



## Education key: new Science Minister

Photo: Kyle Walker



Chris Evans and Suzanne Cory at the Shine Dome meeting

Education is the key to a robust and innovative Australia in the future, the new Minister for Tertiary Education, Skills, Science and Research has told the Council of the Australian Academy of Science.

At an early February dinner meeting with the Council in the Shine Dome, Senator Chris Evans said he considers investment in education to be of great importance.

'It is an exciting period. The mining boom creates enormous opportunities,' said Senator Evans, who took over the expanded portfolio from Senator Kim Carr in December.

'The question of how to maintain interest in science and mathematics is something the Government will respond to seriously.'

The Minister identified two significant moments for science education: the report of Chief Scientist Professor Ian Chubb AC to the Prime Minister on the status of school science and mathematics education in March, and the White Paper on Australia in the Asian Century, due to be submitted to the Prime Minister before mid-2012.

Council also discussed research infrastructure funding, and Australia's place in international science with the Minister.

Also at the dinner was Deputy Secretary of the Department of Industry, Innovation, Science, Research and Tertiary Education, Ms Patricia Kelly.

The dinner was part of the Academy's ongoing efforts to engage with senior federal politicians and policymakers. Late last year the Council dined in the Shine Dome with the Shadow Minister for Communications and Broadband, Malcolm Turnbull, and hosted breakfast with the Member for Melbourne, Greens MP Adam Bandt. 

## Message from the President



Suzanne Cory

This year has begun with fresh enthusiasm and the promise of new beginnings for science in Australia.

The Academy and the broader science community welcomed the Australian Government's decision in December to bring science, research, innovation, and industry together with skills and tertiary education under the stewardship of two Cabinet ministers with a strong track record of achievement.

Former Minister for Innovation, Industry, Science and Research Senator Kim Carr oversaw his portfolio with passion and enthusiasm, and we thank him for his hard work. It is pleasing indeed that the new Minister for Tertiary Education, Skills, Science and Research, Senator Chris Evans, has already voiced a similar enthusiasm for science and innovation.

Members of the Academy's Council enjoyed the opportunity to dine with Senator Evans at the Shine Dome as we gathered for the first meeting of 2012; it was a pleasure to mark his keen interest in Australian science and its place on the world stage.

The Academy also looks forward to working with the new Minister for Industry and Innovation, Greg Combet AM, to help achieve our common goals of enhancing science and education at all levels to modernise, strengthen and shape Australia's economy for the future.

The actions taken by government in the May Federal Budget will influence Australia's ability to remain economically and intellectually competitive. The Academy's pre-Budget submission to Treasury identified four issues for urgent consideration: school science education, Australia's global science engagement, career structures for Australian scientists, and measures to improve the return on public investment in Australian science through ongoing support to the Australian Academy of Science.

We have recommended the following Budget measures be given priority:

- \$12 million over five years to complete development of the Academy's successful and proven school science education programs *Primary Connections* and *Science by Doing*
- \$250 million over 10 years to provide strategic support for enhancing international collaboration for Australian science to improve competitiveness, awareness, governance and science diplomacy in a changing world
- \$20 million over four years to enhance career options for scientists after the immediate postdoctoral period
- grant-in-aid funding to underpin core functions of the Academy on an ongoing basis (approximately \$6m for the four years to 2015), and a staged increase to bring Australia into line with the UK, US and other comparable countries.

I urge the government to strongly consider these measures, which would have a major positive impact on Australia's innovation now and into the future.

The need to support quality education at all levels was highlighted dramatically by the Academy's report *The status and quality of year 11 and 12 science in Australian schools*.

This important paper, commissioned by Australia's Chief Scientist Professor Ian Chubb AC and prepared by the Director of *Science by Doing* Professor Denis Goodrum, found that the number of Australians studying science in years 11

and 12 has fallen significantly since the 1990s and is continuing to drop.

This dramatic and disappointing decline unfortunately appears likely to continue unless, as a nation, we act urgently to reverse the trend. As well as continuing to advocate for our own highly effective primary and secondary school programs, the Academy is working hard to ensure that quality science and maths education at all levels is a priority for the Australian Government.

Finally, I am very pleased to let you know that Professor Jim Williams FAA from the Research School of Physics and Engineering, Australian National University, has agreed to become honorary editor for the Newsletter. In doing so, I wish to publicly thank Professor Neville Fletcher FAA FTSE for his commitment and enthusiasm during his 22 years in this role.

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 IS EXAMINING SUSTAINABLE COMMUNITIES, MINING, AGRICULTURE, CULTURE AND ENVIRONMENT IN COUNTRY AUSTRALIA

**Tues 3 April 2012** Dr Anna Roberts  
*Trade-offs between agriculture and the environment: how do we decide what to protect?*

**Tues 5 June 2012** Dr Mark Stafford Smith  
*Livelihoods and liveability in remoter Australia*

**Tues 3 July 2012** Professor Sue Golding  
*Coal seam gas issues*

**Tues 7 August 2012** Dr Richard Groves  
*Invasive plants*

All lectures 6–7pm in the Shine Dome, Canberra, and live-streamed.

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

## Awards

### 2012 Honorific awards for scientific excellence

The Academy is pleased to announce that the 2012 awards for scientific excellence have been awarded to the following researchers:

#### Career research awards

##### 2012 Macfarlane Burnet Medal and Lecture for research in the biological sciences

**Professor Ruth Hall** AAM FAA  
*School of Molecular and Microbial Biosciences, University of Sydney*

Professor Ruth Hall has made a substantial and highly influential contribution to our understanding of how antibiotic-resistant genes are acquired by gram negative bacteria. This is important because antibiotic resistance develops by resistance genes coming into a pathogen from elsewhere. She discovered and characterised experimentally one of the central mechanisms of gene movement found in bacteria and is continuing to work on novel antibiotic transfer systems. More broadly, her work has made a fundamental contribution to our understanding of how genes of all types are mobilised by bacteria and hence how bacterial genomes evolve.

##### 2012 David Craig Medal for outstanding contributions to chemical research

**Professor Maxwell J Crossley** FAA  
*Professor of Chemistry (Organic Chemistry) and University Professorial Fellow, University of Sydney*

Professor Maxwell Crossley is a world leader in research on porphyrins, a class of compounds of great importance to life and for which many new uses are emerging in nanosciences. Haem, the red coloured oxygen carrier in blood, and chlorophylls, green pigments responsible for photosynthesis in plants, are important porphyrins. Professor Crossley designs and constructs new functional

porphyrin systems for use in solar energy devices, in mimicry of photosynthesis and also in the burgeoning field of molecular-scale electronics. He has been responsible for many influential advances in the field.

##### 2012 Mawson Medal and Lecture for outstanding contributions to earth sciences

**Professor Gordon Lister**  
*Research School of Earth Sciences, Australian National University*

Professor Gordon Lister examines tectonic processes that lead to the building and destruction of mountain belts. His PhD involved modelling and simulation using the primitive computers of the day, and led to the first of many software packages that have stemmed from his research. He taught for a decade in Leiden and Utrecht in the Netherlands, where he developed an ongoing fascination for the evolution of the Alpine-Himalayan orogen. This mountain belt once stretched from Spain to New Zealand, but has now been largely destroyed by the processes of lithospheric extension. His return to Australia enabled a renewed interest in ancient mountain belts, and comparison with modern orogens. Professor Lister was one of the first to demonstrate the importance of extensional tectonics in organic processes. His research has greatly influenced this field.

##### 2013 Matthew Flinders Medal and Lecture for scientific research of the highest standing in the physical sciences

**Professor Kenneth Freeman** FAA FRS  
*Duffield Professor, Research School of Astronomy and Astrophysics, Australian National University*

Professor Ken Freeman is widely acknowledged as the world's most eminent galactic astronomer. The first to identify the necessity for dark matter in galaxies, he has shaped our current understanding of the dynamics and structure of galaxies. Over the past decade, Professor Freeman has

co-established the field of galactic archaeology, where fossil records of stars are used to trace the formation of the Milky Way. His ideas have helped launch the European satellite GAIA (originally named the Global Astrometric Interferometer for Astrophysics). GAIA will work with a purpose-built instrument on the Anglo-Australian Telescope to fossick for stars that will chronicle the history of the galaxy since its birth more than 13 billion years ago. Professor Freeman has supervised more than fifty PhD theses, and he truly is a father of Australian astronomy.

#### Early career awards

##### 2012 Fenner Medal for distinguished research in biology (excluding the biomedical sciences)

**Professor A Harvey Millar**  
*ARC Australian Professorial Fellow and Winthrop Professor, ARC Centre of Excellence in Plant Energy Biology, School of Biomedical, Biomolecular and Chemical Science, University of Western Australia*

Professor Harvey Millar's research focuses on energy production in plants and how the process of respiration is affected by harsh climates. His work has shown how respiration can be protected in plant cells during environmental stress, how production of the antioxidant vitamin C is controlled in plants, and how the complex links between respiration and plant growth can alter plant yields. His discoveries underpin our understanding of respiratory damage in cell ageing and disease, relevant to both plants and animals.

##### 2012 Ruth Stephens Gani Medal for distinguished research in human genetics

**Dr Manuel Ferreira**  
*Senior Research Fellow, Genetic Epidemiology, Queensland Institute of Medical Research*

Dr Manuel Ferreira established the Australian Asthma Genetics Consortium, which recently carried out the largest

## Awards continued

asthma genetics study in Australia. This study, published in *The Lancet*, identified a gene — the interleukin-6 receptor — that has a more active version and a less active version. The more active version is more commonly found in asthmatics and contributes to inflammation. These findings suggest that a drug (currently used to treat rheumatoid arthritis) that reduces the activity of this gene may be effective in asthma.

### 2012 Gottschalk Medal for outstanding research in the medical sciences

**Associate Professor Katharina Gaus**  
*NHMRC Senior Research Fellow, Centre for Vascular Research, University of New South Wales*

Associate Professor Katharina Gaus is a leader in the field of cellular immunology and molecular microscopy. The main aim of her research has been to gain a mechanistic understanding of the organisation of the plasma membrane within cells. She has pioneered fluorescence microscopy approaches to examine and quantify T-cell signalling on a single molecule level (super-resolution microscopy) in living cells. Her research has provided the first evidence for lipids being linked to T-cell activation on a molecular and functional level, and may explain why immune function is compromised in obese people.

### 2012 Anton Hales Medal for distinguished research in the Earth sciences

**Dr Todd Lane**  
*School of Earth Sciences, University of Melbourne*

Dr Todd Lane is an atmospheric scientist at the University of Melbourne. Using computer models he examines processes such as thunderstorms, airflow over mountains, heavy precipitation events, and bushfire weather. He has also conducted extensive research on turbulence near thunderstorms and the hazards thunderstorms pose to commercial aircraft, and is currently working on improving methods for

turbulence avoidance. He is currently supported by an Australian Research Council Future Fellowship.

### 2012 Christopher Heyde Medal for distinguished research in the field of applied, computational and financial mathematics

**Dr Josef Dick**  
*ARC Queen Elizabeth II Fellow, School of Mathematics and Statistics, University of New South Wales*

Dr Josef Dick is an outstanding young researcher who has undertaken pioneering research in the area of numerical analysis. His main research achievements relate to numerical integration and, in particular, quasi-Monte Carlo rules. The importance of Dr Dick's research derives from his ability to obtain practical constructions of well distributed point sets for use in applications from finance, statistics, physics, geoscience and other areas, as well as through rigorous mathematical convergence bounds using advanced mathematical tools.

### 2012 Dorothy Hill Award for female researchers in the Earth sciences

**Dr Karen Black**  
*Australian Research Council Postdoctoral Fellow, School of Biological, Earth and Environmental Sciences, University of New South Wales*

Dr Karen Black is a vertebrate palaeontologist who has described many new fossil species including koalas, possums, marsupial moles, wombat-like diprotodontids and trunked palorchestids. Her internationally acclaimed study of cranial development in a bizarre sun bear like diprotodontid is the first for a fossil marsupial. She spearheads continent-wide research focused on the evolution of Australia's extraordinary mammals, correlating changes over time with global palaeoclimatic events to provide new evidence-based understanding about current and probable future climate-driven changes in Australian biodiversity.

### 2012 Le Fèvre Memorial Prize for outstanding basic research in chemistry

**Dr Pall Thordarson**  
*Senior Lecturer, School of Chemistry, University of New South Wales*

Dr Pall Thordarson has made outstanding contributions to molecular devices and materials using supramolecular and bioconjugate chemistry. He uses nanotechnology inspired by, or 'mimicking', biological systems to create smart gels and bio-devices driven by sunlight. His smart gels, formed by self-assembly, are designed to help anti-cancer drugs kill tumorous cells, reducing the side effects of chemotherapy. His light-driven bio-devices are targeted to the creation of better biosensors for medical applications, as well as combining waste treatment with renewable energy production.



Pall Thordarson

### 2012 Pawsey Medal for outstanding research in physics

**Professor Tanya Monro**  
*ARC Federation Fellow, Director, Institute for Photonics and Advanced Sensing  
Director, Centre of Expertise in Photonics, School of Chemistry and Physics, University of Adelaide*

Professor Tanya Monro is a dynamic, creative and productive physicist who has made numerous internationally significant contributions and achieved



Tanya Monro

world firsts in emerging areas of optical physics, most notably in sensing and nonlinear optics. She and her team have discovered new ways of generating, controlling and manipulating light and its interactions with molecules, and of developing advanced technology for structuring materials on the nanoscale. This research has spanned the development of new theoretical models, the identification of new regimes and fabrication and experimental breakthroughs, and has led to the development of new forms of optical fibres for use in telecommunications, biology, health, food and wine, environmental monitoring and defence.

### 2012 Frederick White Prize for physical, terrestrial and planetary sciences work which contributes to the understanding of natural phenomena

#### Dr Andrew Hogg

*Fellow, Geophysical Fluid Dynamics, Research School of Earth Sciences, Australian National University*

Dr Andrew Hogg uses models of ocean circulation to understand the role of oceans in climate. He has discovered new ways in which the ocean can generate low frequency climate variability, and has applied this knowledge to the prediction of the ocean's response to climate change. He has demonstrated the importance of resolving small-scale

circulation features, particularly in the Southern Ocean region, pointing the way forward for the next generation of climate models.

### 2012 Travelling Fellowships

#### 2012 Graeme Caughley Travelling Fellowship

##### Dr Andrea Byrom

*Landcare Research, New Zealand*

Dr Byrom is a senior ecologist with the New Zealand Crown Research Institution Landcare Research-Manaaki Whenua, and her special expertise is in population ecology of mammals, as was Dr Caughley's. She will visit Canada to speak at the University of British Columbia and to present other seminars.

#### 2012 Rudi Lemberg Travelling Fellowship

##### Professor Peter A Jones

*University of Southern California School of Medicine*

Professor Peter Jones has a distinguished record in cancer research and is a leader in the field of epigenetics that has broad

associations with the discipline of biochemistry. Professor Jones has had strong links with Australian researchers in the field including those carrying out research on epigenetics in plant systems. His public lectures will promote debate and consideration by Australians of this important field and the benefits of Australia's links with international researchers.

#### 2012 Selby Fellowship

##### Professor Richard de Grijis

*Peking University*

Professor Richard de Grijis has a distinguished record in astrophysics and a reputation for excellent public lectures. Given the strong research base in astrophysics and cosmology in Australia and the strategic importance of the possible siting of the Square Kilometre Array in Western Australia, his contribution as a Selby Fellow in 2012 will be outstanding. Professor de Grijis will visit many of the important centres of scientific activity in Australia.

For more information on awards and recipients visit

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

## MARGARET MIDDLETON FUND

The following researchers will receive research support under the **Margaret Middleton Fund for endangered Australian native vertebrate animals.**

#### Professor Ross Alford, James Cook University

*Project: Understanding and managing threats to wet tropics amphibians — improving management prioritisation and using novel techniques to protect frogs*

#### Dr Kellie Leigh, Australian Ecosystems Foundation

*Project: Finding the endangered spotted-tail quoll — new detection methods for declining and low density species*

#### Ms Teagan Marzullo, University of New South Wales

*Project: Estuarine fidelity, home range, habitat use and energetics of stingrays*

#### Mr Ben Scheele, University of Canberra

*Project: Northern corroboree frog disease dynamics and recovery*

#### Ms Rebecca West, University of Adelaide

*Project: Returning warru (black-footed rock-wallabies) to the Anangu Pitjantjatjara Yankunytjatjara Lands of South Australia*

## International news

### Australia–Indonesia bilateral research collaboration

Professor Sangkot Marzuki, President of the Indonesian Academy of Sciences, visited Australia from 12 to 15 December 2011. Professor Marzuki was accompanied by Professor R Sjamsuhidajat, Chair of the Commission for Medical Sciences, and Dr Budhi M Suyitno, Secretary-General. The purpose of the visit was to discuss how the Australia–Indonesia bilateral research collaboration can be strengthened.

The four-day visit began with a roundtable meeting at the University of Melbourne, attended by Professor Suzanne Cory AC PresAA FRS, Professor Bob Williamson AO FAA FRS and Professor Peter

Photo: Nancy Pritchard



R Sjamsuhidajat (left), Sangkot Marzuki and Budhi M Suyitno at the Shine Dome

Hall FAA FRS from the University of Melbourne. In Canberra, Professor Sangkot and his delegation met with Professor Jim Peacock AC FAA FRS FTSE at CSIRO Plant Industry for a meeting and tour of the CSIRO Discovery Centre. A roundtable meeting was also held at the

Shine Dome and was attended by representatives from Science and Technology Australia, the Department of Innovation, Industry, Science and Research, the Australian National University, CSIRO and the Department of Foreign Affairs and Trade. ▲

## AWARD NOMINATIONS NOW OPEN

### The Academy is now calling for nominations for 2013 for its prestigious honorific awards for career and early career researchers.

#### Career awards

- David Craig Medal for research in any branch of chemistry
- Hannan Medal in mathematical sciences
- Jaeger Medal for research in Australian Earth sciences
- Thomas Ranken Lyle Medal in mathematics or physics

#### Early career awards

- Fenner Medal for research in biology (includes an honorarium of \$1000)
- Ruth Stephens Gani Medal for research in human genetics (includes an honorarium of \$1000)
- Gottschalk Medal for research in medical sciences (includes an honorarium of \$1000)
- Anton Hales Medal for research in earth sciences (includes an honorarium of \$1000)

- Dorothy Hill Award for research in Earth sciences (includes an honorarium of \$5000)
- Moran Medal for research in applied probability, biometrics, mathematical genetics, psychometrics and statistics (includes an honorarium of \$1000)
- Le Fèvre Memorial Prize for basic research in chemistry (includes an honorarium of \$3000)
- Pawsey Medal for research in physics (includes an honorarium of \$1000)

Nominations are also invited for the **2014 Macfarlane Burnet Medal and Lecture** in the biological sciences. Only Fellows can nominate candidates for this award, but candidates do not need to be Fellows of the Academy.

**Closing date for nominations for these honorific awards is 29 July 2012.**

### The Academy is also calling applications for travelling fellowships, and conference and research support for 2013–14.

The Academy hopes to distribute almost \$90,000 in 2013 for research awards in the WH Gladstone Population

and Environment Fund and the Margaret Middleton Fund for endangered Australian native vertebrate animals.

The Academy also hopes to administer travelling fellowships worth almost \$70,000 for the Oxford Nuffield Medical Fellowship, the Selby Travelling Fellowship for overseas scientists to visit Australian scientific centres, and the Graeme James Caughley Travelling Fellowship for ecologists resident in Australia or New Zealand to travel to scientific centres overseas.

Applications are also invited for 2013 and 2014 research conferences including the Boden Research Conference in the biological sciences, the Fenner Conference on the Environment, and the Elizabeth and Frederick White Research Conference in the physical sciences. There is \$30,000 available for funding of conferences.

**The closing date for applications for the travelling fellowships and for conference and research support is 31 August 2012.**

Further information is available from [www.science.org.au/awards/](http://www.science.org.au/awards/) ▲

## Australian researcher receives Humboldt Research Award

In 2010, Professor Leone Spiccia from Monash University was selected by the Academy to receive a grant to be part of the Australia–Germany Solar Photovoltaics Research Call for 2010–2011 funded by the Department of Innovation, Industry, Science and Research and the German Federal Government Ministry for Education and Research. His research was in the area of solar driven water splitting techniques. As a result of the work he

conducted while on the grant, Professor Spiccia received a Senior Humboldt Research Award. The nomination for this award was sponsored by Dr Alexander Schnegg and Dr Klaus Lips from the Helmholtz-Zentrum Berlin, his international partners of the Australia–Germany Solar Photovoltaics Research Grant. About 70 awards are awarded annually. Professor Spiccia was the only Australian chemist to receive the award in 2010. ▲



Helmut Schwarz (left), President of the Alexander von Humboldt Foundation, presents the award to Leone Spiccia at the 2011 Bamberg AvH foundation meeting

### FRANCE–AUSTRALIA SCIENCE INNOVATION COLLABORATION (FASIC) PROGRAM EARLY CAREER FELLOWSHIPS FOR 2012

The Australian Academy of Science invites applications from Australian early career researchers for the France–Australia Science Innovation Collaboration (FASIC) program Early Career Fellowships for 2012.

The grants are for researchers in any field of

- 1 medical science and biotechnology
- 2 energy, including clean energy
- 3 sustainable infrastructure and transportation
- 4 climate change and environment in the areas of marine science, land and water management and fire management.

Closing date for submissions:

**Friday 6 April 2012**

Further information:

[www.science.org.au/internet/europe/ecr-France.html](http://www.science.org.au/internet/europe/ecr-France.html)

## Managing Australia's stressed ecosystems

The Australian Academy of Science has launched a strategy to better plan the management of Australia's stressed ecosystems.

Devised by early to mid-career researchers from across Australia and science disciplines at last year's Theo Murphy High Flyers Think Tank, *Stressed Ecosystems: better decisions for Australia's future* will help communities, governments, scientists and industry work together to care for ecosystems under stress.

At the launch of the paper in Melbourne, John Brumby announced that a national implementation committee of scientists and representatives of state, territory and federal governments will work to ensure the strategy informs management planning.

Professor Mark Burgman FAA, a co-convenor of the Think Tank, told the launch that land users and scientists have an interest in managing Australia's ecosystems in a way that accounts for

the needs of society, economics and the environment.

'Scientists, landholders, residents, irrigators and any other group that has an interest in or makes a livelihood from Australia's ecosystems must play a pivotal role in the process of deciding how to manage those ecosystems for this generation and those that are to come', he said.

The report is available at

[www.science.org.au/events/thinktank/thinktank2011/documents/ThinkTankRecommendations2011.pdf](http://www.science.org.au/events/thinktank/thinktank2011/documents/ThinkTankRecommendations2011.pdf) ▲

## News from national committees

### Astronomy

Chair: Professor Elaine Sadler *FAA*

The National Committee for Astronomy held its second meeting for 2011 at the Academy of Science on 19 December. As the first item of business, the Chair offered warmest congratulations to Professor Brian Schmidt *FAA* on the award of the 2011 Nobel Prize in Physics. Brian has been a member of the committee since 2010, and played a key role in the completion of the 2011 Astronomy Mid-term Review. He is an outstanding advocate for Australian astronomy, and more broadly for science at all levels. National Committee for Astronomy members were delighted to have a chance to celebrate with Brian on his return from Stockholm.

The Department of Innovation, Industry, Science and Research has recently published the *2011 Strategic roadmap for Australian research infrastructure*. The National Committee for Astronomy sent a submission in response to the initial discussion paper for this roadmap, and a further submission (jointly with Astronomy Australia Ltd) in response to the exposure draft. The final roadmap is well aligned with the recommendations of our recent mid-term review, but the

timeline for new infrastructure funding (following the end of the National Collaborative Research Infrastructure Strategy scheme in 2011) remains unclear.

Plans are now well underway for the next General Assembly of the International Astronomical Union (IAU), to be held in Beijing in August 2012. The National Committee for Astronomy is in the process of sending a list of proposed new individual members to the IAU Secretariat in Paris.

### Biomedical sciences

Chair: Professor Ian Dawes *FAA*

The National Committee for Biomedical Sciences held the second National Forum on Biomedical Education — *Ahead of the game: biomedical science education into the 21st century* — at the Shine Dome on 12–13 December 2011. The forum aimed to identify key issues and challenges facing biomedical science educators in the 21st century and to form a national collaborative leadership network for the biomedical sciences.

The forum was opened by the Chief Scientist, Professor Ian Chubb *AC*, and moderated by Dr Norman Swan of ABC

Radio National. More information on the forum is available at [www.science.org.au/events/conferences-and-workshops/biomedical-education-forum/2011.html](http://www.science.org.au/events/conferences-and-workshops/biomedical-education-forum/2011.html)

### Chemistry

Chair: Professor Curt Wentrup *FAA*

The National Committee for Chemistry engaged actively in the 2011 International Year of Chemistry, which celebrated the achievements of women in chemistry and was the 100th anniversary of Marie Curie's Nobel Prize in Chemistry. With finance from the Academy, the committee sponsored the Curie Lecturer, Professor Lynn Francesconi, who toured Australia in August 2011. The Selby Lecturer, Dame Julia Higgins, who was also nominated by committee members, toured Australia in November 2011.

Following its critique of the Australian Research Council's Excellence in Research for Australia Initiative process in 2010, the committee made a new submission to the 2011 consultation, evaluating the process and making numerous corrections to the codes used for coding fields of research. Based on such feedback from various sources, the journals ranking system in its present form was rescinded by the Australian Research Council.

Committee chair Professor Curt Wentrup was a member of the Department of Innovation, Industry, Science and Research's Expert Working Group, which drafted the Chemical Sciences Case Study for the government enquiry into Australia's research workforce needs.

Following Professor Wentrup's initial submission to the department's *Discussion paper on the strategic roadmap for Australian research infrastructure*, the committee made a further submission to the *Exposure draft* of this roadmap, emphasising the need to define career paths for chemists and technicians, and the importance of international research collaborations and of support for fundamental science underpinning applied research.

Photo: Jeanette Mill



All winners — the Astronomy National Committee with chocolate Nobel Prize medals

## Crystallography

*Chair: Professor Jenny Martin*

The National Committee for Crystallography held a special handover meeting in February 2012, at which we welcomed new Chair Professor Mitchell Guss and new members Professor Alice Vrielink and Dr Andrew Whitten, who is the committee's first early career researcher member. We thank outgoing members Professor Jenny Martin (Chair), Dr Steve Wilkins and Professor Mark Spackman for their contributions. Discussions encompassed the crystallography centenary celebrations including the Bragg symposium in Adelaide 2012, the proposed International Year of Crystallography in 2014 and the centenary in 2015 of the 1915 Nobel Prize awarded to Lawrence Bragg, Australia's first Nobel Laureate, and his father William Bragg.



Photo: Jeanette Mill

National Committee for Mathematical Sciences and committee observers

## Earth system science

*Chair: Dr Roger Gifford*

Planning is underway for the second Earth System Outlook conference, to be held in late 2012. Potential topics were discussed at the November 2011 meeting of the committee.

Professor David Karoly represented Australia at the World Climate Research Program Open Science Conference in Colorado in October 2011. Professor Karoly is a member of the Joint Scientific Committee of the program, joining fellow Australian scientist Professor David Griggs, former Vice-Chair and now member.

## International Council for Science (ICSU) coordination

*Chair: Professor Bruce McKellar FAA*

The Academy received requests for nominations to several ICSU committees following the ICSU general assembly in September 2011. The National Committee for ICSU Coordination made suggestions for nominations to the Committee on Scientific Policy and Review, and the Scientific Committee for the new program on Urban Health and Wellbeing. The ICSU executive board will make appointments at its April 2012 meeting.

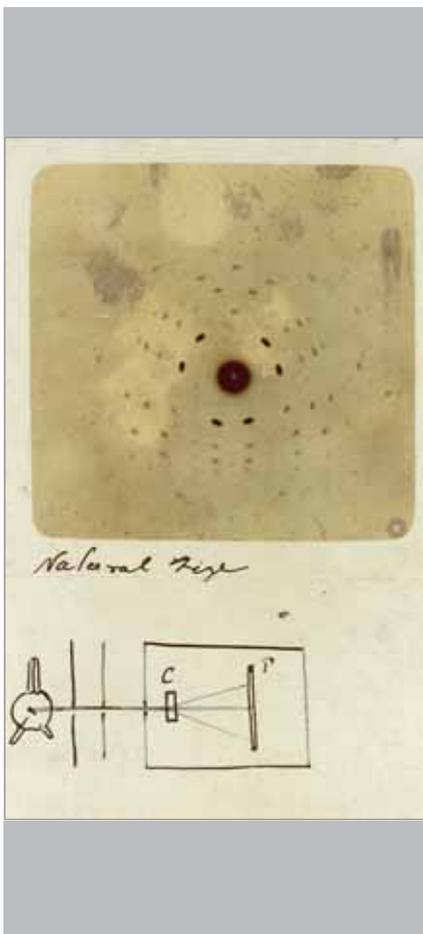
## Mathematical sciences

*Chair: Professor Nalini Joshi FAA*

The Chair of the National Committee for Mathematical Sciences, Professor Nalini Joshi, has written to the Minister for Tertiary Education, Skills, Science and Research, Senator Chris Evans, the Opposition Spokesperson on Education Christopher Pyne, and four key members of the Lower House, expressing deep concern at the Australian Government's recent announcement that the HECS discount for mathematics and science subjects would be removed without any investment in alternative measures to attract students to these enabling disciplines. The committee met by teleconference in December 2011 to discuss this and other issues such as the development of a decadal plan for the mathematical sciences. We welcome Professor Marilyn Goos, Director of the Teaching and Educational Development Institute, University of Queensland, as a new member, and thank outgoing member Associate Professor Judy Mousley.

... continued on next page

Image: © Courtesy of the Royal Institution of Great Britain



Page from Lawrence Bragg's notebook, c.1913

## News from national committees *continued*

### Plant and animal science

*Chair: Professor Roger Leigh*

The committee met by teleconference on 16 December 2011. A particular point for discussion was the preparation of a decadal plan. It had been proposed at an earlier meeting that this should cover both basic and applied biological sciences, but this meeting decided a focus on agricultural sciences would be more appropriate. The committee will partner with organisations such as the Australian Council of Deans of Agriculture to progress this during 2012.

Dr Hugh Dove and Professor David Day retired from the committee at the end of 2011 and will be replaced by Associate

Professor Ros Gleadow, President of the Australian Society of Plant Scientists, and Professor John Buckeridge, who is an observer on the committee. Two early career researchers will be invited to attend the committee as observers, with a view to full membership as present members retire.

### Radio science

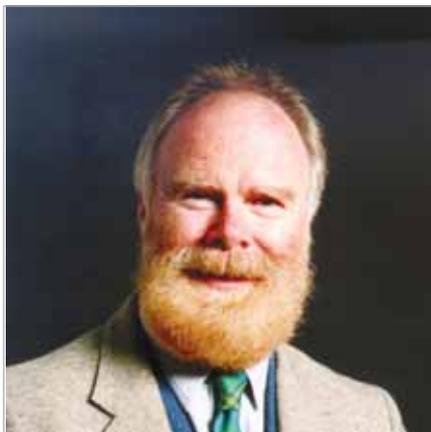
*Chair: Professor Andrew Parfitt*

Australia was well represented at the 30th general assembly of the International Union of Radio Science (URSI) in Istanbul on 13–20 August 2011. URSI continues to establish stronger links with the Asia–Pacific region, and has agreed to continue

support for the Asia–Pacific Radio Science Conference to be held on one of the years between general assemblies.

At the 2011 general assembly, Australia's Dr Phil Wilkinson (who has had two terms as Vice-President of URSI) was elected President for the next triennium. The next Asia–Pacific Radio Science Conference will be in Taipei in 2013. The next general assembly of URSI will be in Beijing in August 2014. ▲

## Honours to Fellows



Richard Hobbs

**Professor Richard Hobbs** FAA has been named WA Scientist of the year for 2011

**Professor Michelle Simmons** FAA has been named NSW Scientist of the year for 2011

**Professor Graham Farquhar** FAA FRS and **Professor James (Jim) Williams** AM FAA FTSE have received the Australian National University's 2011 Peter Baume award

**Corresponding Member Professor Terry Tao** FAA FRS received the Crafoord Prize in Mathematics 2012 from the Swedish Academy of Sciences



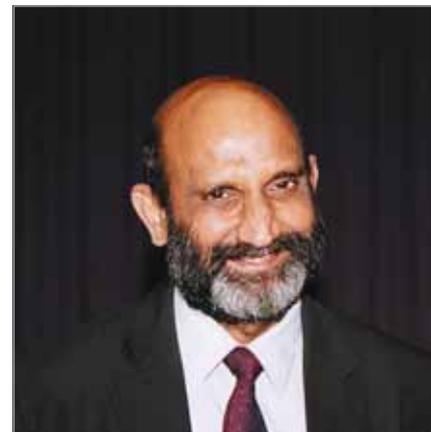
Michelle Simmons

**Professor Bruce McKellar** FAA has been elected President-Designate at the International Union of Pure and Applied Physics General Assembly in London

**Professor Chennupati Jagadish** FAA FTSE won the 2012 Electronics and Photonics Division Award of the Electrochemical Society (US)

**Professor Stephen Simpson** FAA won the Wigglesworth Award for 2012 from the Royal Entomological Society

**Professor Rick Shine** AM FAA has won the Australia Innovation Challenge Award in Environment



Chennupati Jagadish

## 2012 Australia Day Honours

### Members in the General Division of the Order of Australia (AM)

**Professor Roderick Boswell** AM FAA FTSE

**Professor Lorenzo Faraone** AM FAA FTSE

**Professor Martin Green** AM FAA FTSE

**Professor Eugenie Lumbers** AM FAA

**Professor Mandyam Srinivasan** AM FAA FRS

### Medal of the Order of Australia (OAM)

**Professor Rodney Tucker** OAM FAA FTSE ▲

## Geoengineering for climate remediation: a safe and reasoned response?

The most challenging human impact on the global environment is climate change caused by human activity — the increase of carbon dioxide and other greenhouse gases in the atmosphere from burning fossil fuels, land clearing, agriculture and industrial activity.

Discussion and debate at national and international levels on addressing this global problem has focused on mitigation and adaptation, but there may be a third possibility. Geoengineering, or climate remediation, would involve deliberate manipulation of physical, chemical, or biological aspects of the Earth system to reduce human-caused climate change.

Over two days in late September 2011 more than 60 scientists, engineers, social scientists and other interested people gathered at the Shine Dome in Canberra for the symposium *Geoengineering the climate? A Southern Hemisphere perspective*, organised jointly by the Australian Academy of Science and the Academy of Technological Sciences and

Engineering. This symposium addressed some implications of different approaches to geoengineering the climate, including their relative opportunities and risks, and possible impacts in the Southern Hemisphere. Importantly, in addition to scientific and technological aspects of geoengineering, it also included consideration of ethical and governance aspects. The inequities of the possible adverse or unforeseen impacts of climate remediation were discussed. See [www.science.org.au/natcoms/nc-ess/documents/GESymposium.pdf](http://www.science.org.au/natcoms/nc-ess/documents/GESymposium.pdf) for summaries of presentations.

The symposium concluded that climate remediation cannot replace the urgent need for substantial national and international efforts on climate change mitigation. In fact, the need for discussions of climate remediation highlights the inadequacy of action globally and in Australia to reduce emissions of greenhouse gases into the atmosphere from human activity.

The two main types of climate remediation discussed were enhanced removal of carbon dioxide from the atmosphere into vegetation, soils, oceans or by injection underground, and reducing the amount of sunlight that warms up the Earth through reflection from the surface, clouds, or particles in the atmosphere.

The symposium demonstrated the value of bringing together a broad spectrum of disciplines to discuss climate remediation. Many difficult questions were left unanswered but a future joint meeting of all the Australian Academies was suggested. Such joint Academy meetings are also a recommendation of the strategic research plan for Earth system science in Australia, developed by the Academy's National Committee for Earth System Science. The plan, *To live within Earth's limits: an Australian plan to develop a science of the whole Earth system*, is available at [www.science.org.au/natcoms/nc-ess.html](http://www.science.org.au/natcoms/nc-ess.html) ▲

### Still no Mawson: Frank Stillwell's 1911–13 Antarctic diaries

As part of our celebration of 100 years of Antarctic science, the Academy is publishing the 1912 diaries of geologist Frank Stillwell. At the age of 23 Stillwell wintered at Cape Denison with Douglas Mawson's Australasian Antarctic Expedition. This book is the first to deal with Stillwell's time in Antarctica and it gives a fresh perspective on the 1911–14 expedition.

Stillwell was elected as a Fellow of the Academy in its founding year. His diaries, edited by Bernadette Hince, are being published with generous assistance from Geoscience Australia, the Geological Society of Australia and the National Library of Australia.

\$24.95 plus p&h

Special pre-publication offer of \$19.95 (collection only) for those attending the Academy symposium *100 years of Antarctic science* in Canberra in May 2012.

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



Frank Stillwell at his plane table in Antarctica

Photo: State Library of NSW Home and Away collection, item 37175

## Fenner's science today and tomorrow

The Academy's 2011 public lectures paid tribute to the life and work of the late Frank Fenner (1913–2010), whose career in science spanned an astonishing range of fields. Professor Fenner worked on malaria and tuberculosis, biological control of rabbits, the elimination of smallpox, and population dynamics, and had a passion for the environment.

The lectures provided a chance to hear about the latest scientific advances in areas he helped to pioneer, beginning in February with a tribute by three eminent speakers — Professor Peter Doherty AC FAA FRS Nobel Laureate, Emeritus Professor Henry Nix AO and Professor Adrian Gibbs FAA. These speakers shared their insights into the health and environmental research that defined Frank Fenner's career. The March lecture explored possible threats of bioterrorism emerging from research. In April we heard that the malaria parasite, originally a plant-like organism, could be combated using herbicides initially designed to kill plants. Later talks examined ecologically sustainable forest management and interdisciplinary approaches linking the social sciences, humanities and sciences to solve major problems confronting Australia. August saw the return of Professor Peter Doherty, who talked on the eradication of rinderpest virus in cattle and the related possibility of eradicating measles. The theme of immunity continued in September, with Professor Christopher Goodnow FAA describing how the

immune system tells foe from friend. The October lecture examined the evolution of the myxoma virus and rabbits. In November, Professor Tony McMichael AO warned of the threat of pandemics with continued climate change. The final lecture of the year in December took another look at myxomatosis and the effectiveness of biological control.

The series captured substantial media attention. Australia's Public Affairs TV Channel broadcast several lectures in full. In 2011 for the first time each lecture was live-streamed at the Academy's website, attracting growing numbers of online viewers. This facility, and the near-capacity audiences throughout the year, meant that these public lectures were the most popular yet. You can see the Fenner series of public lectures at [www.science.org.au/events/publiclectures/fs/index.html](http://www.science.org.au/events/publiclectures/fs/index.html)

This year's series *Caring for the Australian countryside: Lessons from the past and present* examines sustainable communities, mining, agriculture, culture and environment in country Australia. Adjunct Professor Bill Gammage began the series in February with a talk on Aboriginal land management in 1788. Three hundred people packed the Shine Dome to hear Professor Gammage, and the lecture was live-streamed online. See [www.science.org.au/events/publiclectures/](http://www.science.org.au/events/publiclectures/) for details of other lectures in the 2012 series. ▲

Photo: Mona Akbari



Inaugural speaker for 2012 Bill Gammage (left) with John Passioura

## BIOGRAPHICAL MEMOIRS

Biographers have been appointed for the following Fellows. When there is more than one biographer, the principal biographer is listed first.

### Dr Fraser Bergersen

Biographers: Dr John Brockwell, Emeritus Professors Mike Dilworth and Janet Sprent

### Professor Gavin Brown

Biographers: Professors William Moran FAA and Anthony Dooley

### Professor Keith Cole

Biographer: Emeritus Professor Peter Dyson

### Professor Bill Ellis

Biographers: Professors Bob Delbourgo FAA and Peter McCulloch

### Professor Frank Fenner

Biographers: Professor Stephen Boyden AM FAA, Emeritus Professors Cedric Mims and Bob Blanden FAA

### Professor Angus Hurst

Biographers: Dr Max Lohe, Professors Alan Carey and Peter Bouwknegt

### Professor Ken Le Couteur

Biographer: Dr Brian Robson

### Professor Sandy Mathieson

Biographer: Dr Stephen Wilkins

### Professor Jim Michael

Biographers: Professor Michael Murray and Dr David Parrott (replacement biographers)

### Professor John Sprent

Biographers: Emeritus Professor Chris Bryant, Dr Mal Jones and Professor Ian Beveridge

### Professor Harry Wallace

Biographers: Professor Allen Kerr AO FAA FRS, Drs Kerry Davies and Graham Stirling

### Professor Bryan Womersley

Biographer: Dr Bill Barker

Biographers would be grateful to readers who could provide assistance on the basis of their personal knowledge of the individual or their work. If you would like to do so, please contact Ms Rosanne Walker, Librarian, Australian Academy of Science on (02) 6201 9431 or email [Rosanne.Walker@science.org.au](mailto:Rosanne.Walker@science.org.au)

Memoirs of deceased Fellows are published in *Historical Records of Australian Science* and are also available at [www.science.org.au/fellows/deceased.html](http://www.science.org.au/fellows/deceased.html)

## Interviews with Australian scientists

Veteran of over a dozen *Interviews*, Professor Robert (Bob) Crompton AM FAA finally told his own life story to Professor Erich Weigold AM FAA FTSE for the *Interviews* program late last year. During the interview Professor Crompton spoke about his career in atomic and molecular physics. Some experimental highlights included performing swarm experiments on cross-sections using parahydrogen — if that is not crystal clear, then make sure you read Professor Crompton's explanation in the *Interviews* transcript. Outside of the lab, Professor Crompton was occupied with family and maintaining his 1959 Wolseley, which he has now donated to the National Museum of Australia (the car, not the family). The interview was kindly sponsored by the Australian National University.

Engineer and neurobiologist Professor Mandyam (Srini) Srinivasan AM FAA FRS described his path through science in an *Interview* last year with Professor Graham Farquhar FAA FRS. Born and raised in India, Professor Srinivasan first mastered his native tongue, then English, then the Aussie 'strine' and finally Swiss-German, during a career that has taken him around the globe. During the interview Professor Srinivasan spoke about the challenges of working with bees, the discoveries he has made while researching the bee's visual system and how these can be applied to machines. This interview was proudly sponsored by the Queensland Brain Institute.

Transcripts from the interviews with Professor Graeme Clark AC FAA FRS FTSE, Professor Angas Hurst AM FAA, Professor Noel Hush AO FAA FRS and Professor Jim Pittard FAA are now available from [www.science.org.au/scientists/](http://www.science.org.au/scientists/)

*This is the last newsletter contribution by Dr Cecily Oakley, the Academy's Interviews with Australian Scientists officer. To our great regret, Cecily is taking a position as a communications officer at Sydney University. We wish her all the best. 🍷*

Photo: Cecily Oakley



Graham Farquhar (left) and Mandyam Srinivasan

Photo: Paul Simpson



Erich Weigold (left) and Bob Crompton

### TEACHERS' PROGRAM SCIENCE AT THE SHINE DOME 2012

Registration is now open for the Teachers' program at Science at the Shine Dome. This event creates many opportunities for school teachers to interact with eminent and up-and-coming scientists from a range of disciplines. Teachers can discover more about the science they teach, 'from the horse's mouth'. In addition, teachers will have their own day-long educational workshop, in which they will learn about the Academy's education programs, share one another's pedagogical gems and play with Questacon's Science Circus. Register now and avoid being left behind!

See [www.science.org.au/events/sats/sats2012/tp.html](http://www.science.org.au/events/sats/sats2012/tp.html)

## Science by Doing

### Report on Year 11 and 12 science in schools

On 21 December 2011 the Academy released *The status and quality of Year 11 and 12 science in Australian Schools*. The report, commissioned by the Office of the Chief Scientist, gained much media attention across the country.

Its authors, Professor Denis Goodrum, Ms Amelia Druhan and Ms Joanna Abbs, used a range of data sources including a survey of science and non-science students, a telephone survey of teachers and focus group discussions. The information collected in this way gave two pictures — the ideal (our aspirations for senior school science), and what is actually happening in our classrooms. The report concluded with some simple suggestions that would move us from the actual to the ideal.

One of the surprises in the data was the disturbing fall in science enrolments for senior secondary. The enrolment statistics supplied by the Department of

Education, Employment and Workplace Relations contained some unusual aspects. During January the authors updated the report based on further information from the department.

The general picture that emerges is that fewer students are studying science. For these students, their experiences are in keeping with their expectations. Students and teachers perceive the curriculum as preparation for university with the result that it is overcrowded and content-laden. This leads to a traditional teaching approach with most students spending time every lesson copying notes. Most senior science teachers are well qualified and experienced.

The report provides a fascinating insight into Year 11 and 12 science. A copy of the report (including summary) is available on the Academy website at [www.science.org.au/publications/documents/Year11and12Report.pdf](http://www.science.org.au/publications/documents/Year11and12Report.pdf)

## A MILLION FANS FOR AUSTRALIAN SCIENCE

Australian science, delivered through ScienceAlert, has recently gained its millionth fan on its Facebook site, making it the world's number one provider of science news on Facebook. The site is ahead of *Time Magazine*, the *Wall Street Journal* and all the Australian news media outlets combined, reaching young audiences worldwide. Science Alert is now exploring ways to grow its global exposure by reaching audiences in Chinese, Spanish and French.

web: [www.sciencealert.com.au](http://www.sciencealert.com.au)

Facebook: [www.facebook.com/sciencealert](http://www.facebook.com/sciencealert)



100 YEARS OF ANTARCTIC SCIENCE

# Science at the Shine Dome 2012

CANBERRA, 2-4 MAY



Science at the Shine Dome attracts more than 250 distinguished and early career scientists and teachers from across Australia from a range of disciplines, and is the focus of intense media attention. This year the Academy's special annual celebration of Australian science and scientists celebrates the 100th anniversary of the Australasian Antarctic Expedition, which was led by Douglas Mawson (later a founding Fellow of the Academy).

#### **Wednesday 2 May 2012 — Formal admission of new Fellows and new Fellows seminar**

New Academy Fellows are admitted to the Academy and present a short talk each about their research, followed by questions.

#### **Thursday 3 May 2012 — Presentation of awards**

President's annual address, followed by presentation of the Academy's Honorary awards and lectures by awardees  
Education workshop for science teachers  
Early career researcher workshops  
Annual General Meeting for Fellows of the Academy (closed session)  
Annual dinner

#### **Friday 4 May 2012 — Annual symposium — 100 years of Antarctic science**

*Exploring the latest in Antarctic science including climate science, physics, biochemistry and marine biology*

Full program and registration information available at [www.science.org.au/events/index.html](http://www.science.org.au/events/index.html)

## Primary Connections

### A Nobel donation

*Primary Connections* is delighted with the generous donation of \$100,000 to the project from Nobel Prize winner and Academy Fellow Professor Brian Schmidt FAA. In making this donation Professor Schmidt stated that '*Primary Connections* has had very good penetration across the country — 55 per cent of all primary schools have used it one way or another — and it is one of the most effective tools I have seen to help in teaching science to this age group.'

### Victorian connection

*Primary Connections* was invited by the Victorian Department of Education and Early Childhood Development to conduct three days of training for their 40 newly appointed primary science specialists. We held these professional development sessions in Melbourne on 23–24 November 2011 and 7 March 2012, to train the science specialists as *Primary Connections* professional learning facilitators. These sessions provide hands-on and practical training based on the pedagogical framework of *Primary Connections*.

### Working with business

*Primary Connections* has been nominated as one of five not-for-profit organisations to partner with the Business Working with Education Foundation of Victoria as part of their Maths and Science Partnerships Strategy. This will provide the project with workshop opportunities designed to build project capacity. Topics include developing business models; government and legal structures; and marketing and public relations. Resources will be committed to expanding the



Brian Schmidt shows his Nobel Prize medal to *Primary Connections* director Shelley Peers

professional learning offered to Victorian schools with the vision of training a *Primary Connections* curriculum leader in every primary school.

### New units

Four new *Primary Connections* curriculum units have been released to Australian schools. *All mixed up*, *Earth's place in space*, *Essential energy*, and *Up down and all around* were released in January 2012. The year 2 unit *All mixed up* explores mixtures that surround us and that are used in everyday life. The hands-on activities allow students to investigate how changing the quantities of materials in a mixture can alter its properties and uses. The year 5 unit *Earth's place in space* explores how patterns in the sky relate to days, months and years. Students investigate the elements of our solar system and Earth's position within it. The

year 6 unit *Essential energy* explores how energy (including solar energy, water and wind) is used to make changes in the world. The year 1 unit *Up down and all around* explores natural, made and managed environments that undergo change. Students investigate the daily, weekly and seasonal changes in their local environment through outdoor observations.

All units link science with literacy and provide hands-on activities for students to explore relevant and interesting science concepts.

### Wristbands released

The collaborative learning wristbands have now been released, adding to the teacher and student flash cards as resources available for effective implementation of the *Primary Connections* units. ▲

## Academy applauds focus of Gonski review

The Academy of Science has welcomed the emphasis of the Gonski Review of Funding for Schooling on the need to improve education outcomes for every Australian student.

Speaking on the release of the report, Professor Bob Williamson AO FAA FRSc, the Academy's Secretary for Science Policy, said that the Academy agreed strongly with the report's finding that 'principals

and teachers should encourage a culture of high expectations, continuous learning, and independence and responsibility for all students.'

Recommendation 7 of the report highlights the need to improve teaching practices and flexibly implement strategies to overcome educational disadvantage where it exists. As Professor Williamson said, these are the main aims of the Academy's school science

education programs *Primary Connections* and *Science by Doing*. He noted that the Academy was dismayed when funding for these programs was not continued in the last Federal budget, in spite of their excellent outcomes. 'Australia has wonderful science in fields as diverse as astronomy and molecular medicine', he said, 'and an excellent education system is necessary to make sure we keep it going'. ▲

## Elizabeth and Frederick White research conference

On 28–29 June 2011 the Australian Centre for Astrobiology (University of New South Wales) held a lively Elizabeth and Frederick White research conference titled *The evolution of photosynthesis and oxygenation of the Earth*. Professor Jan Anderson FAA FRS welcomed 45 scientists and a number of postgraduate students studying the early Earth, geochemistry, photosynthesis and the evolution of photosynthetic organisms.

Over the past 10 years there have been significant advances in our knowledge of the mechanism and evolution of photosynthesis. The publication by *Nature* of a new crystal structure for Photosystem II at 1.9 angstrom resolution only weeks before the conference gave impetus to its discussions.

The evolution of cyanobacteria brought about one of the most revolutionary changes in Earth history, the beginning of oxygenation of the atmosphere and hydrosphere. Earth's atmosphere probably became oxygenated by 2.4 billion years ago, but geological evidence suggests that there were cyanobacteria hundreds of millions of years earlier. We are now looking for reliable markers of their presence in ancient rocks.



Stromatolites at Shark Bay, Western Australia

Photo: iStockphoto



Cyanobacteria brought about the oxygenation of the Earth's atmosphere

Photo: iStockphoto

The meeting also discussed the origins of stromatolites, calcareous deposits presumed to have been laid down by cyanobacterial and procyanobacterial communities. Australia is one of the few areas in the world where stromatolitic deposits of Neoproterozoic age (2800–2500 million years) are easily

accessible. Associate Professor Jeremy Bailey's concluding remarks broadened the debate by addressing the possibility for photosynthesis beyond Earth.

All of those involved are grateful to the Australian Academy of Science for its financial support of the conference. ▲



**FOLLOW US ON TWITTER @Science\_Academy**

More information is available from the Academy website [www.science.org.au](http://www.science.org.au)

### Academy Officers

**President** Professor Suzanne Cory AC PresAA FRS

**Secretary for Physical Sciences** Professor Peter Hall FAA FRS

**Secretary for Biological Sciences** Professor Marilyn Renfree FAA

**Secretary for Science Policy** Professor Bob Williamson AO FAA FRS

**Foreign Secretary** Professor Andrew Holmes AM FAA FRS FTSE

**Secretary for Education and Public Awareness** Professor Jenny Graves AO FAA

**Treasurer** Professor Michael Dopita FAA

Published by the  
Australian Academy of Science,  
GPO Box 783 Canberra ACT 2601

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

Telephone: (02) 6201 9400

Fax: (02) 6201 9494

Email: [aas@science.org.au](mailto:aas@science.org.au)

Honorary editor:  
Professor Jim Williams AM FAA

Material in this newsletter is  
copyright but may be reproduced  
with acknowledgment.

Previous newsletters are available at:  
[www.science.org.au/publications/newsletters](http://www.science.org.au/publications/newsletters)

ISSN 1031-9204

### Gifts to the Academy

If you would like to make a gift or a bequest to the Academy, please contact the Chief Executive, Dr Sue Meek, on (02) 6201 9400 or [ce@science.org.au](mailto:ce@science.org.au)