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AUSTRALIAN ACADEMY OF SCIENCE

Newsletter

APRIL 2017 NUMBER 107

INFLUENTIAL VOICE

Academy welcomes new science minister

In January the Academy welcomed the new Minister for Industry, Innovation and Science, Senator Arthur Sinodinos AO, and congratulated Minister Greg Hunt MP on his appointment as Minister for Health and Sport.

Minister Hunt was known for his commitment to science and innovation, his willingness to engage with and understand issues facing the sector and his leadership of the National Innovation and Science Agenda.

He established the Office of Innovation and Science Australia and made a number of timely and welcome commitments to science and innovation as drivers of Australia's economy and social prosperity for the future. His commitment to building international links positioned Australia's innovation sector to make a real global impact, and he affirmed the importance of the CSIRO as Australia's flagship science and innovation agency.

Minister Sinodinos's public policy experience will help translate Australian research in areas such as medicine, clean energy and the basic physical and biological sciences into economic growth.

The Academy will work with Minister Sinodinos to continue building Australia's science and innovation capacity and policies.

Read about Minister Sinodinos's release of the Government's National Science Statement (www.science.org.au/academy-newsletter/apr-2017-107/science-meets-parliament)

The Academy's Secretary Education and Public Awareness, Professor Pauline Ladiges, welcomes the newly appointed Minister for Industry, Innovation and Science at an Academy function in January.

Report underlines the impact of risk on society's decisions

We live in a risky world. Risks from antibiotic resistance, environmental impacts and international security are hot issues in research, but delaying action until the science is settled isn't always feasible.

The Australian Academy of Science recently released a think tank report discussing how risk and uncertainty impact the decisions we make as a society.

An interdisciplinary approach to living in a risky world addresses specific risks from antibiotic resistance, environmental challenges, international security

Medical procedures could become unsafe to perform if antimicrobial resistance continues to spread. Photo: scotth23/Pixabay

and the challenges of making decisions when data is uncertain.

The report is the product of the 2016 Theo Murphy High Flyers Think Tank, which brought together 60 early- and mid-career researchers from the humanities, social sciences and sciences to inform the direction of Australia's future.

A major risk is antimicrobial resistance, which could claim 10 million lives a year worldwide by 2050 and make routine medical procedures such as hip replacements and caesarean sections unsafe to perform. The report recommends changes to antibiotic prescription and usage, and proposes that antibiotic usage in foods be included on labels to inform consumers.

The difficulty of adequately costing environmental impacts and factoring them into cost-benefit analyses when allocating resources for environmental projects is also covered in the report. Risks that unfold or change over long time periods are particularly difficult to grapple with.

The report recommends that policy makers and scientists jointly develop guidelines for cost-benefit analysis, and that tools used by scientists for sequential decision making could be simplified and adopted for policy makers.

Another recommendation is the development of agreed terminology to help communication between scientists and policy makers.

Uncertainty plays a large role in the risks inherent in negotiating international security concerns. The report offers recommendations on a broad range of international security issues such as global migration flows, Australia's compliance with international legal obligations, environmental change and disruptive technologies.

Parliamentary Friends of Science: space science a hot topic

Space science and technology was on the political agenda following a Parliamentary Friends of Science breakfast held in Canberra in February.

The Academy collaborated with Science & Technology Australia to present two space science activites at Parliament House and Questacon. The morning event was hosted by the Parliamentary Friends of Science group, co-convened by

Panelists Solange Cunin, Associate Professor Alan Duffy and Andrea Boyd at the Questacon event.

Associate Professor Alan Duffy asks Solange Cunin (third from left) about the Cuberider program.

the Hon Richard Marles MP and the Hon Karen Andrews MP.

Experts in space science and technology shared their work and unique perspectives on the sector in an effort to highlight Australia's current contributions, and where future possibilities lie for space science in Australia.

Panellists included Director of UNSW Canberra Space Research, Professor Russell Boyce; UNSW Canberra Rector, Professor Michael Frater; CEO of space start-up Myriota, Alex Grant; co-founder of Cuberider, Solange Cunin; and International Space Station Flight Operations Engineer with the European Space Agency, Andrea Boyd. The panel was chaired by Professor Joan Leach, Director of the Australian National Centre for the Public Awareness for Science.

The event at Parliament House was followed by a public forum at Questacon, the National Science and Technology Centre. More than 100 members of the public joined the discussion on Australia's future in space science, the benefits of a space agency, and the potential economic and scientific benefits of investing more in the sector.

The Academy and STA are grateful to those who attended these events, and to the inspiring panellists for sharing their insights with Australian decision makers at all levels.

(Story courtesy of Science & Technology Australia)

Connections made at Science meets Parliament

Science meets Parliament

The Academy was delighted to support Science meets Parliament in March. Run by Science & Technology Australia, Science meets Parliament is a two-day gathering that fosters relationships and understanding between researchers, political leaders, policy-makers and the media.

The Academy's Chief Executive, Ms Anna-Maria Arabia, led a panel discussion on 'How to convince a parliamentarian: hear from the experts' for the 200 scientists in attendance. A number of Academy staff attended SmP and helped facilitate discussion between scientists, MPs and Senators. Academy staff played a vital role in taking the conversation out to much broader audience by live-tweeting and stimulating discussion throughout the event. As a result of this effort, SmP trended nationally for two full days.

National Science Statement

The Academy welcomed the Government's National Science Statement released during Science meets Parliament by the Minister for Industry, Innovation and Science Senator the Hon Arthur Sinodinos.

The Academy's Chief Executive provided insights for scientists at Science meets Parliament.

The Australian Government's National Science Statement recognises the role of science in our society and economy.

The Academy contributed significantly to the development of the statement.

Importantly, the comprehensive statement recognises the:

- criticality of basic research
- need for a long-term sustainable approach
- importance of strong community awareness about science
- need to boost international science engagement.

In particular, the Academy acknowledges the Government's leadership to address inequality in science education, participation and employment, particularly through support of the Science in Australia Gender Equity (SAGE) pilot.

The statement recognises the role of science in our society and economy. It highlights that new knowledge is the fuel that drives innovation and that support is required from basic to applied research.

It provides much needed long-term direction and purpose for government activities in regards to science and shows an understanding of the needs and realities of the sector.

The Academy is ready to work with government to shape an investment strategy that supports this plan. It offers a comprehensive framework and a guide to decision-making and investment.

The focus areas point to a solid foundation for science, including infrastructure, education, engagement, and collaboration mechanisms—all important elements to create a strong science and innovation sector.

The document builds on the National Innovation and Science Agenda and recognises science's role in driving Australia's economic and social wellbeing.

More information on the National Science Statement is at www.science.gov.au/scienceGov/NationalScienceStatement/index.html.

INTERNATIONAL ENGAGEMENT

Falling Walls Lab: great minds, three minutes, one day

The Academy is looking for outstanding talent and innovative thinkers from all disciplines to apply for Falling Walls Lab Australia to be held on 12 September. The winner will travel to Berlin in November to participate in the finale and attend the Falling Walls Conference.

The Falling Walls Foundation is a non-profit organisation in Berlin, dedicated to the support of science and the humanities. It was established in 2009, 20 years after the fall of the Berlin Wall. At its heart is the question '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. Participants are given three minutes to present their research work, business model or initiative to a broad audience from science and industry, including a distinguished jury who selects the most innovative and promising idea.

Falling Walls Lab is a challenging and inspiring format for emerging bright minds, giving them a unique chance to become the next big success story in innovation. Since 2009, there have been over 80 international Labs from close to 50 countries worldwide with over 1,000 participants. Six hundred outstanding talents have participated in the annual Falling Walls Lab Finales in Berlin from 2011 to 2016.

The Academy invites applications from Australian researchers, postdocs and students, entrepreneurs, engineers and innovators from all areas. Applications close 12 June.

More information on Falling Walls Lab Australia 2017 is at www.science.org.au/opportunities/travel/grants-and-exchange/falling-walls-lab-australia.

Researchers connect with Japan

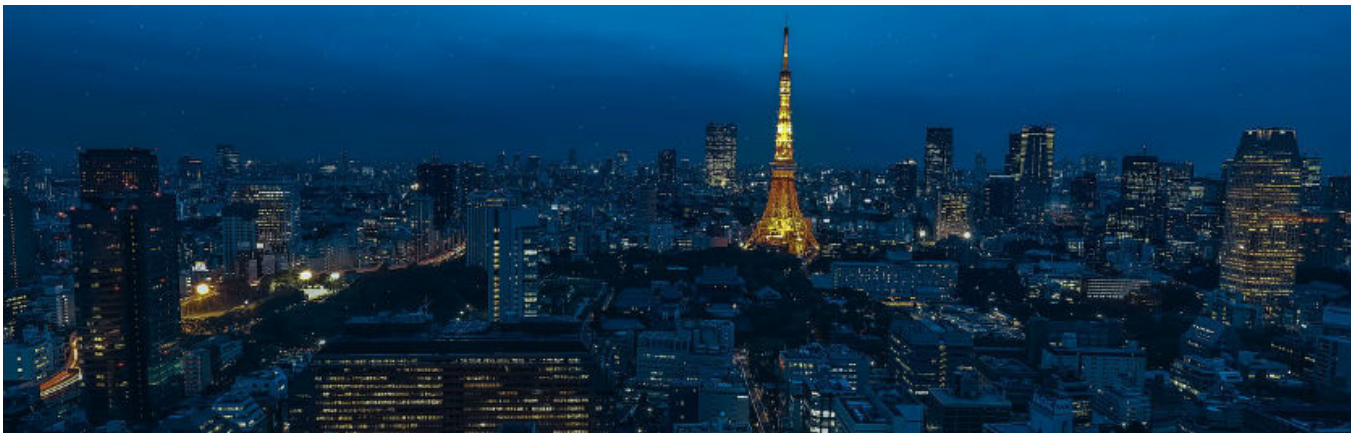
Japan HOPE Meeting signifies promise for young scientists

Six Australian researchers travelled to Tokyo in late February to attend this year's HOPE Meeting, which covered physics, chemistry, physiology and medicine, and related fields.

HOPE meetings give opportunities to excellent graduate students from the Asia–Pacific and Africa regions to engage in interdisciplinary discussions with Nobel Laureates and other distinguished scientists. The aim is to inspire and motivate attendees to become excellent scientists able to direct the future of science and technology in the region.

The Australians who attended the meeting were:

- Dr Nathalie Bock, Queensland University of Technology
- Dr Fatima El-Assaad, UNSW Australia
- Mr Benjamin Fulcher, Monash University



Researchers from the Asia–Pacific and Africa regions, including six Australians, were inspired by Nobel Laureates at the HOPE Meeting in Tokyo.
Photo: Walkerssk/Pixabay

- Mr Shuai Li, Australian National University
- Dr Lidia Matesic, Australian Nuclear Science and Technology Organisation (ANSTO)
- Ms Renee Webster, Defence Science and Technology Group

HOPE meetings are organised by the Japan Society for the Promotion of Science (JSPS). Funding for these participants to attend was provided by the Australian Government Department of Industry, Innovation and Science.

Postdoctoral Fellowships awarded to Australian researchers to travel to Japan

A total of 14 researchers from Australia, selected by the Academy, are heading to Japan on fellowships awarded by the JSPS.

Recipients of JSPS Postdoctoral Fellowships for Foreign Researchers travel to Japan for one to two years and conduct cooperative research with leading research groups in universities and other Japanese institutions.

More about the successful applicants is at www.science.org.au/opportunities/travel/grants-and-exchange/japan-society-promotion-science-fellowships.

The JSPS awards postdoctoral fellowships worth up to $2 million to Australian researchers annually. The Academy manages the application process with funding support from the Department of Industry, Innovation and Science.

Winner of Entrepreneurship Challenge travels to Paris

One of the winners of the the 2016 Australian–French Entrepreneurship Challenge, Ms Lara Bereza-Malcolm from La Trobe University, travelled to Paris in late January to participate in a week of 'International Scientific Young Talents', followed by a four-day study tour.

Her study tour included visits to Agoranov, a public incubator of innovative companies, and Genopole, France's leading biocluster for biotechnologies and research in genomics and genetics.

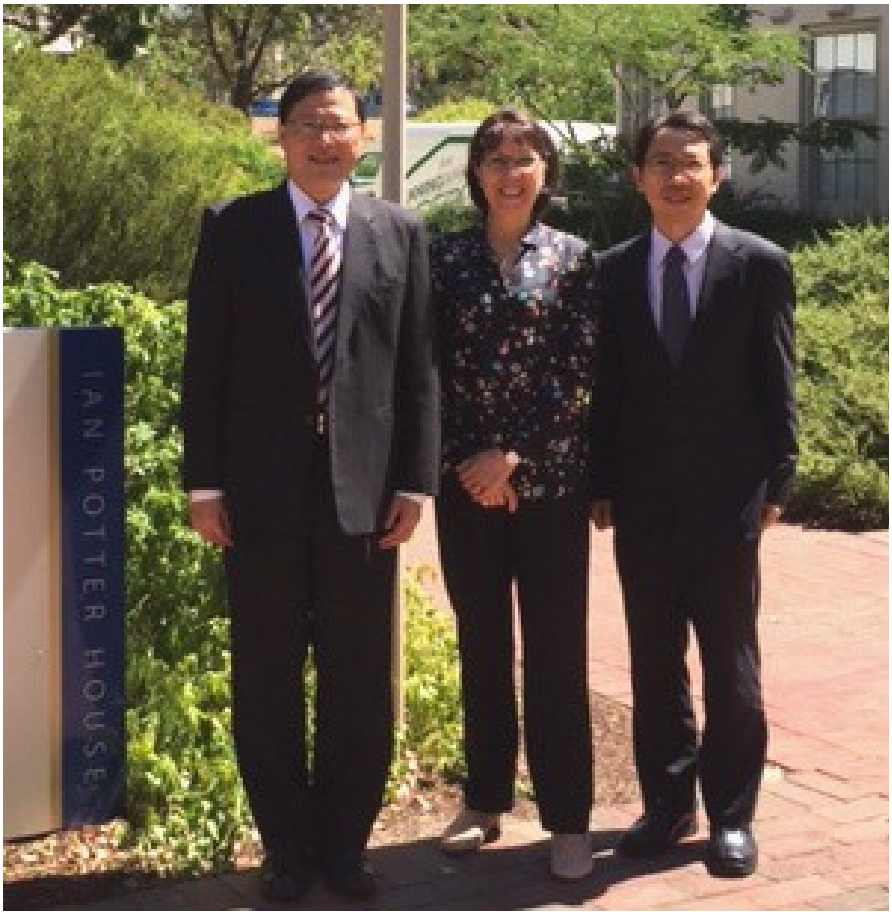
Ms Bereza-Malcolm was one of the six team members who won the inaugural Australian–French Entrepreneurship Challenge last June, held at the Australian National University and supported by the Academy.

More about the other winners' trip to France is at www.science.org.au/academy-newsletter/dec-2016-106/winners-entrepreneurship-challenge-travel-paris.

Academy hosts international science leaders

Taipei Economic and Cultural Office in Australia

Australia–Taiwan research collaborations were discussed during a visit to the Academy in January by Dr Suang-Jing Pong and Mr Kai-Shyr Wang, from the Science and Technology Division of the Taipei Economic and Cultural Office



Dr Suang-Jing Pong (left) and Kai-Shyr Wang with the Academy's Director International Ms Nancy Pritchard.

in Australia. The Academy had a productive researcher exchange program with Taiwan between 1992 and 2011 through the Ministry of Science and Technology of Taiwan. Taiwan has been identified as a priority country under the Australian Government's National Innovation Science Agenda and the Academy will continue to explore potential funding schemes that could support the reinstatement of a bilateral researcher exchange program with Taiwan and facilitate bilateral collaborations.

ICSU President honours Academy Fellow

Professor Gordon McBean, President of the International Council for Science (ICSU) and an internationally recognised meteorologist and climate change expert, visited Canberra in February as a guest of the Australian Meteorological and Oceanographic Society (AMOS). Professor McBean was one of the plenary speakers at the 2017 AMOS national conference, and also spoke at an event at the Shine Dome organised by the Academy and AMOS to celebrate the contributions made to science by Professor Michael Raupach FAA FTSE. Professor Raupach was one of Australia's most distinguished climate scientists and was co-chair of both editions of the Academy's publication, 'The science of climate change: questions and answers'.

While in Canberra, Professor McBean met with the secretaries of the Department of the Environment and Energy, and the Department of Industry, Innovation and Science to discuss the work of ICSU, the global Future Earth initiative, and the newly established Future Earth Australia.

Best brains explore future of brain research

The rise in global commitments to brain research—with a particular focus on existing strengths and future potential of Europe and Australia—was the subject of a meeting of science leaders at the Academy in January.

The meeting included Executive Director of the European Union Human Brain Project Mr Christoph Ebell, Australia's Chief Scientist Dr Alan Finkel AO FAA FTSE, Australian Brain Alliance members Professor John Bekkers and Professor Greg Stuart FAA, and Academy Chief Executive Ms Anna-Maria Arabia.

(from left) Dr Kaori Ikeda, Australian Brain Alliance; Christoph Ebell, EU Human Brain Project; Academy Fellows Professor Greg Stuart and Professor Linda Richards; Jonas Rupp, Science Adviser Delegation of the EU in Canberra), with the Academy's Ms Nancy Pritchard.

The Human Brain Project, established in 2013, is a European Commission Future and Emerging Technologies Flagship funded largely by the European Union. With €1 billion over 10 years, the aim of the project is to develop an ICT-based scientific research infrastructure for brain research, cognitive neuroscience and brain-inspired computing.

The Australian Brain Alliance, formed early last year, is made up of 30 member and 16 supporting organisations and aims to coordinate and boost Australia's brain research sector by establishing a national brain initiative on par with those in the US, EU, Japan and China. Alliance co-chairs, Emeritus Professor Patricia Michie and Professor Linda Richards FAA, also met with Mr Ebell regarding the scientific agenda of the Human Brain Project and ways to enhance existing synergies between the project and the alliance's vision for a proposed Australian Brain Initiative.

Mr Ebell's visit culminated in a roundtable presentation at the Academy to a group of officials from a number of European embassies and high commissions.

Academy represented in Asia

The Academy's Foreign Secretary, Professor Cheryl Praeger AM FAA, has been elected as a Member-at-Large of the Association of Academies and Societies of Sciences in Asia (AASSA) for 2016–18. She has also accepted an invitation to Chair the AASSA Committee of Women in Science and Engineering (WISE). In this role, Professor Praeger was a plenary speaker at the AASSA – Science Council of Japan (SCJ) workshop on 'the Role of Science for an Inclusive Society', held in Tokyo in early March. Professor Praeger spoke on tackling gender inequality in STEM.

Japan Society for the Promotion of Science

While in Tokyo, Professor Praeger met with senior officials at the Japan Society for the Promotion of Science (JSPS). The Academy has had a memorandum of understanding with JSPS since 1977 and both organisations have had bilateral exchange programs for researchers that have strengthened research collaborations between the two countries. Mr Paul Harris, Science and Education Counsellor at the Australian Embassy in Japan, also attended the meeting with JSPS.

Global health focus of Science20 forum

Academy President Professor Andrew Holmes AC PresAA FRS FTSE, and his colleagues from the S20 Science Forum, presented a position statement on global health to the German Federal Chancellor Dr Angela Merkel ahead of the G20 Summit in July.

The science academies of the G20 states make recommendations on improving global health and are playing an active role in the G20. In their joint statement, the academies offered strategies and tools to tackle communicable and non-communicable diseases and to strengthen public health systems. The document provides a basis for the coming G20 Summit consultations.

The Academy's Foreign Secretary, Professor Cheryl Praeger (centre, black and white jacket), in Tokyo recently.

German Federal Chancellor Dr Angela Merkel at S20 Science Forum with Academy President Professor Andrew Holmes (second from right) and international science leaders. *Image credit: Markus Scholz, Leopoldina*

The statement was created by a working group made up of representatives of G20 science academies. The Academy was represented on the working group by Professor Nicholas Talley, Pro Vice-Chancellor Global Research, the University of Newcastle and a member of the Australian Academy of Health and Medical Sciences.

The next Science20 will be held under the G20 Presidency of Argentina in 2018.

More about the position statement is at www.science.org.au/node/6626.

2017 summer programs for graduate and PhD students

The Academy has collaborated with the US National Science Foundation (NSF) since 2004 to organise the East Asia and Pacific Summer Institutes (EAPSI) program for US graduate students.

The program enables US science and engineering graduate students to visit Australia for eight weeks during the American summer, to undertake research and build relationships with their Australian counterparts. It is co-funded by NSF and the Australian Government Department of Education and Training.

This year, the Academy is welcoming 21 EAPSI Fellows to Australia in June.

The students will conduct a research project in their host institutions following an orientation program in Canberra, including a series of lectures and site visits to cultural institutions.

Brazil

This year, the EAPSI program will coincide with the Brazil PhD student exchange program. This program

EAPSI attendees have opportunities to explore Australia's history and natural environment, as well as conduct research with host institutions.

The Academy looks forward to welcoming US graduate students:

EAPSI Fellow	Home institution	Australian host researcher	Host institution
Holly Andrews	University of California	Professor Elise Pendall	Western Sydney University
Lauren Bates	Florida Institute of Technology	Dr Rommel Mathias	Monash University
Elizabeth Bevan	University of Alabama at Birmingham	Associate Professor Mark Hamann	James Cook University
Amber Datta	University of Montana	Associate Professor Lorrae van Kerkhoff	Australian National University
Giovanni DeLuca	Georgia Institute of Technology	Professor Udo Bach	Monash University
Ethan Fulwood	Duke University	Associate Professor Alistair Evans	Monash University
Joseph Gunther	City University of New York	Professor John Roberts	University of New South Wales
Kristen Hunter	Harvard University	Professor Terry Speed FAA FRS	Walter and Eliza Hall Institute of Medical Research
Charles Katerba	University of Montana	Associate Professor Stephan Tillmann	University of Sydney
Anna Kreutz	University of California, Davis	Professor Linda Richards FAA	University of Queensland
Emily Leiner	University of Wisconsin, Madison	Dr Dennis Stello	University of New South Wales
Stephen Madamba	City University of New York Graduate Center	Professor Michael Ryan	Monash University
Daniel Marchant	University of Florida	Associate Professor Zhonghua Chen	Western Sydney University
Tamara Marcus	University of New Hampshire	Professor Gene Tyson	University of Queensland
Douglas Meisenheimer	Oregon State University	Associate Professor Adrian Sheppard	Australian National University
Hennessy Miller	University of Arizona	Dr Scott Wilkinson	CSIRO
Jerome Nash	Purdue University	Associate Professor Patrick Spicer	University of New South Wales
Jonathan Nations	Louisiana State University	Dr Kevin Rowe	Museum Victoria
Crystal Noel	University of California, Berkeley	Professor Trevor Hambley FAA	University of Sydney
Charles Stillwell	North Carolina State University	Professor Tim Fletcher	University of Melbourne
Rebecca Walker	University of California, Davis	Dr Ying Ping Wang	CSIRO

The Academy looks forward to welcoming Brazilian PhD students:

PhD student	Home institution	Australian host researcher	Host institution
Ana Paula Freire	São Paulo State University	Associate Professor Mark Elkins	The George Institute for Global Health
João Gabriel Motta	University of Campinas	Professor Peter Betts	Monash University
Junia Schultz	Federal University of Rio de Janeiro	Dr Paul Dennis	University of Queensland
Leiliane Zeferino	Federal University of Viçosa	Professor Richard Bell	Murdoch University
Maria Clara Cavalcanti	Federal University of Rio Grande do Norte	Dr Nadine Marshall	CSIRO
Mateus Gianni Fonseca	University of Brasilia	Professor Martin Westwell	Flinders University

ran as a pilot in 2016 and, as a result of the pilot's success, was funded for an additional two years by the Australian Government Department of Education and Training.

> *I would like to thank you all for the opportunity and for making the difference in my personal life, my career and in science in general. That is exactly what the world needs!*
> *2016 participant in the Brazil program pilot*

Similar to the EAPSI program, the aims of the Brazil PhD student exchange program are to provide Brazilian second- or third-year PhD students with research experience in Australia, orientation to the Australian culture, and an introduction to the science and research infrastructure of Australia.

The Academy is grateful for the support it receives for both programs from the Australian Government Department of Education and Training and Australian embassies in Washington DC and Brazil.

ICSU update

The International Council for Science (ICSU) is a non-government organisation with a global membership of 48 international scientific unions and interdisciplinary science bodies. These organisations convene scientists within and across the disciplines to coordinate research and address issues of global significance. The Academy is Australia's adhering body for ICSU and 31 ICSU organisations and meets responsibilities and obligations that arise from the ICSU memberships with the assistance of the National Committees for Science.

INTERNATIONAL COUNCIL FOR SCIENCE

2017 ICSU General Assembly

The 32nd ICSU General Assembly will be hosted by the Academy of Sciences located in Taipei. Australia will be formally represented by the President of the Academy, Professor Andrew Holmes AC PresAA FRS FTSE, and the Foreign Secretary, Professor Cheryl Praeger FAA.

A proposal to merge ICSU with the International Social Science Council (ISSC) was approved in principle at an extraordinary General Assembly in Oslo in October 2016. A Transition Task Force is developing detailed transition plans, which will be put to a vote during the general assembly. If endorsed, the transition will be implemented and overseen by the ISSC and ICSU executives, with a founding General Assembly of the new organisation tentatively planned for October 2018. Background documents on the merger are available on ICSU's website at www.icsu.org/general-assembly/extraordinary-general-assembly-oslo-2016/background.

2017 general assemblies of ICSU unions

Meeting	City	Date
38th Session of the WCRP Joint Scientific Committee (www.wcrp-climate.org/jsc38-about)	Paris	3-7 April 2017
49th IUPAC General Assembly (www.iupac2017.org/assembly.php)	Sao Paulo	7-14 July 2017
19th IUPAB congress and 11th EBSA congress (www.iupab2017.org/home)	Edinburgh	16-20 July 2017
IUMS 2017 Congresses (www.iums2017singapore.com/)	Singapore	17-21 July 2017
25th International Congress of History of Science and Technology (www.ichst2017.sbhc.org.br/0	Rio de Janeiro	23-29 July 2017
XXXVIII IUPS Congress (iups2017.com/)	Rio de Janeiro	1-5 August 2017
24th Congress of the ICO (ico24.org/information/foreword/)	Tokyo	21-25 August 2017
XXXIInd URSI General Assembly & Scientific Symposium (www.ursi2017.org/welcome_e.shtml)	Montreal	19-26 August 2017
XXIV Congress & General Assembly (www.iucr2017.org/)	Hyderabad	21-28 August 2017
21st International Congress of Nutrition (www.icn2017.com/)	Buenos Aires	15-20 October 2017
29th IUPAP General Assembly	TBA	November

SCIENTIFIC LITERACY

Christmas wish granted for 'space nut' and his nine-year-old son

A handwritten letter from 9-year-old Robert from Adelaide had a special request for his 'space nut' dad. Robert wanted to surprise his dad at Christmas with Buzz Aldrin's autograph.

The problem was that Buzz Aldrin had toured Australia last year and it was too late to request an autograph. So, how could the Academy honour the Christmas wish of this boy and his father?

The solution was to send Robert a signed poster of Academy Fellow and Nobel Laureate Professor Brian Schmidt AC FAA FRS. Keen to foster an interest in science in the young (and not so young), Professor Schmidt was happy to have a poster with his autograph sent to Robert.

Academy President Professor Andrew Holmes AC PresAA FRS FTSE and other Academy representatives were able to meet both Robert and his dad Daren at the Academy's IMMORTALITY event in Adelaide.

What happened next?

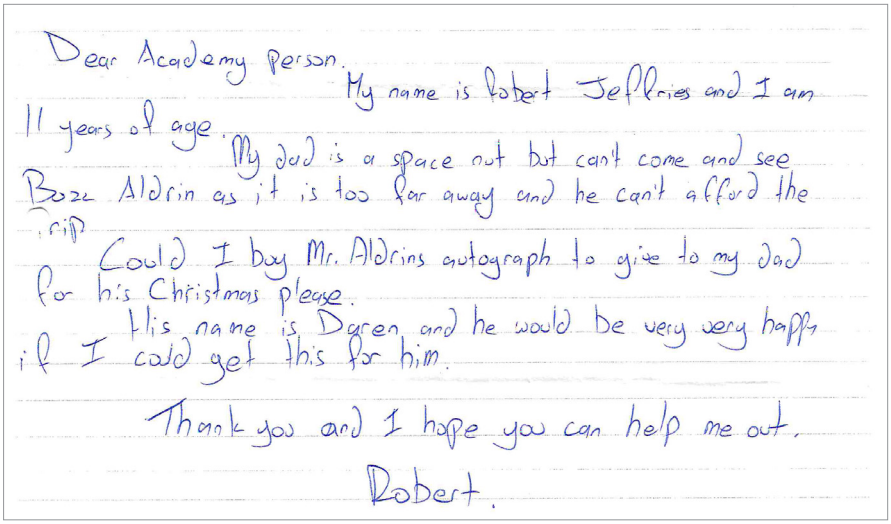
Through the powers of social media Mars One participant Josh Richards saw our story in February about Robert's Christmas wish…

"I have Buzz Aldrin's signature,' Josh wrote via Facebook, 'and I'd love to get it to the boy and his family."

So the Academy organised for the family to attend Josh's Planet Talk at WOMADdelaide in March to hear him speak about the Mars One mission.

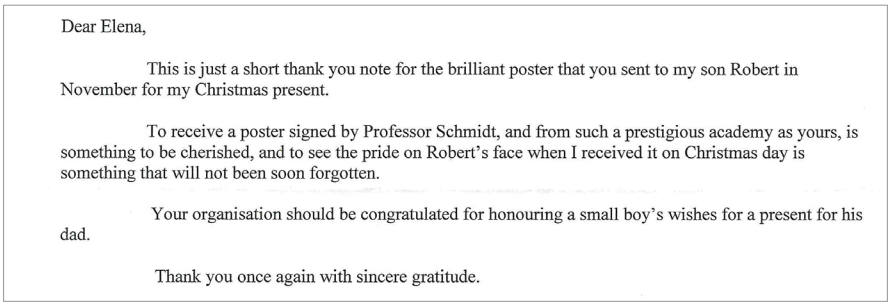
And then, Josh gave nine-year-old Robert and his space-nut dad Buzz's signature.

It was a touching moment and there weren't many dry eyes in the room as Robert got his wish. The Academy thanks Josh for his generous and inspiring act of kindness and the many people who helped make this dream come true.



Dear Academy person.
My name is Robert Jeffries and I am 11 years of age.
My dad is a space nut but can't come and see Buzz Aldrin as it is too far away and he can't afford the trip.
Could I buy Mr. Aldrins autograph to give to my dad for his Christmas please.
His name is Daren and he would be very very happy if I could get this for him.
Thank you and I hope you can help me out.
Robert.

The letter the Academy received from young Robert.



Dear Elena,

This is just a short thank you note for the brilliant poster that you sent to my son Robert in November for my Christmas present.

To receive a poster signed by Professor Schmidt, and from such a prestigious academy as yours, is something to be cherished, and to see the pride on Robert's face when I received it on Christmas day is something that will not been soon forgotten.

Your organisation should be congratulated for honouring a small boy's wishes for a present for his dad.

Thank you once again with sincere gratitude.

Daren thanks the Academy for the gift from his son Robert.

Academy Fellow, Professor Robyn Williams, with young Robert and Josh Richards at the WOMADelaide Festival.

Another big highlight for Robert and his family was meeting radio legend and Academy Fellow Professor Robyn Williams AM FAA, from the ABC Science Show.

Primary Connections strengthens professional learning

Professional learning

Primary Connections held a three-day workshop in Melbourne recently in response to increasing interest in professional learning. The workshop brought the PC team together with 12 potential candidates from across the country. Successful participants will be mentored by existing presenters and will work primarily with in-service and pre-service teachers in delivering PC Ready workshops. The Academy thanks the Australian Government for its support and the Royal Society of Victoria for providing a venue for professional learning activities.

Primary Connections held a workshop recently to increase the number of presenters delivering PC Ready workshops for teachers.

New resources

Primary Connections published four new student science journals at the start of the school year. These journals accompany and support the teaching of Year 5 Curriculum units, and will soon be followed by journals for Year 6 units.

The production of the Year 5 journals was made possible by a bequest from Professor David Craig AO FAA FRS. Professor Craig was a former Academy President and prominent Australian chemist, and the Academy is grateful for this valuable support that is making it possible for Primary Connections to continue its vital contributions to primary science education in Australia.

Nova reaches 100 topic milestone

The Academy's explainer website, Nova: science for curious minds (www.nova.org.au/), recently reached a milestone when it published its 100th topic. The range of subjects covered by the website is enormous: from virtual reality to bushfires and from blood types to black holes. Topics are written in plain English and reviewed by experts in their fields; it's a great resource for people from all backgrounds and attracts many overseas readers as well as

Satisfy your curiosity about science at Nova. Photo: G Rakozy/Unsplash

Australians—all who are curious to know more about the world around them.

Following a generous donation from Telstra the Academy relaunched Nova in 2015 and the website has gone from strength to strength. It's most-read topic tracks the chemistry of cosmetics, followed by several topics relating to climate change and population. A topic on blood types experienced a huge spike of interest recently following the Red Cross Blood Service promoting it on social media.

Jump on to Nova and have a look—you're sure to find plenty of fascinating content to satisfy your curiosity about science. If you have suggestions for topics or would like to join Nova's distinguished group of topic reviewers, send an email to nova@science.org.au.

Events

The Academy's popular public talks have recently stimulated national discussions on such varied subjects as immortality and the exciting future of plastics, while the first in this year's Canberra series challenged a full house with gravitational waves and spacetime. The immortality talk in Adelaide was recently broadcast on ABC Radio's Big Ideas program.

Coming Canberra events include:

- Exploring the Milky Way on 4 April
- Science at the Shine Dome on 23–25 May
- Cleaning up space junk with lasers on 6 June

Talks later this year in several locations across Australia include Australian satellites and where to find them, making better humans with polymers, journeying to the centres of the planets, and Australia's role in looking for life on Mars.

Life on the loose in Science at the Shine Dome

23–25 May

Have you registered for the Academy's annual signature science event, Science at the Shine Dome yet? Now in its 63rd year, this celebration of the best of science will feature more than 40 extraordinary scientists from around Australia—and special international guests—in a fast-paced smorgasbord of new knowledge from across the scientific spectrum. The three-day festival of intellect will be topped off with the 'Life on the loose' symposium, which will bring together a diverse set of players in the challenge to understand, eradicate or control invasive species in Australia and what the world has to learn from the giant ecological experiment taking place on our shores in real-time.

The symposium will feature prominent speakers Professor David Richardson, Professor Rick Shine, Professor Emma Johnston and others, who will take us on a journal of why or how species were introduced, the point they became invasive, impacts they are having and the management controls being implemented.

On the days leading up to the symposium, the event will feature presentations by recipients of the Academy's prestigious awards for their extraordinary achievements in science, and the small number of outstanding scientists who have been admitted to the Academy as Fellows. Much of the event is open to the public.

EXCELLENCE IN SCIENCE

Nominations for awards and grants now open

Awards

The Academy is calling for nominations for next year's prestigious honorific awards for early, mid and career researchers.

The closing date for nominations is 20 April 2017.

Career awards

- David Craig Medal (chemistry)
- Haddon Forrester King Medal sponsored by Rio Tinto (mineral exploration)
- Ian Wark Medal and Lecture (applied science)
- Macfarlane Burnet Medal and Lecture (biological sciences—open to Fellows of the Academy only)
- Mawson Medal and Lecture (Earth sciences)

Mid-career awards

For researchers 8 to 15 years post-PhD in the calendar year of nomination:

- Gustav Nossal Medal (global health)
- Jacques Miller Medal (experimental biomedicine)
- Nancy Millis Medal for Women in Science (any branch of the natural sciences)

Early-career awards

For researchers no more than 10 years post-PhD in the calendar year of nomination:

- Anton Hales Medal (Earth sciences)
- Christopher Heyde Medal (probability theory, statistical methodology and their applications)
- Dorothy Hill Award (Earth sciences, reef sciences, marine geology and taxonomy)
- Fenner Medal (biology—excluding biomedical sciences)
- Frederick White Prize (physical, terrestrial and planetary sciences)
- Gottschalk Medal (medical sciences)
- John Booker Medal (engineering sciences)
- Le Fèvre Memorial Prize (chemistry)
- Pawsey Medal (physics)
- Ruth Stephens Gani Medal (human genetics including clinical, molecular, population and epidemiological genetics and cytogenetics)

Grants, fellowships and support

The Academy has also opened applications for research grants, travelling fellowships and conference and lecture support for 2018–19. The closing date is 1 June 2017.

The Academy is expecting to allocate close to $260,000 in 2018 for the Douglas and Lola Douglas Scholarship in medical science, the J G Russell Award, the Margaret Middleton Fund for endangered Australian native vertebrate animals, the Moran Award for history of science research, the Max Day Environmental Science Fellowship and the Thomas Davies Research Fund for marine, soil and plant biology.

Travelling fellowships totalling over to $30,000 are expected to be allocated for the Graeme Caughley Travelling Fellowship, the Rudi Lemberg Travelling Fellowship, the Lloyd Rees Lecture and the Selby Travelling Fellowship for overseas scientists to visit Australian scientific centres.

Applications are also invited for 2018 and 2019 research conference support including the Boden Research Conference in the Biological Sciences, the Elizabeth and Frederick White Research Conference in the physical sciences and the Fenner Conference on the Environment. The funding available for these three conferences is up to $30,000 in total.

Friends and family celebrate Mike Raupach's life and science

A special public event was held at the Shine Dome in early February in memory of the life and science of the late Michael Raupach FAA who passed away two years ago. He was one of Australia's foremost climate researchers, focusing on interactions between the climate, the carbon cycle and humans. Crucially, he excelled in communicating with the broader Australian and international community.

The event was attended by more than 150 people. It covered Professor Raupach's work from his early days as a PhD student to looking at the directions his work might have taken—and how he impacted current research. Of particular focus was his work on the Global Carbon Project and his various roles advising on the science of climate change. Speakers included Professor John Finnigan, Dr Cathy Trudinger, Dr Vanessa Haverd, Dr Pep Canadell and Professor Penny Sackett.

Professor Michael Raupach. *Photo: Tim Raupach*

The celebration was a joint initiative of the Australian Meteorological and Oceanographic Society and the Academy.

Summit explores future of membrane technologies

A recent international meeting on membrane technologies has supported best practice, breakthroughs, and pioneering

The International Forward Osmosis Summit attracted about researchers from 17 countries.

research and science in the fast-advancing area of membrane technologies.

The International Forward Osmosis Summit—a Fenner Research Conference on the Environment—attracted about 100 researchers from academia and industry from 17 countries to Sydney in December. Fenner conferences were established by the Academy with the generous support of the late Professor Frank Fenner FAA FRS and the late Mrs Bobbie Fenner.

Inspired by the natural osmotic process in cells, forward osmosis and pressure retarded osmosis (PRO) are now emerging as alternative membrane technologies for desalination, water reuse, energy generation and the treatment of challenging streams. The summit enabled experts to connect with other FO professionals and form collaborations to address the growing challenges facing forward osmosis technologies around the world.

The summit was organised by the University of Technology Sydney in collaboration with UNSW Australia, the University of Wollongong, Shanghai Advanced Research Institute, Korea University, the International Forward Osmosis Association, the National Centre for Excellence in Desalination Australia, the FO-RO Hybrid Desalination Research Centre, Hyorim Industries and Porifera. It was supported by the Academy and the Membrane Society of Australasia.

Moran Awardee to research traditional burning

Mr Daniel May

The winner of the 2017 Moran Award for History of Science Research recipient, Mr Daniel May, will examine material in the Northern Territory Archives and the National Archives of Australia relating to the creation and maintenance of Kakadu National Park. He will also travel to examine material from the 1961 Rodger Royal Commission into the Dwellingup Bushfires in the state records Office of Western Australia.

Mr May's research focuses on the political and cultural influence of understandings of 'traditional' burning in Australia and the United States. He argues that understandings of Indigenous Australian and American Indian fire have been political incendiaries, as competing interest groups have attempted to draw upon, appropriate, or deny traditional burning in environmental debates and discourse.

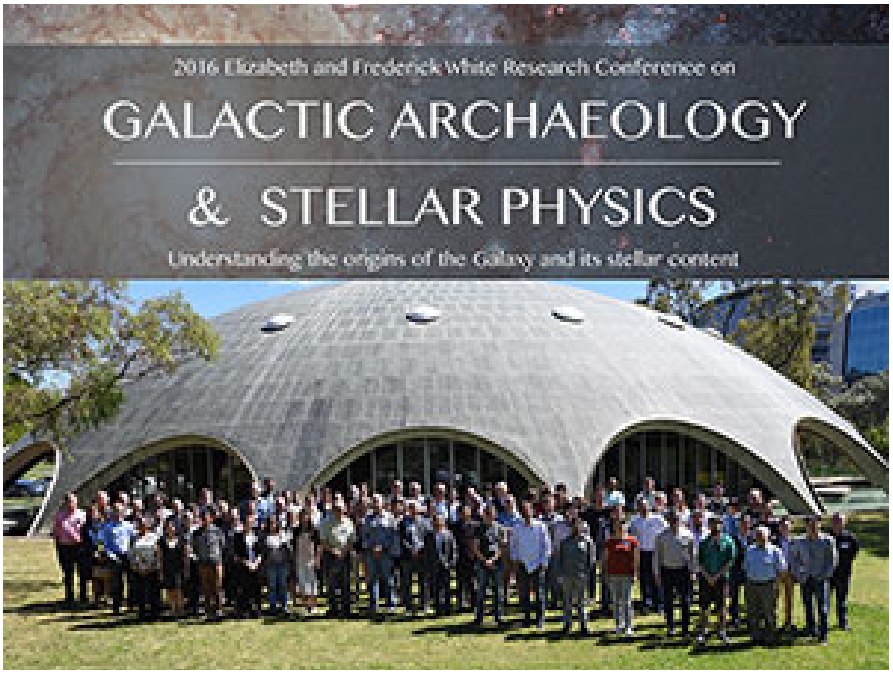
Mr May is a PhD Candidate in the School of History at the Australian National University and an Associate Student at the Bushfire and Natural Hazards Cooperative Research Centre. He is a member of the Australian Centre for Environmental History; the Australasian Association for the History, Philosophy and Social Studies of Science; and the Australian Historical Association.

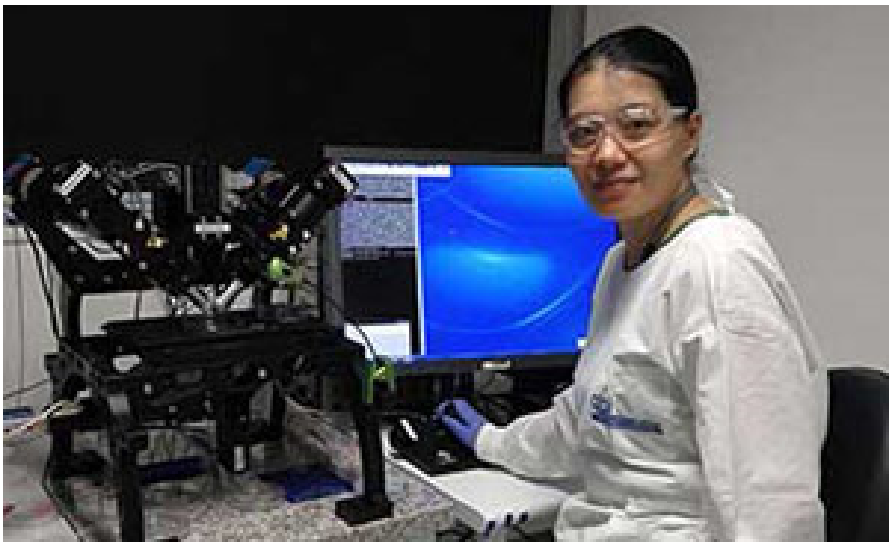
Origins of the galaxy illuminated at the Shine Dome

A conference on the origins of the galaxy and its stellar content late in 2016 saw Australian and international scientists share their latest research.

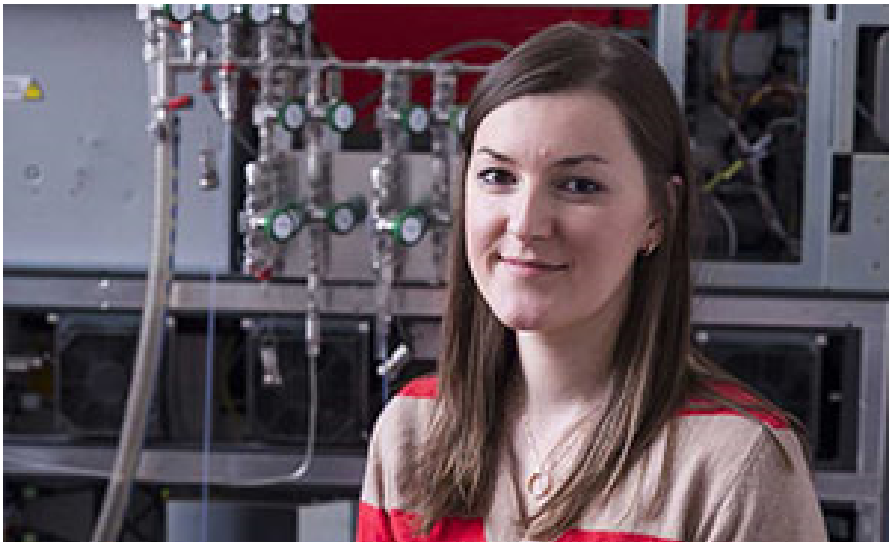
The Elizabeth and Frederick White Conference on Galactic Archaeology and Stellar Physics presented new datasets on the positions, colours, motions and chemical compositions for hundreds of thousands of stars, including first results from Australia's very own SkyMapper and GALAH Surveys, giving astronomers never before seen details of the stellar content of the Milky Way. With this newly available information, astronomers can now 'chemically tag' stars to identify where they were born.

With the generous support of the late Lady White MBBS and the late Sir Frederick White FAA FRS, the Academy manages a series of research conferences in the physical and mathematical sciences related to the solid Earth, the terrestrial oceans, Earth's atmosphere, solar-terrestrial science, space sciences





Dr Iris Tong Wang



Dr Nicole Rijs

and astronomy. Expressions of intent for 2018–19 conferences are now open.

Young researchers win support from Academy

The Academy has announced the recipients of the J G Russell Award to help talented younger researchers in the basic sciences.

The four awardees are working towards cheaper solar cells, understanding brain plasticity, harnessing self-assembling molecules for manufacturing and employing computers to help make sense of the waves of data coming from modern biology.

Each researcher receives $6000 towards the costs of equipment, maintenance and travel as a top up to their Australian Research Council Discovery Early Career Researcher Awards, supported by the generosity of the late Miss J Russell.

Dr Brett Hallam, from UNSW Australia, is studying the process by which defects in cheap silicon solar cells can be ironed out with hydrogen.

Dr Pengyi Yang from the University of Sydney is employing machine learning to help find links between the studies of separate biological processes, such as epigenetics and protein and metabolic processes.

At the University of Queensland, Dr Iris Tong Wang is exploring neural plasticity and how receptors for the amino acid L-glutamate are controlled in the communication between neurons.

Dr Nicole Rijs won her award for a project at the Queensland University of Technology to use

advanced mass spectrometry techniques to explore how molecules assemble themselves, with the aim of more efficient manufacturing of high-technology materials.

Findings on environmental effects of food consumption 'alarming'

Junk foods contribute more than one-third of the average Australian household's diet-related water use, greenhouse gas emissions and land use, according to a researcher from UNSW.

Dr Michalis Hadjikakou, of the university's Sustainability Assessment Program, conducted the research with the support of the Academy's WH Gladtones Population and Environment Fund (https://www.science.org.au/node/108).

Dr Hadjikakou compared the environmental footprints associated with different food consumption patterns in Australia at a very high level of socioeconomic and spatial resolution. His finding is significant and alarming: debate on environmentally sustainable diets has largely centred on carbon emissions related to animal protein consumption, while neglecting the diverse environmental impacts of junk food products.

Following on from his findings, he is using an optimisation technique to generate realistic dietary modifications that could reduce carbon emissions while catering for affordability constraints within each socioeconomic group. Amongst the most interesting findings is that, while diets more compatible with the Australian Dietary Guidelines could significantly reduce carbon emissions in wealthier socioeconomic groups, healthier diets would entail a slight emission rise in lower income groups, even when considering potential food waste reductions and elimination of junk food. This finding highlights the challenge of reducing the environmental impacts of food consumption while also meeting current national dietary recommendations.

What are the environmental footprints associated with different food consumption patterns in Australia? Photo: T Habr/Unsplash

He plans over the next two years to develop more sophisticated models and interdisciplinary research programs related to broader issues such as food and nutrition security and sustainable food systems.

See Dr Hadjikakou's recently published paper in Ecological Economics at www.sciencedirect.com/science/article/pii/S0921800916303615.

The research fund supporting this work was established in 2010 through generous donations from the late Dr William H Gladstones.

EMCR Forum news

Members of the executive committee of the Early- and Mid-Career Researcher Forum held their annual meeting in February. Their main focus this year is to increase membership and learn more about the EMCR community in Australia so they can better represent it. It is free to be a member of the EMCR Forum and so please encourage all the EMCRs you know to join up. They also took the opportunity to meet with and get to know the members of the Academy's Council.

Understanding the needs of postdocs

What do postdocs need to succeed? A survey of current standing and future directions for Australian researchers was recently published by the EMCR Forum executive (see www.palgrave-journals.com/articles/palcomms201693). The peer reviewed article is based on the most recent postdoctoral survey run by the EMCR Forum with the aim of understanding the make-up

of the Australian EMCR community and the issues affecting it. You can read about some of these issues in 'Australia can get a better return on its investment in PhD graduates' at theconversation.com/australia-can-get-a-better-return-on-its-investment-in-phd-graduates-69560, published in The Conversation.

National Committees for Science

The Academy has 22 National Committees for Science that are widely representative of its disciplines. The broad aims of the committees are to foster a designated branch or theme of natural science in Australia and to serve as links between Australian and overseas scientists in the same field. National Committees advise the Academy's Council on Australia's representation for the unions and multidisciplinary bodies of the International Council for Science (ICSU) and other international bodies.

For more information on the meetings and other business of the National Committees for Science, see the quarterly National Committees for Science Update newsletter at www.science.org.au/news-and-events/newsletters/national-committees-science-updates.

New committee chairs for 2017

The success of each National Committee for Science depends on an active chair who is a respected leader in their discipline. The Academy offers a very warm welcome to its new National Committee Chairs in 2017:

- Professor Philip Poronnik, NC Biomedical Sciences
- Professor Martina Stenzel, NC Chemistry
- Professor John Finnigan FAA, NC Earth System Science
- Professor Steve Turton, NC Geographical Sciences
- Professor Mike Gidley, NC Nutrition
- Professor Ian MacArthur, NC Physics

Physics meeting

The National Committee for Physics held a town-hall style meeting during the Australian Institute of Physics congress in Brisbane in December. Around 70 people heard from Professor David Jamison of the University of Melbourne about the 2012–21 Physics Decadal Plan, which has helped to make systematic progress on several fronts. The discussion focused on the creation of a more efficient and fair funding system: an ARC as the world's best system, made for Australians. This discussion will now be continued, potentially expanded to other parts of science, and will lead to a submission to the ARC.

This year the committee will carry out a review of the progress of the decadal plan and ensure that it continues to address the requirements of the physics community in Australia. This review will be led by the new chair of the committee, Professor Ian McArthur from the University of Western Australia.

Mike Smith Prize

The Mike Smith Student Prize for History of Australian Science or Australian Environmental History is a joint initiative of the National Museum of Australia and the Academy, with the involvement of the National Committee for History and Philosophy of Science. In 2016 the prize was split between two winning essays, one on the history

(from left) Professor Andrew Holmes, Katie Holmes, Dr Mike Smith, Martin Bush and children, Lilian Pearce, Rowena MacDonald and Professor Libby Robin.

of science and one on environmental history. The awardees were Lilian Pearce of the Australian National University and Martin Bush of Swinburne University.

The winning entries may also be considered for publication in the Academy's journal, 'Historical Records of Australian Science'.

Geology travel grants for 2017

The Academy and the Australian Geoscience Council congratulate the recipients of the 2017 round of the 34th International Geological Congress (IGC) Travel Grant Scheme for Early-Career Australian and New Zealand Geoscientists.

The Academy's National Committee for Earth Sciences co-administers the IGC Travel Grant Scheme together with the Australian Geoscience Council. The award provides grants for career-enhancing travel for early and mid-career geoscientists and was established with the proceeds of the 34th IGC in Melbourne in 2012. Applications are open year-round and are awarded each December.

Recipients of the 2016 round, funding traveling for 2017, are:

- **Drew Lubiniecki**
  University of Adelaide
  Attend and present at Biennial Meeting of the Society for Geology Applied to Mineral Deposits (SGA) in Quebec City and at the American Association of Petroleum Geologists International Conference and Exhibition in London. Conduct deformation band mapping in the Athabasca Basin and field visit to textbook localities in England.
- **Benjamin Andrew**
  University of Waikato
  Attend and present at the FUTORES II Conference in Townsville, attend a Mount Isa focussed special meeting; Fieldwork to identify fluid pathways and develop exploration targeting criteria utilising stable isotopes, along with reactive transport modelling to determine time-integrated fluid fluxes for the system.
- **Kathryn Suzanne Hayward**
  Australian National University
  Attend and present research at the Deformation Mechanics, Rheology and Tectonics conference in Inverness, Scotland. Undertake state-of-the-art earthquake slip experiments at the ENS laboratory in Paris, France
- **Teresa Ubide**
  University of Queensland
  Work with Professor Silvio Mollo at the Experimental Petrology lab at Sapienza, University of Rome Italy, to collaboratively develop high temperature experiments on the growth and zoning of clinopyroxene crystals. Track pre-eruptive magma histories at a mineral scale. Advance the understanding of triggers of volcanic eruptions.
- **Lloyd White**
  University of Wollongong
  Attend the 2017 American Geophysical Union Fall Meeting to be held in New Orleans in December 2017, convene a multi-disciplinary session on arc volcanism to discuss ways to understand the pathways and rates of fluid/melt transport from subducted slabs to arc volcanoes at the surface. Additional travel to John Hopkins University, Baltimore, will be made to develop future research programs and to develop grant applications

Honours and awards to Fellows

Australia Day Honours

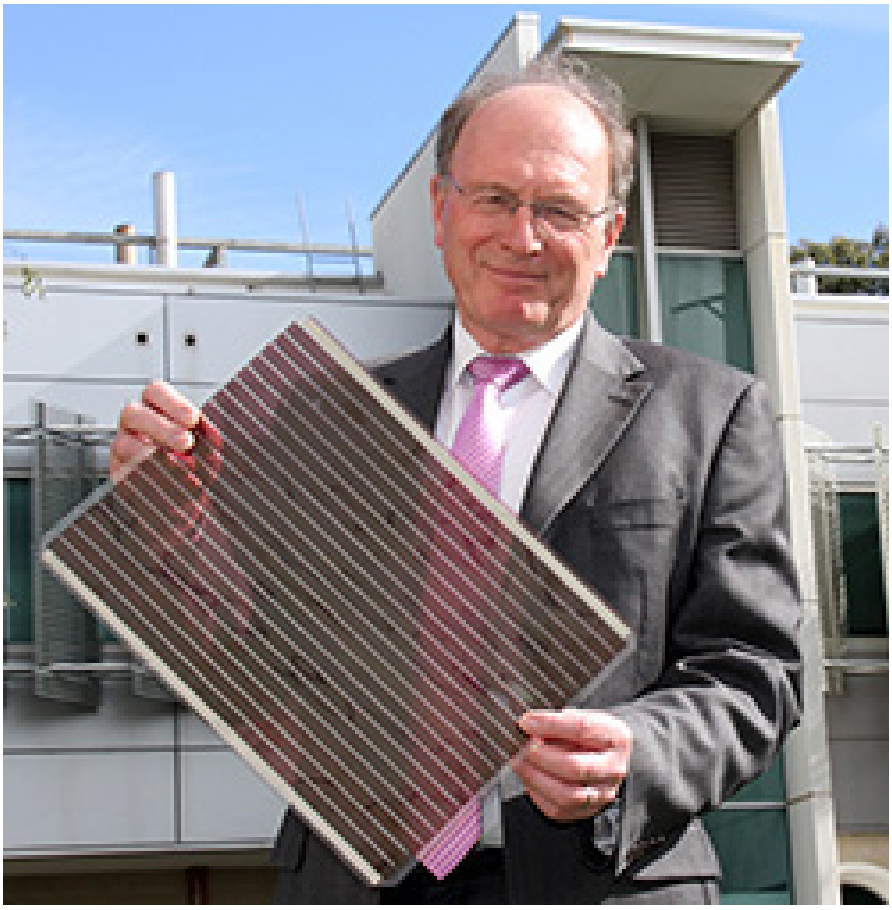
Professor Andrew Holmes AC PresAA FRS FTSE—for eminent service to science through developments in the field of organic and polymer chemistry as a researcher, editor and academic, and through the governance of nationally recognised, leading scientific organisations.

Professor Max Lu AO FAA FTSE—for distinguished service to education, to national and international research in the fields of materials chemistry and nanotechnology, to engineering, and to Australia–China relations.

Professor Gordon Wallace AO FAA FTSE—for distinguished service to science and research in polymer materials and their use in biomedical applications, and to national and international collaboration with industry.

Professor David Vaux AO FAA—for distinguished service to medicine in the field of biomedical cancer research, to higher education as an academic and mentor, and to professional integrity and ethics.

Professor Colin Masters AO FAA FTSE—for distinguished service to medical research through international and national contributions to understanding Alzheimer's and other neurodegenerative diseases.



Professor Andrew Holmes and the flexible solar cell. Photo courtesy of CSIRO

Professor Richard Harvey AM FAA FRS—For significant service to medicine in the field of cell biology and cardiovascular research, and through scientific leadership roles.

Professor Evan Simpson AM FAA—For significant service to medical science, particularly in the field of breast cancer, as an academic and researcher.

Professor Malcolm Walter AM FAA—For significant service to science in the field of astrobiology as an author, academic, educator and mentor.

Honours and awards

Professor C. Jagadish AC FAA FTSE—made an Honorary Fellow of the Indian Academy of Science

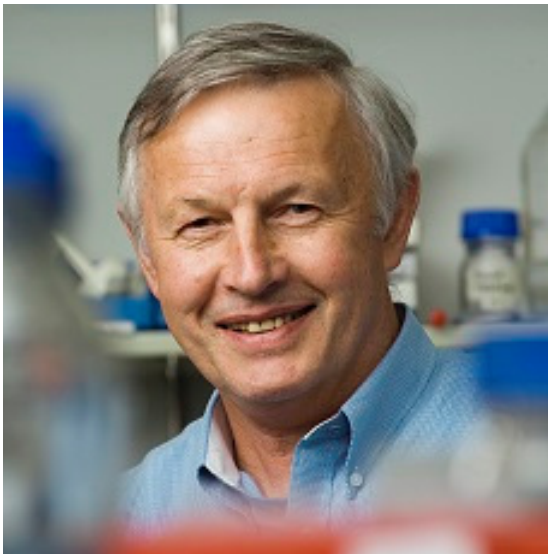
Professor Tony Klein AM FAA—2016 Australian Optical Society WH (Beattie) Steel Medal, for his strong and sustained record of authority and innovation in the field of optics in Australia or New Zealand

Professor Harry Poulos AM FAA FTSE—American Society of Civil Engineers, Outstanding Projects and Leaders (OPAL) award for design, for his contributions to understanding foundation structure and ground support interactions.

Obituary

Dr Colin Ward FAA FTSE FAIAS 1943–2017

Dr Colin Ward was born at Cootamundra, Australia in 1943. He completed his BSc at UNSW where he was also a talented rugby union player. He then completed his PhD on the biochemistry of parasitic nematodes, and became a postdoctoral fellow at the University of Massechusetts, USA.



Dr Colin Ward

Ward returned to Australia in 1970 and joined CSIRO as a research scientist. During 37 years at CSIRO he held various senior positions, including assistant chief. In 2007 he joined the Walter and Eliza Hall Institute for Medical Research.

Ward was internationally recognised for his work on the influenza virus antigens haemagglutinin and neuraminidase, which attracted international attention. In later work he unraveled the 3D-structures of the extracellular domains of four growth factor receptors: IGF-1R, insulinR, EGFR and erbB2. Ward led and inspired the teams involved in this work, and his insight into the protein chemistry and biological implications of the structures revolutionised our understanding of the activation mechanisms for these receptors.

Ward was made a Fellow of the Academy in 2011, and most recently served on the Inter-disciplinary Sectional Committee from 2015 to 2016.

OPERATIONAL EXCELLENCE

Academy news

Marking 25 years

Ms Nancy Pritchard recently celebrated 25 years at the Academy.

Ms Nancy Pritchard recently celebrated 25 years of service at the Academy. Nancy initially worked with the Australian Foundation for Science, the then fundraising arm of the Academy. She also worked in the Academy's publications section on a book for senior secondary students called 'Environmental Science', followed by the primary school project Primary Investigations.

Nancy became manager of the Academy's international section in 2000 and continues in that role promoting Australia's international scientific engagement. She also oversees the work of the National Committees for Science and the Academy's Awards.

Nancy is well known by Academy staff, Fellows and Australian and international partners for her commitment, professionalism and delightful personality. We thank her for her service over many years and look forward to her continuing contributions.

Management changes

There have been some recent staffing changes at the Academy. Mr Ben Patterson has moved from Business Manager to lead the Academy's Primary Connections program, with Mr David Perceval joining the organisation as the new Business Manager. Dr Melanie Bagg has been appointed as Director Communications and Outreach. The Academy welcomes the new senior leaders.