



## President urges investment in science: nationally televised address



Photo: Sandy Spier

Suzanne Cory on stage at the National Press Club with Club President Laurie Wilson

In a speech broadcast throughout Australia, Academy President Professor Suzanne Cory urged the Government to ensure Australia's future prosperity by investing in science education and research. In her National Press Club address in September, Professor Cory examined the state of primary and high school science education in Australia, and of scientific literacy among the Australian community generally. Speaking to an audience of scientists, educators, policy writers and media, she explored the importance of science to trades, professions and in everyday life.

'We live in a world where national prosperity is increasingly driven by

scientific and technological innovation,' Professor Cory said.


'We face many big challenges – in our economy, health, energy, water, climate change, sustainable agriculture and conservation of our precious biodiversity. To tackle these challenges, we need creative researchers and engineers, drawn from many disciplines, and a technologically skilled workforce.'

Professor Cory called for an increase in Australia's research and development expenditure to at least three per cent of GDP by 2020. She also urged the Government to create a new program to provide strategic support to Australia's international science linkages, and to fund

the Academy's junior secondary science education program, *Science by Doing*.

'We can, and should, be 'the clever country', but this will only happen if we place appropriate emphasis on properly educating our young people in the areas of science, maths and technology,' Professor Cory said.

'Australia can halt the decline in our international rankings for education, investment in science, and economic competitiveness.

'Let's invest now to turn that around and improve our standing on the world stage. Let's ensure we're prepared to fully engage in the booming global science effort.' 

## Message from the President

This has been a year of highs and lows for the Academy.

The lows included the devastating Budget news that the International Science Linkages Program would not be replaced and that funding had ceased for our important *Primary Connections* and *Science by Doing* education programs. In addition, the Academy's grant in aid is still under review.

Then, in October, came the exciting news that the Nobel Prize for Physics had been awarded to Professor Brian Schmidt *FAA* and his team for their discovery that the expansion of the universe is accelerating. Furthermore, the team of Professor Saul Perlmutter, who shared the Prize, included two other AAS Fellows, Brian Boyle *FAA* and Warrick Couch *FAA*. All Australian scientists stood tall in the reflected glory.

Within the same week the nation's top science prize, the Prime Minister's Prize for Science, was awarded to two Fellows of the Academy, Professors Ezio Rizzardo *FAA FRS FTSE* and David Solomon *AM FAA FRS FTSE*. We were also delighted that *Primary*

*Connections* facilitator Brooke Topelberg won the Prime Minister's Prize for Excellence in Science Teaching in Primary Schools.

Fellows of the Academy also won three 2011 Australian Museum Eureka Prizes: Professor Murray Esler *AM FAA* for medical research translation; Professor Alan Cowman *FAA FRS* for infectious diseases research; and Professor Rick Shine *AM FAA* for promoting understanding of Australian science research. In November, Professor Andreas Strasser *FAA* won the 2011 Victoria Prize for his work in cell death and cancer.

Australian science's representation on the international stage received a welcome boost with the election of Professor David Black *FAA* as Secretary-General of the International Council for Science (ICSU) and Professor Bruce McKellar *FAA* as President-Elect of the International Union of Pure and Applied Physics (IUPAP).

In an effort to broaden Australia's international science engagement, the Academy's new policy document outlining Australia's opportunities and responsibilities for international science linkages, *Australian science in a changing world: innovation requires global engagement*, was launched at the Shine Dome in November. The paper puts a strong case for urgent Government investment in maintaining and building on international science linkages, and the Academy is working hard to ensure it is heard by federal politicians and policymakers.

Closer to home, the Academy enhanced its engagement with early to mid-career researchers with a successful and thought-provoking Theo Murphy High Flyers Think Tank – *Stressed ecosystems: better decisions for Australia's future*.

Nurturing our young scientists is paramount if we are to ensure a robust research and development future for this nation. I spoke on this – and the vital importance of supporting strong and engaging science education at all levels – when I had the privilege in August of speaking at the National Press Club, in a nationally televised address. The messages I shared there about building and maintaining strong international links, investing in research and



Suzanne Cory

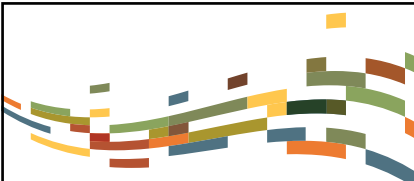
development, and nurturing the young scientists of tomorrow, were echoed and reinforced in an eloquent speech by Professor Schmidt at the formal dinner for the Prime Minister's Prizes for Science two weeks later. We are lucky to have in Professor Schmidt a passionate and inspiring ambassador for science, education and international engagement.

Major recent events held at the Shine Dome included a successful two-day symposium on the controversial science of geoengineering the climate; a lecture on the new paradigm in plate tectonics by our newest Corresponding Member, Professor John Dewey *FAA FRS*, who also signed the Charter book; a presentation by the Science and Technology Secretary to the Government of India about the changing landscape for India's science sector; and a highly successful bilateral symposium bringing together eminent French and Australian medical researchers.

This newsletter is the last of a great many shepherded to completion under the eagle eye of Honorary Editor Professor Neville Fletcher *AM FAA FTSE*. We are immensely grateful for his contribution over the last 22 years.

Sadly, we have lost two Fellows in the past months. Dr Fraser John Bergersen *AM FAA FRS* died on 3 October, and Professor (Charles) Angas Hurst *AM FAA* died on 19 October. Our condolences go to their families.

Professor Suzanne Cory *AC PresAA FRS*



**CARING FOR  
THE AUSTRALIAN  
COUNTRYSIDE**

LESSONS FROM THE PAST AND PRESENT

THE AUSTRALIAN ACADEMY OF SCIENCE'S 2012 PUBLIC LECTURE SERIES WILL EXAMINE SUSTAINABLE SOCIOLOGY, MINING, AGRICULTURE, CULTURE AND ENVIRONMENT IN COUNTRY AUSTRALIA

**7 February 2012** *Aboriginal land management through history* by Adjunct Professor Bill Gammage *AM*. Shine Dome, Canberra

**6 March 2012** *Sustainable management of annual crops* by Dr John Kirkegaard. Shine Dome, Canberra

[www.science.org.au/events/](http://www.science.org.au/events/)

## The Academy's new Nobel Laureate

Professor Brian Schmidt *FAA*, Australian National University astronomer and Fellow of the Academy since 2008, has won the 2011 Nobel Prize in Physics. Professor Schmidt shared the honour with his American colleagues in astronomy, Professors Adam Riess and Saul Perlmutter, for their discoveries that the expansion of the universe is accelerating, and of dark energy.

In an inspiring speech to the Prime Minister's Prizes for Science at Parliament House the week after his Nobel win, Professor Schmidt said Australia's future is bright, but not guaranteed.

'Capitalising on Australia's opportunities will not just happen, it requires strategic science and education policies that adapt to a changing world,' he said.

'And Australians will have to be willing to make significant changes in how they go about their business.'


Following Professor Schmidt's win, Fellows of the Academy joined other leaders in science and federal politicians at the

Shine Dome for a special champagne breakfast to congratulate and celebrate their colleague. Academy President Professor Suzanne Cory said it was a special privilege to count the nation's newest Nobel laureate as a friend and colleague in the Academy. She noted that Professor Schmidt's Nobel-winning work had been recognised with one of the Academy's early career medals, the Pawsey Award in 2001.

'Brian's work is richly deserving of this highest accolade, the Nobel Prize: his findings have completely changed the way in which we understand the universe,' Professor Cory said.

'In becoming a Nobel laureate, Brian joins several other Fellows of the Australian Academy of Science. Like many of them, he is actively involved in mentoring young scientists and raising public awareness of science.

'Already Brian's work and his Nobel Prize have captured the imagination of school children, young researchers, the media

and the public. They have also captured the minds of the nation's politicians, many of whom have come out in proud support of science. I hope that they stay out in proud support of science.' 



Brian Schmidt

## Fellows win top Australian science honour

Two Fellows who revolutionised polymer science have won the 2011 Prime Minister's Prize for Science.

Professors David Solomon *AM FAA FRS FTSE*

and Ezio Rizzardo *FAA FRS FTSE* accepted the prize in October at a formal dinner at Parliament House.

'Solomon and Rizzardo's research in polymer chemistry has been truly transformative,' said Academy President Professor Suzanne Cory.

'Their work is a marvellous example of how elegant fundamental science can also be of immense practical benefit.'

Ezio Rizzardo, a CSIRO Fellow, and David Solomon, a Professorial Fellow at the University of Melbourne, both also Fellows of the Royal Society and the Australian Academy of Technological Sciences and Engineering, devised a means of custom building plastics and other polymers. Applications of their work are diverse, from producing plastic solar cells to delivering drugs precisely to their site of action in the body.


'Each one of us feels the impact of their work, every day of our lives, in so many of the industrial products we use,' said Professor Cory. 

Photo: Irene Dowdy



David Solomon and Ezio Rizzardo with Prime Minister Julia Gillard at the prize dinner



## International news

### Academy speaker series

Three eminent Australian scientists have shared their knowledge with colleagues in Europe, America and Asia, through a program organised by the Academy on behalf of the Australian Government Department of Innovation, Industry, Science and Research.

Professor Doug Hilton *FAA* visited North America and Canada, Professor Tanya Monro *FTSE* toured Europe, and Professor Hugh Possingham *FAA* delivered his lectures in Asia.

In total, the speakers travelled for combined 41 days, and in this time 18 lectures were delivered at 18 different organisations in 11 different countries. Each of the speakers reported that the series was a worthwhile and rewarding

exercise, which allowed Australian research to be showcased, and increased the opportunities for international collaboration.

Professor Tanya Monro, Director of the Institute of Photonics and Advanced Sensing at the University of Adelaide, reported that when she received the invitation to take part in this project from the Academy she was thrilled, honoured and daunted in equal measure.

'The offer of a chance to tour Europe and strengthen our links with the region has provided me with a welcome chance to reflect on what my team is doing well, and, more generally, on what Australia does really well and to think about what we could do better via strengthening out collaborations,' she said.

'It has also given me pause for thought about the role collaborations play in our success in research; success at the individual level, success for groups of researchers, and in the success with which we translate innovations to create prosperity and solve practical problems.'

The Academy liaised with diplomatic posts and its sister Academies in the regions, which assisted with the promotion of the lectures. Professor

Hugh Possingham delivered an additional lecture at the Australian Embassy in Jakarta, and met separately with the Australian Ambassador to Indonesia and the Deputy Australian High Commissioner to Singapore.

### Eighth China–Australia symposium

The Academy, together with the Australian Academy of Technological Sciences and Engineering (ATSE) and the Chinese Academy of Sciences (CAS), hosted the 8th China–Australia symposium on Science and Technology. Held in Shanghai and Suzhou, China, from 5 to 9 November 2011, the symposium explored the theme of Green Materials and the Recycling Economy.

The symposium consisted of three workshops: biomedical materials and devices; recycling hard waste and liquids; and materials for clean energy. Academy President Professor Suzanne Cory and ATSE President Professor Robin Batterham *AO FAA FTSE* attended the event and Professor Chennupati Jagadish *FAA FTSE* convened the workshop on materials for clean energy. This was the first Australia–China symposium attended by Professor Chunli Bai as the President of CAS.

### Meeting of the global network of science academies

The Academy's Foreign Secretary, Professor Andrew Holmes *AM FAA FRS FTSE*, attended the Executive Committee meeting of the Inter-Academies Panel (IAP), the global network of science academies, in Mexico City on 18–19 October 2011. The meeting considered issues including approval of budget for 2011 and 2012, membership, decisions on funding affiliated network grant applications, project applications, publications and communications, policy activities, IAP projects and science diplomacy. The Academy has been a member of IAP since 1993.

Photo: Tanya Monro



Photo: Shizhuan Zhang



**Top:** Tanya Monro takes a break from her lecture series with a visit to the medieval German town of Jena  
**Above:** Chunli Bai, Robin Batterham and Suzanne Cory exchange gifts during the opening of the 8th China–Australia symposium

## Indian Science and Technology Secretary visits the Academy

The Academy, in conjunction with the Department of Innovation, Industry, Science and Research, hosted a visit and public lecture by Dr Thirumalachari Ramasami, Science and Technology Secretary to the Government of India. The lecture, held on 4 November and attended by 60 people, was entitled *Changing India's science, technology and innovation landscape*. It explored how the Indian science and technology sector intends to fulfil the aspirations of the people and polity of the largest democracy in the world. The lecture was followed by a networking session and afternoon tea in the Shine Dome.

## Showcasing excellence in biomedical research: Australia–France symposium

In association with the Embassy of France and the Department of Innovation, Industry, Science and Research, the Academy organised a high profile conference on biomedical research, held on 23 and 24 November 2011 at the Shine Dome.

Co-chaired by Professor Suzanne Cory and Professor Moshe Yaniv from the Institut Pasteur and Member of the French Academy of Sciences, the symposium featured presentations from leading scientists from France and Australia within five themes: neuroscience; cancer; infection and immunity; cardiovascular disease; and clinical translation. Policy and strategy were also discussed by participants.

Early to mid-career researchers from France and Australia were invited to submit abstracts to make short presentations on their research; eight of these were chosen to present. A further 20 bursaries were awarded to early to mid-career researchers, covering accommodation and registration costs. More information is available from [www.science.org.au/events/conferences-and-workshops/australiafrance/2011.html](http://www.science.org.au/events/conferences-and-workshops/australiafrance/2011.html)



Photo: Press and Information Department of the French Embassy in Australia/Claire Dupré

Suzanne Cory with Stéphane Romatet, French Ambassador-designate to Australia, at the opening of the Australia–France biomedical research symposium

## ADAM J BERRY MEMORIAL FUND

The Adam J Berry Memorial Fund is co-managed on behalf of the Berry family by the Academy and the US National Institutes of Health Foundation. It aims to assist one early career Australian researcher to work in the USA at an institute of the National Institutes of Health (NIH) each year. In addition to gaining valuable experience for themselves, these scientists are expected to make a contribution to the research program of the institute they are visiting.

Ms Ursula Sansom-Daly, University of New South Wales, is the recipient of this award for 2012. Ursula will be working for 8 weeks at the National Cancer Institute of the NIH to research paediatric psycho-oncology practices and to contribute to protocol development for a cross-cultural intervention for parents of children with chronic illness.

## FELLOWSHIPS – JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE

The Academy, in association with the Japan Society for the Promotion of Science, invites applications from Australian researchers to undertake Invitational and Postdoctoral Fellowships in Japan. Invitational Fellowships are either short term, for 14 to 60 days, or long term, for two to 10 months. Postdoctoral Fellowships are for one to two years.

Researchers in any field of natural sciences, including technology, engineering and medicine may apply. Applications in the humanities and social sciences are also accepted for the Postdoctoral Fellowships only.

Closing date for submissions: Friday 2 March 2012

Further information: [www.science.org.au/internat/asia/index.html](http://www.science.org.au/internat/asia/index.html)

## News from national committees

### Crystallography

*Chair: Professor Jenny Martin*

Raising awareness of crystallography has been high on the National Committee for Crystallography's agenda, in light of the upcoming centenary years for crystallography. The Committee is therefore delighted to report that as a consequence of our lobbying, together with that of Bragg biographer Professor John Jenkin, Australia Post will be releasing a 2012 stamp of Australia's first Nobel Prize winner and the youngest ever Laureate Lawrence Bragg, who won the Nobel Prize for physics in 1915 at the age of 25. This will be just in time for the Bragg public symposium planned for December 2012 in Adelaide to celebrate the centenary of the publication of Bragg's Law.

In August this year, the International Union of Crystallography (IUCr) held its congress and general assembly in Madrid. The three Australian voting members for the general assembly were Professor Mitchell Guss, Dr Steve Wilkins and Professor Ray Withers *FAA*. Professor Guss was elected onto the IUCr Council and will also take over as chair of the National Committee for Crystallography in 2012. Professor Peter Colman *FAA FTSE* retired from the IUCr Council at the Madrid meeting, after serving a six-year term, the last three as Vice-President. The IUCr is planning an International Year of Crystallography in 2013, and this is proposed to be launched at the 2012 Bragg Symposium and joint Asian Crystallographic Association and Society of Crystallographers in Australia and New Zealand meeting in Adelaide.

### Earth sciences

*Chair: Professor Brian Kennett *FAA**

The general assembly of the International Union of Geodesy and Geophysics met in Melbourne from 27 June to 8 July 2011. This meeting attracted over 3500 delegates from across the globe. Following elections at the general assembly for its eight constituent associations, Australia now has a very strong representation across the wide range of fields in the Union. Attention is

now focused on preparations for the 34th International Geological Congress, which will be held in Brisbane on 5–10 August 2012, in association with the business meetings of the International Union of Geological Sciences. A comprehensive program with 36 major themes comprising many individual symposia is being developed. Full details of the meeting are available from [www.34igc.org](http://www.34igc.org).

### Earth system science

*Chair: Dr Roger Gifford*

The National Committee for Earth System Science organised a geoengineering symposium at the Shine Dome from 26–27 September 2011, through the efforts of convener Professor David Karoly. This meeting was co-sponsored by the Australian Academy of Technological Sciences and Engineering and formed the next step in the National Committee's effort to implement recommendations from its strategic research plan launched in December 2010. One recommendation was that all learned academies should be involved in discussions on collaboration and coordination of activities in Earth system studies due to their complex nature. In discussing economic, governance, ethical and equity aspects of various proposed approaches to global climatic remediation, the workshop made a start in that direction. No answers were provided for many difficult questions, but a future joint meeting of all the Australian academies, through the Australian Council of Learned Academies, was suggested. For a more detailed summary of the symposium see [www.science.org.au/natcoms/nc-ess.html](http://www.science.org.au/natcoms/nc-ess.html).

### International Council for Science (ICSU) Coordination

*Chair: Professor Bruce McKellar *FAA**

The ICSU general assembly was held in September 2011. Early in the year, documents for the general assembly were circulated for comment to national members. ICSU Coordination was able to suggest comments to the executive board

on these documents that influenced their final form. Candidates were also suggested for ICSU officers and the ICSU executive board that resulted in Professor David Black *FAA* being elected to the position of ICSU Secretary-General at the general assembly. The National Committee also prepared notes for Australians attending the general assembly.

### Mathematical sciences

*Chair: Professor Nalini Joshi *FAA**

The National Committee for Mathematical Sciences met on 12 August, with a major topic of discussion being the possible formulation of a decadal plan. Decadal plans provide a long-term vision for each discipline area in a way that is supported by cognate disciplines, and create a supporting framework for the benefit of individual scientists in the area.

Another major topic of discussion was the results of Excellence in Research for Australia 2010 in the mathematical sciences. It is deeply concerning that 17 out of 41 universities did not have sufficient output to be assessed in the mathematical sciences and that 25 were not assessed in statistics. The chair wrote



Future directions in saturated fats were on the agenda of the Nutrition National Committee

Photo: iStockphoto



Photo: iStockphoto



Quaternary research is an interdisciplinary field encompassing the last ice age and interglacial warming period

a letter to the Deputy Vice-Chancellor for Research at Flinders University, a major university which did not receive an assessment in the mathematical sciences.

The International Congress for Mathematics Instruction will be held in 2012 and the Committee has proposed Professor Marilyn Goos as our voting delegate. The Academy also sent a letter of support for the International Council for Industrial and Applied Mathematics (ICIAM) to become an associate member of the International Council for Science; this application was accepted. The chair attended ICIAM 2011 in Vancouver, where the report of the joint working group of the International Mathematical Union and ICIAM on the feasibility of ranking journals was presented.

## Nutrition

*Chair: Professor Andrew Sinclair*

The National Committee for Nutrition met in early October 2011 via teleconference to consider several matters ongoing from their face-to-face meeting in June. In July, the Committee chair met with Professor Ibrahim Elmadfa, President of the International Union of Nutritional Sciences, and Dr Po-Chao Huang, President of the Federation of Asian Nutrition Societies (FANS), at the

Asian Congress of Nutrition in Singapore to discuss membership of FANS. At the FANS executive meeting in Singapore in July, the Nutrition Society of Australia was not invited to join FANS. The chair is in ongoing discussions with Professor Elmadfa on this matter.

Professor Caryl Nowson prepared and circulated a document to the Committee on the recent increase by the US Institute of Medicine on the dietary recommended intakes for vitamin D. Professor Nowson indicated that Australia should investigate if allowing more vitamin D fortification of the Australian food supply could help address the issue of the emergence of rickets. It was agreed that the Committee would examine the possibility of running a workshop on this topic in 2012.

The chair attended an International Life Sciences Institute South East Asia Region Australasia meeting on future directions in saturated fats, which was held in Melbourne on 14 September 2011. As the Committee had provided some financial support, the chair opened the meeting. He reported that the meeting provided very thorough coverage of the topic from basic nutritional physiology through to the production of new plant oils produced by new plant breeding techniques including genetic engineering. The Committee discussed several different

strategies for raising its profile amongst nutrition scientists in Australia and agreed to support the Nutrition Society of Australia for a high profile speaker at the society's 2012 annual conference, to identify opportunities for Committee members to talk about their activities, and to develop two-year and five-year plans in 2012.

## Mechanical science

*Chair: Professor Jim Denier*

Professor Ross McAree from the University of Queensland was Australia's voting delegate at the 12th general assembly of the International Federation for the Promotion of Mechanism and Machine Science, held from 19 to 23 June 2011, in Guanajuato, Mexico. Thirty-seven member nations attended. The incoming president will be Professor Yoshihiko Nakamura from Japan, who served as vice-president from 2008 to 2011. Professor Nakamura succeeds Professor Marco Ceccarelli. Professor James Trevelyan from the University of Western Australia, a member of this Committee, remains a member of the executive council. The general assembly voted that the 2015 world congress be held in China.

## Quaternary research

*Chair: Professor Allan Chivas<sup>FAA</sup>*

Dr Craig Sloss and Dr Steven Phipps represented Australia as voting delegates at the 18th International Union for Quaternary Research (INQUA) congress and general assembly, from 20 to 27 July 2011 in Bern, Switzerland. Professor Allan Chivas's four-year term as president of INQUA concluded at this gathering, although he remains a member of the INQUA executive committee as past president. The incoming president for 2011 to 2015 is Dr Margaret Avery, from South Africa. The Committee met on 14 October 2011, with the major agenda items including a young Quaternary scientists conference in conjunction with INQUA, and data collection and stakeholder consultation in preparation for a decadal plan.

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Photo: iStockphoto



The space science decadal plan presents a long-term vision for Australian space science

## Space science

*Chair: Professor Russell Boyce*

In the period since the launch of the *Decadal plan for Australian space science 2010–2019* at the 10th Australian Space Science Conference in September 2010, the Australian space science community has entered the implementation phase of the plan. The plan, which has already been extremely successful in bringing together and growing the space science community, presents a vision of building a long-term, productive presence in space for Australia via world leading innovative space science and technology, strong education and outreach, and international collaborations. Three substantial projects described in the plan's priorities have already been funded: Scramjet-based access-to-space systems; a growing national asset in the form of a plasma thruster and satellite test facility at the Australian National University, both funded by the Australian Space Research

Program; and a dedicated mass spectrometer laboratory for cosmochemistry, funded by the Australian Research Council's Linkage Infrastructure Equipment and Facilities fund and the Australian National University.

These projects and many more were presented in detail at the successful 11th Australian Space Science Conference, held in Canberra in late September 2011. Highlights of the conference included: the release by Senator The Hon. Kim Carr, Minister for Innovation, Industry, Science and Research, of the guiding principles for the development of a national space industry policy; a bilateral Italy–Australia space symposium which provided a forum for discussion and development of Italian–Australian collaborations in space science and technology; and the passing by the conference delegates of a conference resolution. That resolution acknowledged the current growth in the space and astronomy sectors in Australia

that have been assisted by the minister. It declared that the Australian space science and technology community seeks to work closely with government and industry to build Australia's presence in space and contribute to secure and assured access to space-based technologies. It encouraged the government to provide funding certainty for the Space Policy Unit. It vowed to continue the Australian Space Research Program, and to ensure access for Australia to data from the next generation of Earth observation satellites. The resolution was forwarded by the conference chairs to the minister.

An excellent outcome for space science has been its inclusion as an enabling capability area in the recently released *2011 strategic roadmap for Australian research infrastructure*, with many of the suggestions and arguments in submissions from the Committee adopted.

After five years as chair of the Committee, Professor Iver Cairns of the University of Sydney stepped down in August 2011. Under his effort and guidance the space science community has gone from strength to strength and the decadal plan has been developed. Professor Cairns's colleagues acknowledge and applaud the tremendous effect that his leadership has had, and the great effort and enthusiasm that he brought to the task. They extend their warmest thanks and gratitude to him. The leadership of the Committee is now in a brief transition phase – the new chair is Professor Russell Boyce, Defence Science and Technology Organisation Chair for Hypersonics at the University of Queensland, with Professor Cairns providing the role of deputy chair until the end of 2011. Dr Graziella Caparelli of University of Technology Sydney will become deputy chair in January 2012.

## Spectroscopy

*Chair: Professor Keith Nugent FAA*

Dr John Holdsworth and Professor Min Gu FAA were Australia's voting delegates at the 22nd general congress of the International Commission for Optics general assembly from 15 to 19 August 2011 in Puebla, Mexico. ▲



## Science policy

### Australian science in a changing world: innovation requires global engagement

Professor Suzanne Cory launched the Academy's report *Australian science in a changing world: innovation requires global engagement* on 22 November 2011. This report seeks to reinvigorate the national debate about what Australia must do to ensure that it can maintain and build its links with leading international science, and continue to maximise economic and social benefits for the nation from these global networks. Delayed action now will limit our ability to make effective and efficient decisions in the future. This is the critical decade for Australia's links to the emerging world of the 21st century.

As Australia enjoys the proceeds of a mining boom, our major partner economies in Asia are in the middle of a science and innovation boom. The Organisation for Economic Co-operation and Development (OECD) reports that China's investment in research and development alone accounted for 13 per cent of the OECD total in 2008, up from five per cent in 2001. This rapid growth shows no signs of slowing, and other countries including India, South Korea, Singapore and Malaysia all show

stronger research and development growth than Europe, North America and Japan. Our future engagement with these economies will require the ability to link in with their science and innovation establishments.

Other countries are responding to this change with deliberate action. The Australian Government's main program for supporting strategic international science collaboration was terminated in June 2011. In light of these global scientific trends and the relevance of science and technology to shaping our future, reconsideration of our international engagement is urgently required. Australia has a unique opportunity, as both a Western and an Asian nation, to participate strategically in global science and innovation.

The big challenges and opportunities for Australia in the 21st century – social, economic and environmental – are global, requiring coordination and integration across scales and disciplines. Australian science and innovation can continue to play an influential role, but will increasingly need to be coordinated with and be cognisant of the efforts of others. This will require investment now by the Australian Government for the future.

This report builds on the 2010 Australian Academy of Science position paper,



*Internationalisation of Australian Science* that addressed the challenges arising from, and the opportunities for participating in the continuing internationalisation of science and innovation. The Academy's report recommends the establishment of a new program of \$250 million over 10 years, representing 0.25 per cent of the Australian Government's total investment in science, research and innovation over the decade. This strategic investment would provide a crucial multiplier effect in terms of benefits gained through effective and ongoing access to the 97–98 per cent of new knowledge that is produced outside Australia. ▲

### CORRESPONDING MEMBER VISITS ACADEMY

Professor John Dewey FAA FRS, who was elected as a Corresponding Member in 2011, visited Australia in November–December. In a ceremony on 21 November 2011 at Ian Potter House attended by Academy President Professor Suzanne Cory, Council members and Fellows of the Academy, he signed his name into the Charter Book as a Corresponding Member. Later that evening he gave a public lecture on continental drift via tectonic plates to a packed audience at the Shine Dome.

Suzanne Cory presents John Dewey with his certificate of admission as a Corresponding Member



## Leaders in science, business mix in Melbourne

Victorian Fellows of the Academy mingled with politicians and business leaders at a reception in Melbourne recently. Held by Club Melbourne at the Melbourne Convention and Exhibition Centre, the event aimed to foster relationships between science, business and politics. Victorian Minister for Technology Gordon Rich-Phillips and Academy President Professor Suzanne Cory both spoke at the event of the need to support high quality, engaging science education at all levels. ▲



Photo: Melbourne Convention and Exhibition Centre

Suzanne Cory, Gordon Rich-Phillips and Sophie Mirabella, Shadow Minister for Industry, Innovation and Science

## Light up the Shine Dome

Fellows gathered with architects, early career researchers, politicians, policymakers and journalists to celebrate and formally switch on the Shine Dome's colourful new lighting. At a cocktail reception in October, Member for Canberra Gai Brodtmann officially switched on the lights for the first time. The coloured lights installed in the moat to illuminate the building's arches are in keeping with best practice and emit minimal ambient light. Thanks to grant funding from the Australian Government National Historic Sites Program, the lights also have a practical application; with increasing evening pedestrian traffic in the area, they alert passers-by to the moat. A photo-electric sensor causes the lights to switch on when dark falls. They are turned off at 10 pm. ▲



Photo: Mark Graham

Member for Canberra Gai Brodtmann and Sue Meek formally switch on the Shine Dome lights

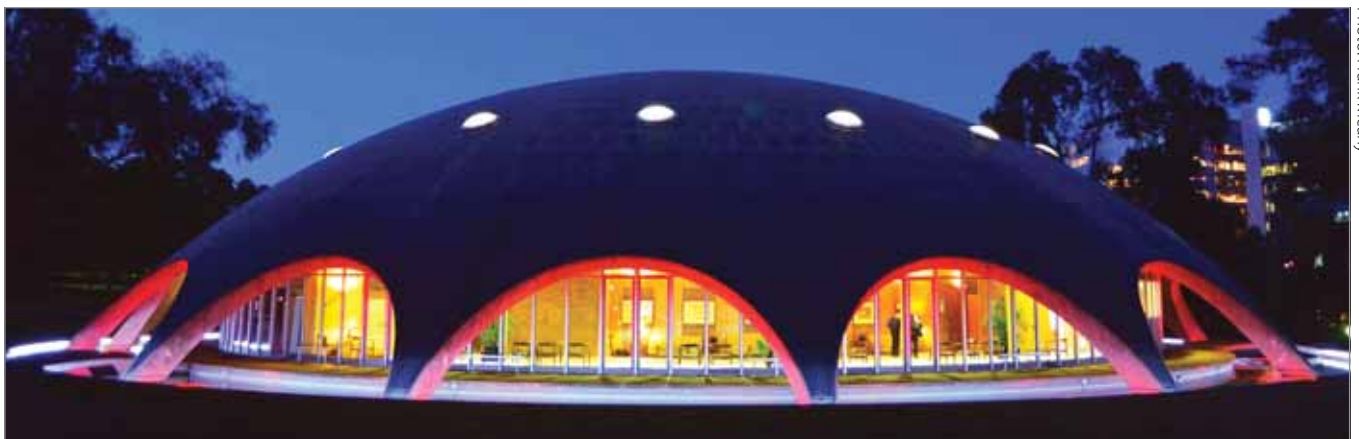


Photo: Frank Meany



## Interviews with Australian scientists

### Interviews program goes international

The *Interviews with Australian scientists* program explored the international nature of science this September, with a visit to the United Kingdom. Professor Geoffrey Burnstock FAA FRS, Dame Bridget Ogilvie AC DBE FAA FRS and Professor Lord Robert May of Oxford OM AC FAA FRS were interviewed by Professor Robyn Williams AM FAA. These three eminent scientists may live overseas but their antipodean connections mean they still call Australia 'home'. Despite their titles of Professor, Dame and Lord, they insisted on being addressed as Geoff, Bridget and Bob. The interviews were hosted by the Royal Society in their beautiful and historic headquarters at Carlton House Terrace in London. Sponsorship was generously provided by the Australian Physiological Society, the International Society of Autonomic Neuroscience, University College London, the University of New England, the University of Sydney and the Wellcome Trust.

Closer to home, Dr Cyril Appleby FAA, Professor Noel Hush AO FAA FRS, Professor Kurt Lambeck AO FAA FRS and Professor Jim Pittard AM FAA also recently joined the list of Fellows interviewed for the Academy.

Dr Appleby made a name for himself investigating the origin and function of haemoglobins in the plant kingdom, so much so that he was known as 'Mr Plant Haemoglobin'. A self-confessed oddball, Dr Appleby shared stories of his rocky road through science with interviewer Dr Jim Peacock AC FAA FRS FTSE at the Shine Dome in Canberra.

Atoms are mostly empty space. Quantum reality explains why, despite this empty space, a baby's hand doesn't pass through its mother's cheek, for example. This idea was explained by Professor Hush in his interview with Professor Williams at the ABC studios in Sydney this August. This interview was kindly sponsored by the University of Sydney.

Past president Professor Lambeck was interviewed in Canberra in October 2011. Professor Williams, again donating his time to the *Interviews* project, conducted

the interview with Professor Lambeck. Polylingual and multi-skilled, Professor Lambeck spoke of his moves from the Netherlands to Dapto to Paris and from surveying to geophysics to President cum politician. Thanks to the Australian National University for sponsoring this interview.

Microbial geneticist Professor Pittard was interviewed by Professor Michael Hynes FAA at his mud brick home on the outskirts of Melbourne. Professor Pittard began his working life as a pharmacist and then embarked upon a scientific

research career in gene expression. Despite his grandmother's warning that he was 'giving up the substance for the shadow', Professor Pittard succeeded in providing for his lovely family – even building the roof that was over their heads! This interview was proudly sponsored by the University of Melbourne.

Transcripts from the interviews with Dr Angus McEwan FAA, Associate Professor Bryan Fry, and Dr Alicia Oshlack are now available at [www.science.org.au/scientists/](http://www.science.org.au/scientists/) ▲



Robyn Williams interviewed the witty and delightful Bridget Ogilvie at the Royal Society in September 2011

### New publications manager

We are delighted that Dr Bernadette Hince has joined the Academy Secretariat as new publications manager. Bernadette (who started in November) has tertiary qualifications in science and English, with a PhD in environmental history. She has extensive experience in editing, writing and publications management. Welcome to the team, Bernadette.



We wish former publications manager Dr Kate List all the best in her new job as new managing editor of CSIRO Education. We would like to thank her for her splendid work at the Academy, and acknowledge her exceptional dedication to the job. Thank you, Kate!



Bernadette Hince (top) and Kate List



## Science by Doing

*Science by Doing* is taking a break from junior secondary science as it puts a lens on the status and quality of Year 11 and 12 science in Australia. Earlier this year Australia's Chief Scientist Professor Ian Chubb AO commissioned the Academy to survey attitudes to science education amongst teachers and senior science students and prepare a report. The report complements a similar study of undergraduates being conducted by Universities Australia, and both form

part of the Office of the Chief Scientist's *Health of Australian Science Project*.

With Principal Researcher Professor Denis Goodrum, the *Science by Doing* team is preparing a report that outlines the ideal picture for senior science and the actual picture of senior science in Australia. The study then provides pragmatic solutions for moving from the present actual to the attainable ideal.

Several data sources are informing the actual picture of Australian senior science including teacher telephone surveys, student surveys and a series of focus groups with teachers, students, community members, scientists and peak science education bodies. While the data supports much of what we already know about senior science, it has revealed some novel concerns. It seems some students are advised against selecting senior science subjects by school staff, if the students don't require science as a prerequisite for the tertiary education course. Instead, they are encouraged to 'choose something easier that involves less work! Furthermore, a proportion of our young people do not believe that a basic science understanding is important for everyday life.

The report is due for submission in early December with the *Health of Australian Science Project* to be officially launched in early 2012. Academy Chief Executive Dr Sue Meek FTSE will represent the Academy on the advisory group for the project. Further information about this important project can be found at [www.science.org.au/sciencebydoing/research-evaluation](http://www.science.org.au/sciencebydoing/research-evaluation)

*Science by Doing* has been supporting science education in one of our closest neighbouring countries, Indonesia. During September, *Science by Doing* Director Amelia Druhan made a keynote presentation and held a workshop at the 2nd International Science Education Conference in Bali. The conference was organised by the South-East Asian Ministers of Education Organization (SEAMEO) of which Australia is an affiliate member.

Following the conference Amelia travelled to Bandung, West Java, to the SEAMEO Regional Centre for the Quality Improvement of Teacher and Education Personnel in Science. There she conducted a one-day workshop on inquiry-based science education for 28 local teachers. Despite the heat and the limited English of some participants, it was a worthwhile experience for all. Teachers left with some simple and practical solutions for engaging students with science knowledge and the process of science. ▲



*Science by Doing* education specialist Joanna Abbs processes student surveys



Awards in the Lifelong Learning category. In partnership with CSIRO Publishing, who did the digital development, the digital components of the *Science by Doing* resources were the winning entry for innovation in design and development, quality of content and audience engagement. The Academy's Director of *Science by Doing* Amelia Druhan jointly accepted the award with CSIRO's Multimedia Producer Steve Gartner at a gala dinner and presentation in Melbourne.

The Australian Academy of Science's *Science by Doing* professional learning resources for secondary school science teaching have won the eLearning Association of Victoria Excellence

## Primary Connections

The Academy is delighted that Brooke Topelberg, a trained Professional Learning Facilitator in the Academy's *Primary Connections* science education program, has won the Prime Minister's Prize for Excellence in Science Teaching in Primary Schools. She is a passionate, dedicated primary teacher who in 2010 became

the Western Australia Primary Science Educator of the Year. As the science coordinator of Westminster Primary School, Mrs Topelberg has revolutionised science teaching. It has taken good organisation and creativity as well as the support of her colleagues and *Primary Connections* resources. She joins a group

of six *Primary Connections* trained Professional Learning Facilitators who have also won the Prime Minister's Prize for Excellence in Science Teaching in Primary Schools.

Further *Primary Connections* curriculum units and support resources were made available to Australian schools in September. The three new curriculum units: *Beneath our Feet*, *Watch it grow!* and *Melting moments* are fully aligned to the new *Australian Curriculum: Science*. The Year 4 unit *Beneath our feet* explores the concepts of landforms, rocks and soil and how these are changed over time by processes such as erosion and weathering. The Year 2 unit *Watch it grow!* explores how living things grow and change over time. Students apply what they have learnt as they investigate the stages in the life cycle of mealworms. The Year 3 unit *Melting moments* provides hands-on experiences of materials as they change state between solids and liquids.

Other support resources such as student and teacher flash cards and silicon wristbands have also been developed to help teachers use collaborative team roles when teaching the curriculum units. ▲

Photo: Irene Dowdy



Prime Minister's Prize for Excellence in Science Teaching in Primary Schools winner Brooke Topelberg with Prime Minister Julia Gillard and Senator Kim Carr, Minister for Innovation, Industry, Science and Research

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## Honours to Fellows

**Professor Brian Schmidt FAA Nobel Laureate** jointly awarded the Nobel Prize in Physics with Professor Adam Riess and Professor Saul Perlmutter for the discovery of the accelerating expansion of the universe through observations of distant supernovae.

**Professor David Solomon AM FAA FRS FTSE** and **Dr Ezio Rizzardo FAA FRS FTSE** jointly awarded the 2011 Prime Minister's Prize for Science.

**Professor Andreas Strasser FAA** awarded the 2011 Victoria Prize for his work on cell death and cancer.

**Professor Peter Doherty AC FAA FRS Nobel Laureate** honoured with the Research Australia Lifetime Achievement Award.

**Professor Min Gu FAA FTSE** awarded the WH (Beattie) Steel Medal presented by the Australian Optics Society.

**Professor Doug Hilton FAA** awarded the 2011 Milstein Award for outstanding contributions to cytokine research and the 2011 Research Australia Leadership and Innovation Award.

**Professor John Shine AO FAA** awarded the inaugural Peter Wills Medal.

**Professor Graeme Clark AC FAA FRS FTSE** has won the CSL Florey Medal for his pioneering work on the bionic ear.

**Professor Mathai Varghese FAA** was a finalist for the award of South Australian scientist of the year.

## Academy Fellow to lead International Council for Science

Academy Fellow Professor David Black<sup>FAA</sup> has been elected Secretary-General of the International Council for Science (ICSU). ICSU is a non-government organisation with a global membership of national scientific bodies and international scientific unions, which aims to strengthen science globally for the benefit of all humankind. It plans and coordinates interdisciplinary research to address major issues of relevance to both science and society. Professor Black is a professor of organic chemistry at the University of New South Wales and is the current Secretary-General of the International Union of Pure and Applied Chemistry. He was elected Secretary-General of ICSU at the Council's 30th general assembly in Rome in October 2011. The position is for three years. ▲



Photo: Andrew Holmes

David Black and Bruce McKellar on the terrace of the FAO building in Rome

## Appointment to international physics body

Academy Fellow Professor Bruce McKellar<sup>FAA</sup> has been elected as the next President of the International Union of Pure and Applied Physics. Professor McKellar was elected President-Designate at the union's general assembly in London. When he takes office in 2014, he will become the union's first Australian President, and its first President from the southern

hemisphere. The International Union of Pure and Applied Physics was formed in 1922 to represent physics internationally. Australia became a member in 1925. The mission of the Union is to assist in the worldwide development of physics, to foster international cooperation in physics, and to help in the application of physics toward solving problems of

concern to humanity. Professor McKellar was elected to the Academy of Science in 1987. He has been its Secretary Physical Sciences, Vice-President, and Foreign Secretary. He is also a Fellow of the Australian Institute of Physics, the Institute of Physics (UK) and the American Physical Society, and is an Honorary Professorial Fellow of the University of Melbourne.



Rick Shine

## Eureka Prizes

**Professor Murray Esler AM<sup>FAA</sup>** and Associate Professor Markus Schlaich received the NSW Department of Trade and Investment Jamie Callachor Eureka Prize for Medical Research Translation.

**Professor Alan Cowman FAA FRS** received the Australian Infectious Diseases Research Centre at the University of Queensland Eureka Prize for Infectious Diseases Research.

**Professor Rick Shine AM<sup>FAA</sup>** received the Australian Government Eureka Prize for Promoting Understanding of Australian Science Research.



## Obituaries

### Fraser Bergersen



Fraser John Bergersen was born in Hamilton, New Zealand, on 26 May 1929 and died in Canberra on 3 October 2011. He was educated at the University of Otago in Dunedin, obtaining a BSc in 1952 and an MSc (1st class honours) in 1954. He received a DSc from the University of New Zealand in 1962.

While doing his Masters he worked as an associate in the Bacteriology Department at the University of Otago, where he undertook studies of bacterial structure and of antibiotic resistance. In 1954 he moved to Australia to join CSIRO's Division of Plant Industry as a research officer. He remained there for the rest of his working life. By 1972 he had become chief research scientist, a position he held until his retirement in 1994. He was also chairman of the Microbiology Section from 1966 to 1977 and program leader of Nitrogen in Agriculture from 1979 to 1985. After retirement he became an honorary research fellow in the Division and a visiting fellow in the Division of Life Sciences at the Australian National University.

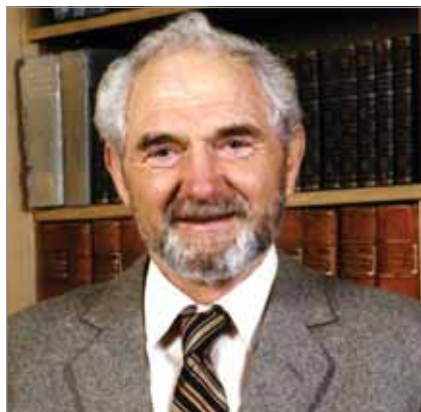
Fraser's research concentrated on the study of the symbiotic fixation of atmospheric nitrogen in the root nodules of legumes. The main direction was to investigate the physiology and biochemistry of the process, but the research also included studies of the structure and ultra-structure of nodules, the disposition and specialisation of symbiotic bacteria and the roles of various related structures. In addition, there were studies in field settings, including pioneering applications of the stable isotope  $^{15}\text{N}$  for the measurement of nitrogen fixation.

He was also active in the wider scientific community. Some of his contributions were as a regional editor for *Soil Biology and Biochemistry* from 1969 to 1994, member of sub-committee PC of the International Biological Program from 1966 to 1974, and of the advisory committee on Research in Agriculture in NSW from 1971 to 1979, a consultant on nitrogen fixation to FAO, UNESCO, the UN Environment Programme, the International Institute of Tropical Agriculture and the Rockefeller Foundation at various times, and leader of Australian Centre for International Agricultural Research projects in Malaysia, Indonesia and Thailand, and Australia from 1984 to 1991. In addition he served on the Academy Council from 1987 to 1993, being Foreign Secretary from 1989 to 1993.

Fraser won the David Rivett Medal (CSIRO Officers Association) in 1968. He was elected to the Fellowship of the Royal Society in 1981 and the Australian Academy of Science in 1985 and became a Member of the Order of Australia in 2000.

He is survived by his wife Gladys and their children Jennifer, Philip and Peter.

### Angas Hurst



Charles Angas Hurst was born on 22 September 1923 in Adelaide, and died in Adelaide on 19 October 2011. He was educated at the University of Melbourne, obtaining a BA (hons) in 1947, a BSc in 1948 and an honorary DSc in 1991, and the University of Cambridge where he completed his PhD in 1952. In 1952 he was appointed senior lecturer in the Mathematics Department at the University of Melbourne, and in 1957 accepted the position of senior lecturer

in the Department of Mathematical Physics at the University of Adelaide. He was promoted to professor in 1964 and held this position until his retirement in 1988, when he was made an emeritus professor. He became acting Vice-Chancellor of the University of Adelaide in 1985, and was appointed Pro Vice-Chancellor (Research) from 1986 to 1988.

Angas was a mathematical physicist noted for his work in lattice models, quantum field theory, asymptotic expansions and Lie groups. His PhD was a seminal work on quantum field theory, developing asymptotic expansions for perturbation expansions. Later work on lattice problems and the Ising model led to the free fermion field model and he also found the simplest non-linear field, still used as a test model for perturbation theory.

He was elected as a Fellow of the Australian Academy of Science in 1972 and served as a member of the Council from 1983 to 1986 and as a vice-president from 1984 to 1985. He served the Academy on a number of other committees, including the School Mathematics Advisory Committee (including as chair from 1984 to 1986) and was chair of the South Australian regional group from 1980 to 1986. In 2001 he was awarded a Centenary Medal and in 2003 he became a Member of the Order of Australia.

With his co-professor in Adelaide (Professor HS Green) he was responsible for establishing Australian mathematical physics as a research field of international distinction. He was a Fellow of the Australian Institute of Physics and the Australian Mathematical Society. From 1975 to 1978 he was a member of the Council of the University of Adelaide and he was instrumental in establishing the first graduate college of the university, Kathleen Lumley College, serving on its first council for three years. He also played a role in the formation of the International Association of Mathematical Physics in 1976.

Angas Hurst married Barbara Stevens in 1945. She survives him, together with their children John, Elinor and Rachel and their families. ▽

## 2011 Theo Murphy High Flyers Think Tank

Sixty young scientists from around Australia and across the scientific disciplines gathered in Brisbane recently to bring their collective knowledge to bear on the problem of how to make better decisions for managing Australia's stressed ecosystems.

On 29 and 30 September 2011, the early and mid-career researchers participated in the Academy's 2011 High Flyers Think Tank, *Stressed ecosystems: better decisions for Australia's future*, to discuss the ways in which scientific modelling can support decision making related to the management of Australian ecosystems. Delegates came from universities and government institutions across Australia. The participants, including one from Malaysia, brought with them a wide variety of skills and knowledge from fields as diverse as ecology, marine science, engineering, statistics, geology and the social sciences.

The Hon. Rachel Nolan, Queensland Minister for Natural Resources, officially opened the event, followed by presentations from senior researchers who defined and discussed key issues in relation to ecological modelling. A senior public servant also provided insight into how scientists can best engage with government to aid the policy process. Small group discussions then focused on four ecosystem case studies: Queensland's Bowen and Surat Basins, the Murray-Darling Basin, Ningaloo Marine Park off Western Australia and Melbourne's

peri-urban grasslands. The dinner address by Queensland's Chief Scientist Dr Geoff Garrett provided further inspiration on key challenges for Australia's future.

By the final session, when all groups presented the results of their discussions, a number of common themes had emerged (despite the diverse nature of the four ecosystems). For instance, it was emphasised that there should be a greater focus on participatory research in which scientists contribute to a transparent and iterative process involving communities and decision makers. It was proposed that such an approach could result in the collective management of ecosystems, taking into consideration the values and objectives of different stakeholders. Professor Hugh Possingham FAA, chair of the Think Tank organising committee, emphasised in his closing remarks that scientists should be prepared to occasionally venture 'into the government tent' to discuss their science with policymakers, rather than always standing on the outside 'throwing stones' in response to ecosystem management decisions.

The full outcomes and recommendations of the Think Tank will soon be published and presented to government, so that they can be used to guide future policy development and research prioritisation. The event program is available at [www.science.org.au/events/thinktank/thinktank2011/](http://www.science.org.au/events/thinktank/thinktank2011/) ▲



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