's Australian Centre for Astrobiology, Dr Carol Oliver, will explain how

Australia is involved in the search for life on Mars.

5 December at the Shine Dome, Canberra

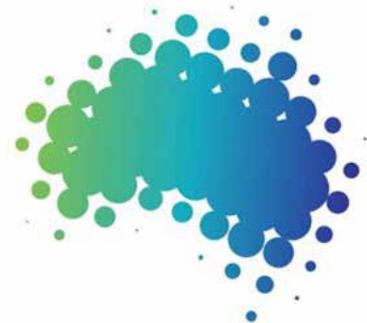
More information www.science.org.au/news-and-events/events/public-speaker-series/dawn-new-space-age/australias-role-looking-life-mars

Brains at the Dome

This one-day program will feature presentations and a panel discussion with senior representatives of the brain science programs in Europe, the US, China, Japan, Korea and Israel, along with Australian brain scientists and representatives of Australian and international neurotechnology companies, and industry groups.

7 December at the Shine Dome, Canberra

More information www.science.org.au/news-and-events/events/brains-dome



Brains at the Dome is in Canberra on 7 December

David Craig Medal lectures

Professor David St Clair Black AO FAA is the recipient of the 2017 David Craig Medal and Lecture and will be presenting lectures on molecular design and synthesis in Sydney, Adelaide, Hobart and Brisbane between November and March.

More information www.science.org.au/news-and-events/events/2017-david-craig-medal-lectures-adelaide

Selby Travelling Fellowship

Recipient of the 2017 Selby Travelling Fellowship, Professor Xi-Cheng Zhang, is presenting two lectures in three locations in December. The first is Next rays? T-rays! in Melbourne and Adelaide, and the second topic of Puzzle of Terahertz wave emission from liquid water with ultrafast laser pulses will be delivered in Wollongong.

Frew Fellowship Lectures

During November and December, Professor Albert Polman is delivering the 2017 Frew Lecture at the Australia New Zealand Conference on Optics and Photonics in New Zealand, as well as lectures on light management in photovoltaic materials in Melbourne, Sydney and Canberra.

More information www.science.org.au/news-and-events/events/2017-frew-fellowship-lecture-monash

EMCR update—November 2017

November 09, 2017

Exploring the Antarctic Frontier

The Academy's most recent Theo Murphy Australian Frontiers of Science Symposium brought together 70 early- and mid-career researchers (EMCRs) with an interest in the Antarctic region. The researchers travelled from around Australia to meet in Hobart with a view of the Aurora Australis, Australia's flagship Antarctic icebreaker and research vessel. Her



Her Excellency Professor the Honourable Kate Warner AC, Governor of Tasmania (right) meeting keynote speaker Professor Anne-Marie Brady and Academy Fellow Professor Ian Allison at the Frontiers of Science symposium.

Excellency Professor the Honourable Kate Warner AC, Governor of Tasmania, opened the event and was delighted to meet a selection of Academy Fellows, senior Antarctic researchers and emerging research leaders at the opening night function.

Over the following two days the EMCRs explored the breadth of research occurring in Antarctica and the Southern Ocean, touching on everything from volcanoes to the effects of wastewater, the impact of plate tectonics on ocean currents, and understanding how best to manage threats to biodiversity. The symposium gave participants excellent opportunities to find out about other fields and develop networks for future collaborations.

The Academy thanks the generous sponsors who contributed to the success of this event, from the Theo Murphy (Australia) Fund, the Institute for Marine and Antarctic Studies at the University of Tasmania, the Antarctic Climate and Ecosystems CRC, ARC Special

Research Initiative for Antarctic Gateway Partnership, and CSIRO.

Women in STEM and Entrepreneurship (WISE) grants program

Businesses, not-for-profits, education and research organisations are encouraged to apply for grants to inspire more girls and women to pursue careers in science, technology, engineering, and maths (STEM) and entrepreneurship.

Applications for round two of the WISE program close on 15 November 2017, and the successful projects will be announced in early 2018. The Women in STEM and Entrepreneurship program is part of the 'Inspiring all Australians in Digital Literacy and STEM' component of the Australian Government's National Innovation and Science Agenda.

More information www.business.gov.au/Assistance/Women-in-STEM-and-Entrepreneurship

Message from the Chief Executive

December 12, 2017

Dear Fellows and friends of the Academy

With the festive season soon upon us, the December newsletter will be the last for 2017.

At this time of year I'd like to personally acknowledge the generosity of the Fellows of the Australian Academy of Science who tirelessly, generously and humbly share their expertise and experience to advance science in Australia and internationally. I also offer my sincerest thanks to friends and supporters of the Academy whose philanthropic contributions enables so much of the Academy's work. You can read more about the Christmas 2017 Awards Fundraising Appeal in this newsletter.

I'm delighted to share with you the 2017 Annual Fellows' Christmas Reading List. Annually, the Fellows of the Academy are asked to recommend a book title and this year 31 favourite reads have been received. The 2017 Annual Fellows' Christmas Reading List will not disappoint even the most avid reader, including fiction and non-fiction, science and some lighter reading too. The titles make great gifts or perhaps you can immerse yourself in a few books over the summer.

Enjoy reading the December newsletter. The next edition will be published in February.

Please be free to contact me at any time annamaria.arabia@science.org.au.



[org.au](http://science.org.au). Until then, my warmest wishes to you for the Christmas period and a safe and prosperous beginning to 2018.

Anna-Maria Arabia
Chief Executive

Academy President launches Christmas 2017 Awards Fundraising Appeal

December 12, 2017

Central to the purpose of the Academy is the recognition and support of outstanding contributions to the advancement of science. The honorific awards were established to recognise distinguished research in three categories: awards of medals and prizes are made to early-career scientists up to 10 years post PhD, mid-career scientists 8 to 15 years post PhD, and the prestigious career awards which are made to scientists for life-long achievement.

“It's virtually impossible to imagine a world without science and without scientists striving every single day to understand the world around them.”



Professor Andrew Holmes: 'It is hard to imagine where the Australian Academy of Science would be without the generosity and philanthropic support of many individuals and organisations.'

It's virtually impossible to imagine a world without science and without scientists striving every single day to understand the world around them. I often reflect on the collective impact on the world made by the Fellows of the Australian Academy of Science and remain quite awestruck at the difference their work has made to our wellbeing, our economy and our environment. The world simply would not be as we know it today in the absence of their contribution.

Equally, it is hard to imagine where the Australian Academy of Science would be without the generosity and philanthropic support of many individuals and organisations.

All of us share a desire for science and scientists to prosper and for future generations to benefit from discovery and to be empowered by knowledge. Yet each person has a unique reason for supporting the Australian Academy of Science.

I invite you to support the Australian Academy of Science through our Christmas 2017 Awards Fundraising Appeal so that together we can continue to build a strong and vibrant future for science in Australia.

The Christmas 2017 Awards Fundraising Appeal offers you the chance to support the Academy of Science through donations that are fully tax deductible.

Should you wish to discuss ways in which you can support the Australian Academy of Science and how you would like your support directed, please contact Ms Isobel Griffith, Manager Development and Stewardship on (02) 6201 9400.

Your support is deeply appreciated.

Yours sincerely

Professor Andrew Holmes AC PresAA FRS

FTSE

Academy receives ARC grants for nutrition science and big data projects

November 10, 2017

The importance of improving our understanding of the changing Australian diet has been recognised with a \$118,000 grant to develop a national 10-year plan for nutrition science.

This is one of two Australian Academy of Science projects to receive Australian Research Council



What do we eat, and what should we eat? The Academy will develop a 10-year plan for nutrition science to help us answer these questions.

funding as part of the Council's Learned Academies Special Projects (LASP) scheme.

The second project—to identify the challenges and opportunities associated with big data in Australian research—has received \$210,000.

The two projects are among five to receive a total of \$1.15 million from the scheme, announced today by Education Minister Simon Birmingham.

The objective of the scheme is to support the development of Australian research by providing funding to Australia's learned academies.

The funding was announced alongside grants for the Discovery, Discovery Early Career Research Awards, Discovery Indigenous and Linkage Infrastructure, Equipment and Facilities programs.

'Nourishing Australia: A decadal plan for nutrition science' will be led by Chief Investigators and Academy Fellows Professor Stephen Simpson

from the University of Sydney and CSIRO's Dr TJ Higgins. They will develop a plan to address the complex health and environmental challenges associated with changes in food production and consumption.

'Big data in Australian research: issues, challenges and opportunities' will be led by Academy Fellow Professor Michael Barber from Flinders University. The project will explore better utilisation of big data for the research sector by mapping existing capability and infrastructure within and across disciplines and identifying challenges and opportunities.

World's brain initiatives move forward together

December 12, 2017

A meeting of representatives of some of the world's major brain research projects, hosted by the Australian Academy of Science in Canberra, has made a declaration to establish an International Brain Initiative.



Representatives of some of the world's major brain research projects met recently. Attendees included (from left) Professor Andrew Holmes (host), Professor Linda Richards, Dr Caroline Montojo, Dr Christoph Ebell, Professor Rafael Yuste, Professor Shigeo Okabe, Professor Sung-Jin Jeong, Professor Hideyuki Okano and Dr James Deshler.

The declaration, made by representatives from Japan, Korea, Europe, the United States of America and Australia, is designed to speed up progress on 'cracking the brain's code'.

'Researchers working on brain initiatives from around the world recognise that they are engaged in an effort so large and complex that even with the unprecedented efforts and resources from public and private enterprise, no single initiative will be able to tackle the challenge to better understand the brain,' according to the declaration.

Academy President, Professor Andrew Holmes, said the announcement of an International Brain Initiative was one of the most exciting days of his presidency to date.

'It is very pleasing to see a global commitment to stronger collaboration on brain research. Challenges of this magnitude need a global effort,' Professor Holmes said.

The first meeting of the International Brain Initiative steering

committee will be held in January 2018. Brain research initiatives from other countries and regions are also invited to join the International Brain Initiative.

Read the 'Canberra Declaration' to create an International Brain Initiative www.brainalliance.org.au/learn/media-releases/worlds-brain-initiatives-move-forward-together/

Academy announces recipients of 2018 honorific awards

November 17, 2017

Outstanding contributions to science have been recognised by the Australian Academy of Science today with 18 of Australia's leading scientists and future superstars receiving prestigious 2018 honorific awards.

The scientists' discoveries cross the breadth of science, from the threat posed by the melting ice sheets of Greenland and Antarctica, to solving the mysteries of the universe and interpreting how

disruptions of brain connectivity can lead to mental illness.

Professor David Cooke from the University of Tasmania has been awarded one of the top honours, the Academy's Haddon Forrester King Medal and Lecture. Others recognised among the Academy's lifetime achievement awards include Professor Douglas MacFarlane from Monash University, awarded the 2018 David Craig Medal.

Mid-career researcher Dr Marie-Liesse Asselin-Labat, from the Walter and Eliza Hall Institute of Medical Research, has been awarded the 2018 Nancy Millis Medal for Women in Science. Associate Professor Tracy Ainsworth from James Cook University has been awarded the Dorothy Hill Medal. She is one of 10 early career researchers to be recognised in this year's annual awards.

Read more about the awardees and their research www.science.org.au/opportunities-scientists/recognition/honorific-awards/honorific-awardees/2018-awardees

Read the Academy's media release www.science.org.au/news-and-events/news-and-media-releases/bright-stars-australian-science-recognised-academy-awards

Recipients

Career honorifics (for lifelong achievement)

- 2018 David Craig Medal— Professor Douglas MacFarlane FAA FTSE, Monash University
- 2018 Haddon Forrester King Medal and Lecture—Professor David Cooke, University of Tasmania



The Australian Academy of Science's 2018 honorific awardees

- 2018 Mawson Medal and Lecture—Professor Matt King, University of Tasmania
- 2018 Ian Wark Medal and Lecture—Professor Calum Drummond, RMIT University
- 2018 Macfarlane Burnet Medal and Lecture—Professor Geoffrey Burnstock FAA FRS, University of Melbourne (previously announced)

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

- 2018 Gustav Nossal Medal for Global Health—Professor Anushka Patel, UNSW Sydney
- 2018 Jacques Miller Medal for Experimental Biomedicine—Professor Swaminathan Iyer, University of Western Australia
- 2018 Nancy Millis Medal for Women in Science—Dr Marie-Liesse Asselin-Labat, Walter and Eliza Hall Institute of Medical Research

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

- 2018 John Booker Medal—Associate Professor Shanyong Wang, University of Newcastle
- 2018 Frederick White Medal—Dr Alex Sen Gupta, UNSW Sydney
- 2018 Christopher Heyde Medal—Dr Zdravko Botev, UNSW Sydney
- 2018 Ruth Stephens Gani Medal—Dr Irina Voineagu, UNSW Sydney
- 2018 Fenner Medal—Dr Ceridwen Fraser, Australian National University
- 2018 Anton Hales Medal—Dr Rhodri Davies, Australian National University
- 2018 Gottschalk Medal—Associate Professor Alex Fornito, Monash University
- 2018 Pawsey Medal—Dr Paul Lasky, Monash University
- 2018 Dorothy Hill Award—Associate Professor Tracy Ainsworth, James Cook University

- 2018 Le Févre Medal—Associate Professor Amir Karton, University of Western Australia

The majority of the awards will be presented at the Academy's annual signature science event, 'Science at the Shine Dome', on 24 May 2018.

Generous donation helps secure the future of Dorothy Hill Medal

December 05, 2017

A generous donation to the Academy from the University of Queensland will continue to support female early-career researchers working in the Earth sciences.

The gift also helps secure the future of the Academy's Dorothy Hill Medal, established as an award in 2002 in honour of the late Professor Dorothy Hill AC CBE FAA FRS, a pioneer for women in science.

Professor Hill became Australia's first female professor in 1959 when she was appointed Professor of Geology



Professor Dorothy Hill was a pioneer for women in science.



Associate Professor Tracy Ainsworth from James Cook University is the 2018 recipient of the Dorothy Hill Medal.

at the University of Queensland. Professor Hill also became the first Australian female Fellow of the Australian Academy of Science (1956) and the Royal Society of London (1965), and the first female President of the Academy (1970).

Seventeen female early-career researchers have received awards, with Associate Professor Tracy Ainsworth from James Cook University the latest recipient. Her

research has improved our understanding of how stress responses and diseases occur in corals.

She has also discovered that while small increases in sea temperatures negatively impact the health of corals, under the right circumstances corals can acclimate to increased sea temperatures and survive the bleaching process.

Professor Hill continues to be an inspiration and a role model for scientists in the Earth sciences, particularly early-career women. Professor Hill's achievements and leadership are as relevant today as they were throughout her ground-breaking career.

The Dorothy Hill Medal in earth sciences provides support and an invaluable opportunity to showcase the research of women in the Earth sciences. Through the support of the University of Queensland, this medal will continue to recognise the achievements of leading early-career female Earth scientists.

More about Professor Dorothy Hill <https://small-change.uq.edu.au/blog/2016/03/hammer-shaped-university> and the Dorothy Hill Medal www.science.org.au/opportunities-scientists/recognition/honoric-awards/early-career-awards/dorothy-hill-medal.

Two young scientists receive environmental science award

November 10, 2017

PhD students Ms Melissa Houghton from the University of Queensland and Mrs Charlie Phelps from Edith Cowan University are the 2018 recipients of the Australian Academy of Science Max Day Environmental Science Fellowship Award.

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.



Melissa Houghton (top) will study insects, spiders and other invertebrates on Macquarie Island. Charlie Phelps (above) will study the effects on kelp of bacteria, increasing temperature and kelp-eating organisms.

It is named in honour of Academy Fellow, the late Dr Maxwell Frank Cooper Day AO, who spent a lifetime championing entomology, conservation and forestry, as well as helping other scientists. He died in July this year aged 101.

Macquarie Island invertebrates

Ms Houghton will use the award to conduct the first study of insects, spiders and other organisms without a backbone (invertebrates) on Macquarie Island since the

eradication of rabbits, rats and mice in 2014. The World Heritage Listed subantarctic island is located in the Southern Ocean, approximately half way between Australia and Antarctica.

As a dog handler Ms Houghton took part in the successful eradication mission on the island. Now she is studying the island's 300 native and 50 non-native invertebrate species and their interactions to determine how

Macquarie Island's complex ecosystem is recovering and changing following the conservation effort.

Ms Houghton will return to the island in January for her third and final invertebrate survey. She is supported by the National Environmental Science Programme, Threatened Species Recovery Hub.

Kelp in temperate Australian reefs

Mrs Charlie Phelps will study the effects of bacteria, increasing temperature and kelp-eating organisms (herbivory) on the ecologically-important kelp, *Ecklonia radiata*, sometimes referred to as the 'biological engineers of temperate Australian reefs'.

The kelp provides habitat and shelter for many marine animals and juvenile fish, enhances biodiversity, assists in nutrient cycling and supports the fishing and tourism industries.

Bleaching of the kelp, where the surface tissue turns white, can have a drastic effect on its health and can lead to death. Increasing water temperatures and bacteria have been identified as possible causes. Mrs Phelps' study will be the first to inoculate the kelp with microbial pathogens and use interactive stressors (temperature and herbivory) to help determine the extent of bleaching from a type of bacteria known as R10.

Ms Houghton and Mrs Phelps will receive their awards at the Academy's annual signature science event Science at the Shine Dome on 23 May 2018.

Highly commended

Two researchers were also highly commended for the Max Day Environmental Science Fellowship Award:

- Dr Tatiana Soares Da Costa from La Trobe University for her project 'Development of New Herbicide Cocktails for Effective Weed Management'.
- Dr Emma Camp from the University of Technology Sydney for her project 'Set-Up For Survival – The Holobiont Signature Facilitating Australia's Coral Communities In The Face Of Climate Change'.

More information about the award www.science.org.au/opportunities/research-funding/max-day-environmental-science-fellowship-award

Read the Academy's media release www.science.org.au/news-and-events/news-and-media-releases/academy-recognises-young-environmental-scientists-protecting-australia

Recommended summer reading from our top scientific minds

December 11, 2017

There's nothing like fully immersing yourself in a good book—so what do Australia's top scientific minds recommend you read this holiday season?

The Australian Academy of Science's second Annual Christmas Reading List, released today, contains 31 favourite reads submitted by the Academy's Fellows.

Academy Chief Executive Ms Anna-Maria Arabia said while some Fellows recommend good reads for exploring science, there are plenty of suggestions for escaping it altogether.

'Avid readers may find a few surprises not typically included on a holiday reading list,' Ms Arabia said.

The Bad-Ass Librarians of Timbuktu, Joshua Hammer

Recommended by Professor Georgina Chenevix-Trench. 'I knew

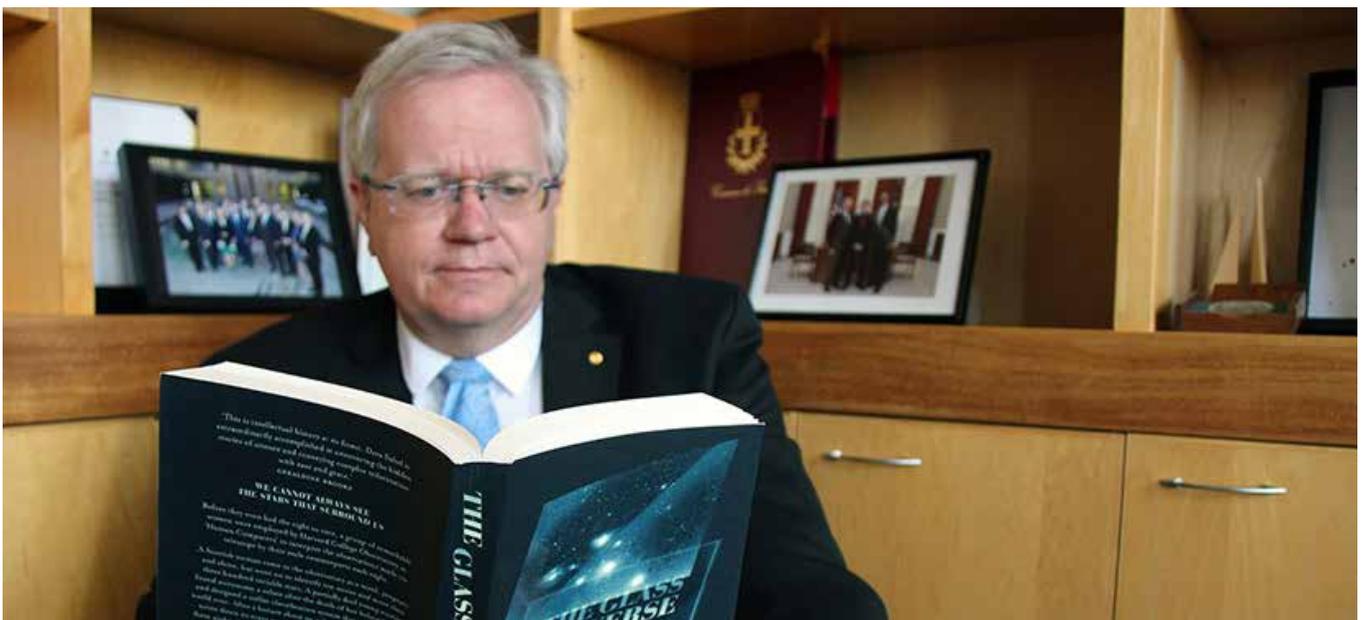
there were a lot of important ancient manuscripts in Timbuktu, but I had no idea of the scale, and age of them. The book describes one man's attempt to recover thousands of them from outlying districts and the race to save them from Al-Qaeda, including shipping them down river on pirogues to Djenne to be picked by taxis and re-hidden in Bamako.'

Sand, Wolfgang Herrndorf

Recommended by Professor Bryan Williams. 'This is an engrossing read. It is a thriller, a conundrum and a comedy of circumstances. The concise chapters are headed by quotes from a wide array of literary figures that entice the reader to make the connection.'

Cold Light, Frank Moorhouse

Recommended by Professor Wendy Hoy. 'The essence of the fledgling Canberra, its institutions and personalities; issues of gender and identity and empathy for the human condition; superbly intelligent and insightful.'



Academy Fellow Professor Brian Schmidt recommends *The Glass Universe* by Dava Sobel

The Siege, Arturo Pérez-Reverte

Recommended by Professor David Black. 'During the siege of Cadiz in 1811, a serial killer is on the loose, and to find the murderer, the police commissioner perceives the city as a vast chessboard trying to predict his unknown opponent's next deadly move. Any novel by this author can be recommended, and the translations from Spanish are excellent.'

Fellows also recommend:

- Endurance, Alfred Lansing—recommended by Professor Nalini Joshi
- Sapiens: A Brief History of Humankind, Yuval Noah Harari—recommended by Professors Boris Martinac and Geoff Fincher
- Zen and the Art of Motorcycle Maintenance, Robert Pirsig—recommended by Professor Igor Bray
- Radio Astronomer: John Bolton and a New Window on the Universe, Peter Robertson—recommended by Professors Robyn Williams and Joss Bland-Hawthorn
- The Glass Universe, Dava Sobel—recommended by Professor Brian Schmidt

Read the complete Annual Christmas Reading List

www.science.org.au/files/userfiles/events/newsletters/112/fellows-reading-list-2017.pdf

Australian scientists heading to India to kickstart research collaborations

December 12, 2017

Australian scientists researching emerging mosquito-borne diseases, drug resistant tuberculosis and



Deakin University's Dr Rangam Rajkhowa has been awarded a 2018–19 Australia–India EMCR Fellowship.

childhood type 1 diabetes are among the latest recipients of 2018–19 Australia–India Early- and Mid-Career Researcher (EMCR) Fellowships announced today by the Australian Academy of Science.

The EMCR Fellowships are part of the Australia–India Strategic Research Fund (AISRF), a platform for bilateral science collaboration jointly managed and funded by the governments of Australia and India.

Under the program, Australian researchers are awarded up to A\$40,500 to travel to India and work with leading researchers at major Indian science and technology organisations for between three to nine months. The total amount awarded for the 14 recipients awarded Fellowships in this latest round is \$282,908.

Assistant Minister for Industry, Innovation and Science, Craig Laundy, welcomed the Fellowships.

"They give high-performing Australian researchers exciting opportunities to work with fellow scientists at leading Indian research institutions and to engage with a rising science superpower early in their careers," Assistant Minister Laundy said.

"The Australian Government has committed more than \$80 million to the AISRF since 2006 in recognition of India's increasing prominence in the global research effort."

President of the Academy of Science, Professor Andrew Holmes, said the Fellowships are designed to facilitate long-term science, technology and innovation collaboration between the two countries.

"Among this year's recipients is Deakin University's Dr Rangam Rajkhowa who is returning to India in 2018 after receiving his first Australia–India Early Career

Fellowship in 2012," Professor Holmes said.

Dr Rajkhowa is researching 3D printed functional composites, made from protein fibre particles, for biomedical applications. He will be collaborating with scientists at the Indian Institutes of Technology in Guwahati and Delhi.

See the list of successful recipients and more information about the awards www.science.org.au/opportunities/travel/grants-and-exchange/fellowships-india

Review aiming to achieve excellence in schools

December 12, 2017

The Australian Government has initiated a review looking at ways to achieve excellence in Australian schools. The review will examine and report on how Australian schools could use additional funding to improve student performance.

Australia has remained one of the leading countries in terms of public investment in education—at the same time as students' average performance in science and mathematics has declined in relative terms.

The Academy made a substantive submission to the inquiry, which was chaired by David Gonski, who also delivered the 2011 Gonski Review.

The core message of the submission was that a solid grounding in science and maths in both primary and secondary school is vital for younger Australians.

Beyond this key principle, the Academy noted that:

- fundamental science knowledge should continue to include a coherent understanding of scientific concepts, and generate experience and trust in the process of scientific inquiry
- education should build an appreciation of science as a human endeavour, as well as how science shapes society and how society shapes science.

The submission acknowledged the evidence that the average performance of Australian students in maths and science is falling behind that of their counterparts in other developed (and many developing) nations.

Policy responses will need to include more effective evaluation of programs intended to improve student performance (to see what works, and what doesn't), and supporting new and existing teachers through best practice training and professional learning.

Realising this broader and deeper culture of evaluation can be fostered and supported by a National Education Evaluation Agreement, as recommended by the Productivity Commission in its report into the National Education Evidence Base.

The Academy has developed evidence-based science and mathematics teaching and learning resources for primary and secondary schools teachers and students for a number of years.

Our flagship Primary Connections and Science by Doing programs are used by more than three-quarters

“ *A solid grounding in science and maths ... is vital for younger Australians.* ”

of Australian schools and school science teachers, while our new reSolve: Mathematics by Inquiry program is quickly establishing a strong network of teacher Champions across the country.

These programs have a track record of being highly effective in improving student engagement and broadening teacher skills.

Correctly setting the dial on research

December 12, 2017

The Productivity Commission has added its influential voice to the ongoing debate on the role of universities—in particular, their research and teaching roles.

The long-awaited Shifting the Dial report puts forward a number of proposals to improve the processes for, and the outcomes from, the teaching of students at Australian universities.

However, it emphasises that any changes must not come at the expense of the universities' research capability.

It is not a matter of either/or, but both: more and better teaching outcomes; more and better research capabilities.

The report notes that research undertaken at Australian universities has substantial economic and social dividends, in terms of promoting economic and employment growth, and creating new goods and services of value to consumers.



There is a need to improve the processes for, and the outcomes from, the teaching of students at Australian universities. Photo by Štefan Štefančík on Unsplash

“ *Research undertaken at Australian universities has substantial economic and social dividends.* ”

It is also vital for the business models which sustain our universities.

It points out that universities' research capabilities and output drive their international rankings, which in turn attract international students.

In short, universities can, and do, regard research output (most notably their publications) and the standing of their star academics and faculty as 'advertising beacons' for student recruitment and retention showing that research supply drives student demand.

An economic analysis commissioned by Universities Australia provides some useful estimates of the economic and social impacts of university research.

For example, investment in university research over the past 30 years has added around \$10 billion a year to Australia's national output.

Associated improvements in our productivity performance are equivalent to nearly one-third of the growth in average living standards over the same period.

Looked at another way, the stock of knowledge generated by university research is about the same as the entire value-added of the much-higher profile mining, and of the building and construction sectors.

Similarly, research commissioned by the then Department of Education, Science and Training found publicly funded research in Australia generated an economy-wide social rate of return of between 25 and 40 per cent per annum—an enormous dividend by any measure.

Universities have to undertake both cutting edge, world-class research, and deliver teaching outcomes that are valued by their students and other key stakeholders; a mutually beneficial partnership.

Academy videos rocketing through Facebook

December 12, 2017

Multiple Academy videos have gone viral internationally on Facebook since the launch of the Academy's new daily commitment to answer everyday questions and introduce people to science.

Volcanoes, animals in the wild, space and human health are some of the winning video topics so far. Academy Fellows, members of National Committees and other leading Australian and international scientists are contributing to the project through interviews, providing ideas and footage, and reviewing videos and articles for scientific accuracy before publication.

Several videos have been picked up by major national media outlets and included in relevant news stories, spreading the Academy's influence even wider.

The Academy is also publishing an article a day on a wide range of topics, including seasonal ones such as bushfires, swimming pools and sunscreen. The articles are also being widely shared, with the majority being read to the end—an unusual occurrence on Facebook.

The number of people 'liking' the Academy's Facebook page has skyrocketed and is now well over 100,000, a 12-fold increase since the project launched in mid October. The videos, images and articles are also promoted on Twitter and Instagram.

The Academy is responding to the widespread need for a trusted, credible source that can be relied

on for scientific information but also stimulates interest and encourages exploration of science.

Chinese-speakers are also able to access much of the content, translated by the Academy for social media platforms Weibo and Toutiao.

Primary Connections makes STEM connection

December 12, 2017

The Academy recently hosted a Primary Connections showcase professional learning workshop at Queensland University of Technology (QUT). This was the first workshop of its type, with key stakeholders in STEM education observing part of the workshop and engaging with the 30 primary

school educators in attendance.

Primary Connections is an innovative approach to teaching and learning which enhances primary school teachers' confidence and competence for teaching science. It develops students' knowledge, understanding and skills in both science and literacy.

The 12 stakeholders at the workshop included representatives of the University of Queensland, QUT, Griffith University, the Queensland Government and Independent Schools Queensland. Professor Srini Srinivasan, a member of the Academy's Council, and Academy Chief Executive Anna-Maria Arabia also attended.

Throughout the workshop educators considered STEM

education in their contexts and delved deeper into the synergies between science and design and technologies.

The event provided a valuable opportunity to discuss the future of primary school STEM teaching and learning.

The learning space, generously provided by QUT, is innovative and inspiring. The Cube is one of the world's largest digital interactive learning spaces dedicated to providing an explorative experience of QUT's science and engineering research.

The Academy gained a great deal in hosting this diverse group interested in primary education.



Queensland educators and STEM education stakeholders found the event a valuable opportunity to discuss the future of primary school STEM teaching and learning.

Australia represented at Falling Walls Lab finale in Berlin

December 12, 2017

The winners this year of Australia's second Falling Walls Lab, Dr Vini Gautam from the Australian National University and Dr Mortaza Rezae from Curtin University, represented Australia at the international event in November. The Berlin event was attended by 100 finalists and winners from the 49 international Falling Walls Labs held during the year.

The Falling Walls Foundation is a non-profit organisation in Berlin, established in 2009, 20 years after the fall of the Berlin Wall. It asks 'Which are the next walls to fall?' as a result of scientific, technological, economic and sociological breakthroughs.

Each year, the foundation supports scientific organisations around the world to host a Falling Walls Lab to promote interdisciplinary connections between aspiring academics, innovators, entrepreneurs, investors and professionals. Participants have just three minutes to present their research work, business model or initiative to a broad audience from science and industry, and a jury selects the most innovative and promising idea.

The Australians received support and encouragement while in Berlin from Academy President Professor Andrew Holmes and Emeritus Professor Hans Bacher. Her Excellency Ms Lynette Wood, Australian Ambassador to Germany, also attended the event.



Dr Vini Gautam (top) and Dr Mortaza Rezae represented Australia at the international Falling Walls Lab in November.

The winner of this year's international event was Agnes Reiner from the University of Vienna, for her research on novel blood-based biomarkers for early detection of ovarian cancer.

The Falling Walls conference, held the day following the lab, involved world experts presenting on topics including food insecurity, refugee assistance, global security and ocean pollution. Dr Jennifer Lavers from the Institute of Marine and Antarctic Science, University of Tasmania, spoke on the

accumulation of plastic waste in the oceans.

Science meets Business

December 12, 2017

Australian science and technology is well placed to seize opportunities to commercialise at home and abroad, according to experts who gathered in Sydney in November.

Leaders in research and investment met at Science meets Business to discuss the future of Australia's knowledge economy, including UTS



Attending the event were assistant Minister for Industry, Innovation and Science, the Hon Craig Laundry MP; President of Science & Technology Australia and Dean of Science at UNSW, Professor Emma Johnston; and Academy Fellow Catherine Livingstone, Chancellor of UTS and Chair of the Commonwealth Bank. Photos: Mark Graham

Chancellor and Commonwealth Bank Chair, Catherine Livingstone; Assistant Minister for Industry, Innovation and Science, the Hon Craig Laundry MP; Shadow Minister for Industry, Innovation, Science and Research, Senator Kim Carr; and senior representatives from GE, Google, Austrade, and other influential business and research organisations operating in Australia.

Ms Livingstone shared her vision for Australia on the global stage and encouraged the business and research sectors to remain positive.

The event, of which the Academy was a sponsor, was the third time that Science & Technology Australia had brought together cross-sectoral leaders.

The Academy works with many businesses to advocate for science and innovation, and to increase support for school students, young researchers and the work of Australia's leading scientists.

Funding awarded by Academy for research projects and conferences

December 12, 2017

The Academy has awarded more than \$200,000 to a number of high-quality research projects and conferences, generously supported

by donations to the Academy. In 2018 these will, among other things, fund cutting-edge Australian marine, soil and plant biology research and help the survival of some of Australia's endangered species. There is also support for specialist conferences on subjects such as the rapid collapse of ecosystems in a changing world.

The Thomas Davies Research Grant for Marine, Soil and Plant Biology fund offers annual science grants of up to \$25,000 to early- and mid-career researchers in the field of marine, soil and plant biology. The 2018 awardees are:

- Ashlea Doolette, University of Adelaide: How do Australian native plants survive on low phosphorus soils? New insights using ³¹P NMR spectroscopy
- Mark Farrell, CSIRO: An innovative method for probing active soil microbial function
- Manoj Kumar, University of Technology Sydney: Identification of the molecular response of seagrasses to heavy metal pollution and ocean acidification
- Zoe Richards, Curtin University: Enhancing coral threatened species management with integrated phylogenomics

- Isaac Santos, Southern Cross University: Coral reef calcification in the Great Barrier Reef following widespread bleaching
- Allison van de Meene, University of Melbourne: Dissecting mechanisms of cell wall deposition and variability for improved understanding of our crop plants and products

The Margaret Middleton Fund for endangered Australian native vertebrate animals offers annual science grants of up to \$15,000 each to support field-based, high-quality ecological research of postgraduate students and early career researchers. The objective of the grant is to provide financial support for conservation-based research of Australian ecosystems that ultimately will lead to tangible outcomes for management. The 2018 awardees are:

- Dr Christopher Gordon, University of Wollongong: Interacting impacts of persistent fire regimes and predation on threatened mammals
- Ms Katharine Senior, University of Melbourne: Spatial solutions for managing fire and native mammal conservation
- Ms. Emma Spencer, University of Sydney: Does predation threaten the endangered night parrot (*Pezoporus occidentalis*)?

Boden Research Conference Award—up to \$10,000 of funding is offered for specialist conferences in the biological sciences to enable active research workers in rapidly advancing fields to discuss current advances and problems. The 2018–19 conference is Ecological surprises and rapid collapse of ecosystems in a changing world.

Elizabeth and Frederick White research Conference Award—up to 10,000 of funding is offered for research conferences in the physical and mathematical sciences related to the solid Earth, the terrestrial oceans, Earth's atmosphere, solar-terrestrial science, space sciences and astronomy. The 2018–19 conference is Gas–solid reactions in earth sciences and astronomy.

Fenner conferences on the environment—up to \$10,000 of funding is offered for conferences that bring together those with relevant scientific, administrative and policy expertise to consider current environmental and conservation problems in Australia, thereby contributing to the formation of policies that can alleviate some of these problems. The 2018–19 conference is The use of gene drive technology in conservation.

Fellows feature in online video resource

December 12, 2017

A collection of videotaped biographical interviews with more than 130 important figures in clinical medicine and science from the United Kingdom and Australia—including several Academy Fellows—is now available online.



Dr Max Blythe interviewing Professor Mollie Holman. Image from the video

The Medical Sciences Video Archive of the Royal College of Physicians and Oxford Brookes University has converted tapes to digital format and made them freely available on the Research and Digital Asset Repository <https://radar.brookes.ac.uk/radar/hierarchy.do?topic=1faf8871-9f58-445d-9206-7d4f3156aef5&page=1>.

The video archive is a collection of interviews created between 1985 and 2002 and initiated by Dr Max Blythe of Oxford Polytechnic (now Oxford Brookes University).

Academy Fellows interviewed include Alan Wardrop, Derek Denton, Max Day, James Lance, Mollie Holman, Donald Metcalf, Gustav Nossal, Gordon Ada, Bridget Ogilvie and Frank Fenner.

The archive is aiming to add transcripts and interactive indexes, to allow users to jump to particular parts of the interview, over the next year.

Academy resources

The Academy publishes substantial resources about Fellows on its

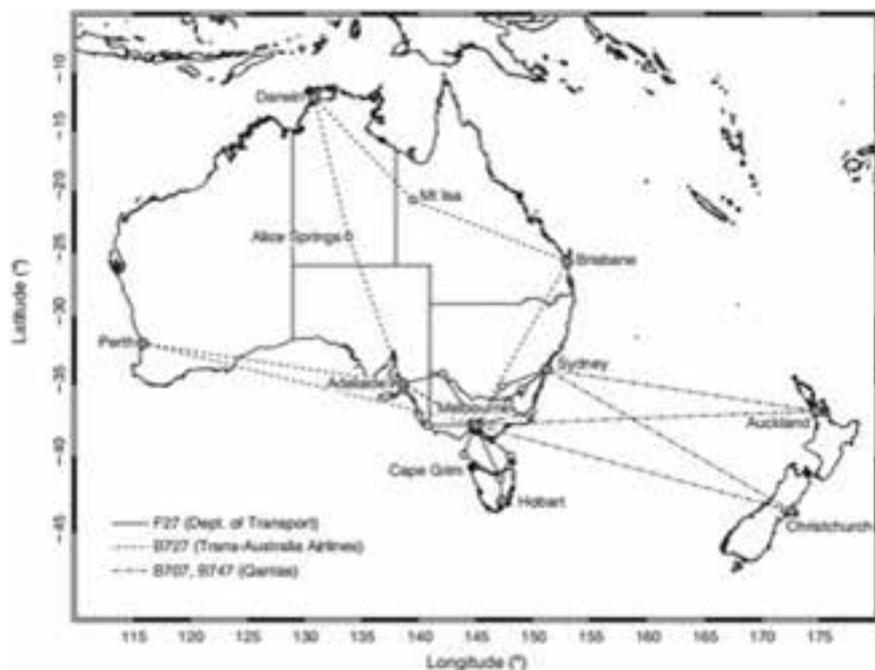
website in addition to their citation at year of election. See its biographical memoirs www.science.org.au/fellowship/fellows/biographical-memoirs (from Historical Records of Australian Science) and interview transcripts www.science.org.au/learning/general-audience/history/interviews-australian-scientists.

Journal features history of CSIRO research on greenhouse gases

December 12, 2017

The December 2017 issue (Volume 28 Number 2) of the Academy's journal, Historical Records of Australian Science, is now available. This issue contains five articles on the history of Australian science, four biographical memoirs of Fellows, and a selection of book reviews.

The historical articles include an account of the involvement of a physics professor in the development and use of the new



Aircraft air sampling routes for the collection of tropospheric air samples for CO₂ analysis during the '70s and early '80s.

medium—radio—in the 1920s and 1930s, a detailed review of the life and work of Australia's first professor of biochemistry, T. Brailsford Robertson, and further details of the career of nineteenth-century plant scientist, Hermann Beckler.

Perhaps the most significant articles are by those who made their careers in CSIRO studying the influence of greenhouse gases on Earth's atmosphere. The articles explore the modest beginning of the program, its increasing sophistication as the importance of the phenomenon became more apparent, and the way in which the results obtained have been integrated into a global research effort. The CSIRO work with other greenhouse gases will be covered in future articles.

The biographical memoirs published in this issue honour the contributions of mathematician Peter Hall, geologist Bruce Chappell, marsupial biologist Geoff Sharman and chemist David Craig. Craig's

memoir has also been published by the Royal Society, of which he was a Fellow.

Fellows' access to the journal is free via a link on the Fellows' page of the Academy website (requires log-in).

Virtual issue and online early

In a new development for the journal, the publisher and editors brought together articles and biographical memoirs from past issues that described the careers of nine Australian women scientists. This 'virtual issue' was made available without charge for three months to coincide with the Science in Australia Gender Equity (SAGE) conference in September.

Another strategy to make the journal more noticeable and accessible was to create the category of 'online early' publications. Once editorial processing had been completed, six articles were made available through the website so that they could be accessed before the

formal publication of the journal issue. One of these, the biographical memoir of Bruce Chappell, was made available without charge for a month to participants in a conference on granite geology. This was the field in which Chappell was a world leader.

Change to publication months

From 2018, the journal will be published in January and July each year rather than June and December.

Opportunities for scientists—December 2017

December 12, 2017

External awards

In addition to the Academy's opportunities for scientists, there are many opportunities to nominate for prizes and awards managed by other organisations. The following are currently open.

See our full calendar of external awards and prizes www.science.org.au/opportunities/recognition/external-sources-recognition

Lefoulon-Delalande Grand Prize

The Lefoulon-Delalande Grand Prize is awarded to scientists who have made important contributions to cardiovascular physiology, biology or medicine—€500 000.

Closing date: 29 January 2018

Lasker Award

The Lasker Award is for outstanding scientists in basic medical research, clinical medical research and public service award—US\$250,000

Closing date: 5 February 2018

V. Ambartsumian International Prize

The V. Ambartsumian International Prize is awarded to outstanding scientists who have made a significant contribution in physical-mathematical sciences from any country and nationality—US\$500,000

Closing date: 18 March 2018

Fellows update— December 2017

December 12, 2017

Honours and awards to Fellows

Emeritus Laureate Professor David Bogor ^{FAA FRS FTSE}—Distinguished Alumni Award, University of Illinois College of Liberal Arts and Science

Professor David Gardner ^{FAA}—2017 American Society for Reproductive Medicine Distinguished Researcher Award

Dr John Kirkegaard ^{FAA}—2017 Farrer Memorial Medal for services to Agriculture, NSW Department of Primary Industries

Professor Michelle Simmons ^{FAA FTSE}—NSW 2018 Australian of the Year

Maria Forsyth ^{FAA}—2017 Victoria Prize for Science and Innovation for contributions to the development of advanced electrolyte materials for electrochemical devices.

Professor Geoffrey Lindeman ^{FAA}—(jointly with Professor Visvader) 2017 Victoria Prize for Science and Innovation in recognition of their legacy for cancer research activities in Australia and their ongoing efforts to translate basic discoveries to the clinic.

Professor Jane Visvader ^{FAA}—(jointly with Professor Lindeman) 2017 Victoria Prize for Science and Innovation in recognition of their legacy for cancer research activities in Australia and their ongoing efforts to translate basic discoveries to the clinic.

Professor Min Gu ^{FAA FTSE}—Foreign Member of the Chinese Academy of Engineering

Yiu-Wing Mai ^{AM FAA FRS FTSE}—Foreign Member of the Chinese Academy of Engineering

Professor Aibing Yu ^{FAA FTSE}—Foreign Member of the Chinese Academy of Engineering

Professor Tony Klein ^{AM FAA}—2017 University of Melbourne Award for outstanding and enduring contribution to the University and its scholarly community.

Professor James Angus ^{AO FAA}—2017 University of Melbourne Award for outstanding and enduring contribution to the University and its scholarly community.

Professor Marelyn Wintour-Coghlan ^{AO FAA}—(jointly with Emeritus Professor John Coghlan AO) 2017 University of Melbourne Award for outstanding and enduring contribution to the University and its scholarly community.

Professor Adrienne Clarke ^{AC FAA FTSE}—2017 University of Melbourne Award for outstanding and enduring contribution to the University and its scholarly community.

Recently elected Fellow Professor David Gardner has received a Distinguished Researcher Award from the American Society for Reproductive Medicine.

Obituary

*Professor Tony Linnane AM FAA FRS FTSE
1930–2017*



Professor Tony Linnane

Professor Tony Linnane was an internationally recognised biochemist and molecular biologist. He was elected to the Academy in 1972 for his studies on the biogenesis of mitochondria and mitochondrial respiratory enzymes, particularly in yeast, and on the selective effects of antibiotics on intramitochondrial and cytoplasmic protein synthesis.

Professor Linnane received the Lemberg Medal from the Australian Biochemical Society in 1973 and was elected to Fellowship of the Royal Society in 1980 and to the Australian Academy of Technological Sciences and Engineering in 1999. He received the Distinguished Service Award from the International Union of Biochemistry and Molecular Biology in 2000. He served as President of the Australian Biochemical Society, President of the Federation of Asian and Oceanic Biochemical Societies and Treasurer of the International Union of Biochemistry and Molecular Biology.

Professor Linnane served on many of the Academy's committees, including the National Committee for Biophysics, the National Committee for Biochemistry and the National Committee for Biochemistry and Molecular Biology. He also served as a member on Sectional Committee 7, then called Biology at the Cellular and Molecular Level. He was Chair of the Victorian Regional Group from 1982 to 1983.

Most recently, Professor Linnane served as Chair of the organising committee for the Theo Murphy Frontiers of Science Symposium on the Microbiome in 2016. Frontiers of Science brings together the very best young Australian scientists in multidisciplinary areas to discuss emerging technologies and identify potential opportunities for future research collaboration.

Academy events open up world of science

December 12, 2017

National audiences taken on polymer journey

The Academy's national speaker series aims to deliver science around Australia in an engaging, accessible and positive way. Since August, the Academy has delivered Making Better Humans with Polymers in Wollongong, Brisbane and Adelaide, with audiences taken on a polymer journey by Dr Katherine Locock, Dr Georgina Such, Professor Martina Stenzel, Professor Gordon Wallace, Professor Christopher Barner-Kowollik and Professor Peter Murphy.

In addition to getting a taste for incredible science, audiences were



Tackling space junk is just one of the many challenges scientists are facing in the new space age.

also given the opportunity to network and engage with Academy President, Professor Andrew Holmes and many other key stakeholders.

The Academy thanks all the speakers as well as the series Chair, Dr Bobby Cerini of Inspiring Australia, and Convenors Professor San Thang and Professor Maria Forsyth.

In 2018 the Academy will continue to take science around the nation, diving into the world of 'The Science Behind Sport'.

Canberra public speaker series out of this world

This year's Canberra speaker series in the iconic Shine Dome was, as always, a wonderful success. Convened by Professor Matthew Colless and Professor Tamara Davis, Dawn of the New Space Age brought together a collection of the top minds in space research in Australia.

Researchers Professor Dean Rickles, Professor McClure-Griffiths, Dr Ben Greene, Professor Iver Cairns, Dr

Helen Maynard-Casely and Dr Carol Oliver wowed audiences with their work towards discovering life on Mars, tackling the huge issue of space junk, exploring the Milky Way, and much more.

With a record number of season passes sold, and sell-out crowds for almost all talks, it is clear there is an overwhelming interest and passion that exists for space and the incredible discoveries in this area of science.

The recordings of each of the six instalments of the series can be found on YouTube <https://www.youtube.com/user/ScienceAcademyAu/featured>.

The Academy thanks each of the speakers, convenors and chairs, and also acknowledges the generous ongoing support of Edge Catering and Jirra Wines at Jeir Station to make these events possible.

The Academy will welcome audiences back in 2018 for 'From Womb to Tomb: the science of our lives'.