



## 2009 Theo Murphy High Flyers Think Tank



Photo: Stockxpert



Photo: Stockxpert

**Food supply and agricultural productivity are back on the political agenda**

The 2009 High Flyers Think Tank, Agricultural Productivity and Climate Change was held in Melbourne on 22 and 23 October. The two day conference brought together recognised experts in agricultural productivity, food security, climate change, and social scientists who understand the associated human dimensions. There were also around 65 early- and mid-career participants from a diverse range of disciplines, such as soil ecology, genetics, environmental science, agronomy, engineering, economics and many others.

This annual Think Tank – the second to be generously supported by the UK Royal Society through the Theo Murphy (Australia) Fund – arose from growing concern over the impact of global climate change. As changes in climate continue into the foreseeable future, the consequential changes in a range of biophysical, environmental, social and economic impacts across a variety of sectors – including agriculture – will affect not only Australia but the rest of the world.

For the first time in almost a quarter of a century, food is back on the political agenda. The hitherto widespread assumption that problems of food production have been solved, and that food security is largely a matter of distribution, has been challenged. For example, with recent projections of a 60

per cent increase in Australia’s population by 2050, there will be an extra 13 million Australians consuming resources – including agricultural resources – in a country with finite carrying capacity. This presents enormous challenges.

The emphasis of this year’s Think Tank was not on climate change itself, but rather, on facing the challenge of agricultural productivity and climate change. It was about using the insight and expertise of the various participants to identify and examine potential mitigation and adaptation strategies, in the context of other environmental, social and development pressures.

Breakout group discussions raised the need for sharing of new knowledge because of the relatively new, very complex and uncertain nature of climate change. A ‘big Australia’ will only be sustainable if natural and social scientists undertake collaborative work hitherto unseen in Australia. Academy President Professor Kurt Lambeck challenged participants ‘to identify the important issues and ... any gaps in knowledge or gaps in our ability to effectively respond to avoiding a food crisis.’

Professor Peter Gregory, Director and Chief Executive of the Scottish Crop Research Institute, delivered both the keynote address

and the open lecture as part of his 50th Anniversary Selby Fellowship. His open lecture, *Food security in a changing climate*, demonstrated how global, environmental and social changes are affecting food systems, and suggested some of the likely technological and policy responses which would result.

The Think Tank recognised the complex interaction of a number of problems facing Australia – climate change, water, food security and population – but also pointed to the opportunities for sustaining social, economic and environmental health.

Audio files from the presentations are available from [www.science.org.au/events/thinktank2009](http://www.science.org.au/events/thinktank2009) and the full proceedings will be published at a later date. ■

Announcement of awards for scientific excellence and research support

See page 5

## Academy Officers

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## Honours to Fellows



Geoff Burnstock

The Australian Academy of Technological Sciences and Engineering announced 28 new Fellows at their annual general meeting. Included in the list are:

**Professor Michael Barber**, Vice-Chancellor and President, Flinders University, Adelaide – honoured for his contribution to Australian science and technology as an applied mathematician and through senior leadership in universities.

**Dr Jeremy Burdon**, Chief, CSIRO Plant Industry, Canberra – honoured for his major contributions, as a scientist and senior science manager, to plant-based agriculture and conservation in Australia.

**Professor Douglas MacFarlane**, ARC Federation Fellow and Professor of Chemistry, Monash University, Melbourne – honoured for his discovery, development and application of advanced organic materials in electrochemical technology, chemical processing and biotechnology.

**Professor Geoff Burnstock** received the Copernicus Gold Medal from the Università Degli Studi di Ferrara, Italy, and the British Neuroscience Association Award for 'outstanding contributions to British neuroscience'.

The 2009 Florey Medal has been awarded to **Professor John Hopwood** in recognition of his achievements in biomedical science and human health advancement.

**Professor Cheryl Praeger** has been named Western Australia's Scientist of the Year. ■

## Opening of the Wes Whitten Building

The Wes Whitten Building at the Australian National University was officially opened by the Vice-Chancellor, Professor Ian Chubb, on 21 September. The building is named after Dr Wesley Kingston Whitten FAA (b.1918), the university's first veterinary officer, who served from 1949 to 1961. Dr Whitten's siblings came from as far as New Zealand for this event, while his children came from Brisbane, Canberra and Perth. An unscheduled response to the Vice-Chancellor's speech was given by Dr Whitten's elder brother, Lloyd, while the official thank-you on behalf of the family



Photo: Courtesy of Penny Whitten

Wes Whitten at the opening ceremony

was given by his younger daughter, Penny. Those attending were then shown around the facility in small groups. ■

## Important dates

**2 February:** Public lecture, *Water sensitive cities: From socio-technical path-dependency to adaptive governance*. Associate Professor Rebekah Brown, School of Geography and Environmental Science, Monash University. Shine Dome

5.30–7.00pm, Shine Dome, Canberra. Contact [savita.khiani@science.org.au](mailto:savita.khiani@science.org.au) or call 02 6201 9462.

**2 March:** Public lecture in the series *Water management options for urban and rural Australia*. Shine Dome 5.30–7.00 pm, Shine Dome, Canberra. Contact [savita.khiani@science.org.au](mailto:savita.khiani@science.org.au)

[science.org.au](http://science.org.au) or call 02 6201 9462.

**5–7 May:** Science at the Shine Dome annual general meeting and symposium, *Genomics and mathematics*. Shine Dome, Canberra. Contact [savita.khiani@science.org.au](mailto:savita.khiani@science.org.au) or call 02 6201 9462.



## International news

### Sixth Australia-China Symposium

The Academy and the Australian Academy of Technological Sciences and Engineering (ATSE), on behalf of the Australian Government Department of Innovation, Industry, Science and Research organised the Australia-China Symposium on Sustainable Coastal and Deltaic Systems in China on 14 and 15 October. This symposium is the sixth in a series of high-level annual symposia to be conducted with the Chinese Academy of Sciences.

The Australian delegation was led by the Academy's President, Professor Kurt Lambeck, and ATSE Vice-President, Mr Peter Laver.

The symposium was divided into five workshops which were each co-convened by an Australian and a Chinese participant. The subjects of the workshops were:

- sustainable land use
- sustainable coastal wetland ecosystems
- environmental pollution and public health
- sustainable marine use
- coastal management and observation.

All identified a range of prospective future collaborative activities. In addition to bringing together leading scientists from both economies to increase research linkages and strategic partnerships formed through participation, these symposia have provided a valuable avenue for the training and exchange of young scientists, and the sharing of expertise and facilities between the two countries.

The symposium was coupled with pre- and post-event site visits to institutions including the South China Sea Institute of Oceanology, South China Botanical Gardens and the Guangzhou Institute of Geochemistry.

The next Australia-China symposium will be held in Australia in 2010. For more information on the Academy's international activities visit [www.science.org.au/internat](http://www.science.org.au/internat).

### Australia-Japan Workshop on Biodiversity

The Academy and the Japan Science and Technology Agency (JST), on behalf of the Department of Innovation, Industry, Science and Research, organised the Australia-Japan Workshop on Biodiversity, which was held at the Academy on 27 and 28 October.

The aim of the workshop was to bring together leading researchers from both countries to strengthen bilateral cooperative research links in areas of



Photo: Stockxpert

Sustainable use of river delta systems was the topic of discussion for Australian and Chinese researchers

mutual priority. Twenty Australian and Japanese researchers presented on the theme of biodiversity across three topics: informatics of rare animals and plants; biodiscovery of chemical ecology in plants and animals; and investigation, conservation and utilisation of Australian and Japanese bio-resources and ecosystems.

The conveners were Professor Barry Osmond FAA of the Australian National University and Professor Motomi Ito of the University of Tokyo. The Academy's Foreign Secretary, Professor Jenny Graves FAA, opened the workshop and Dr David Patterson of the Encyclopaedia of Life, Marine Biological Laboratory, USA, presented an open lecture on Monday 26 October at the Shine Dome. The program and abstracts of speakers is available from [www.science.org.au/events/conferences-and-workshops/australiajapan09](http://www.science.org.au/events/conferences-and-workshops/australiajapan09).



Photo: Stockxpert

Oceans still hold a wealth of discoveries for science

## International news continued

### Visit by University of Minas Gerais, Brazil

The Academy hosted a delegation from the National Institute for Science and Technology: Natural Resources, Water and Biodiversity from the Federal University of Minas Gerais, Brazil, on 17 September. The delegation was made up of chemical engineers, biologists and geoscientists interested in learning about sustainability, water and environmental issues in Australia.

Australian attendees included researchers from the Australian National University, the CRC for Greenhouse Gas Technologies and representatives from the Department of Innovation, Industry, Science and Research. Discussions were held on issues of common interest, including potential topics for future bilateral workshops.

### InterAcademy Panel Meeting of Young Scientists

The Academy supported the attendance of Dr James Tickner of CSIRO as the Australian representative at the InterAcademy Panel's Meeting of Young Scientists at the 2009 World Economic Forum (WEF) in Dalian, China, from 10 to 12 September. The meeting was designed to provide a forum for young scientists to discuss international issues and participate in sessions of the main WEF meeting. Discussions centred around the teaching of science worldwide and ways in which young scientists could better integrate science into society.

The Academy also supported the attendance of Mr David Fisher of ABC Radio's *Science Show*, which featured the meeting during their 14 November broadcast, available from [www.abc.net.au/rn/scienceshow/stories/2009/2702182.htm](http://www.abc.net.au/rn/scienceshow/stories/2009/2702182.htm). ■

### New inquiry into international research collaboration in Australia

The House of Representatives Industry, Science and Innovation Committee is conducting an inquiry into Australia's international research engagement, with particular reference to:

- the nature and extent of existing international research collaborations;
- the benefits to Australia from engaging in international research collaborations;
- the key drivers of international research collaboration;
- the impediments faced by Australian researchers when initiating and participating in international research collaborations; and
- principles and strategies for supporting international research engagement.

Information and terms of reference can be found at: [www.aph.gov.au/house/committee/isi/intresearch/media.htm](http://www.aph.gov.au/house/committee/isi/intresearch/media.htm). Interested persons and organisations are invited to make written submissions to the inquiry by Friday 29 January 2010.

### Student prize for the history of Australian science or environment now open

The National Museum of Australia and the Academy, through its National Committee for History and Philosophy of Science, invite submissions for this prize.

A certificate and \$2500 will be awarded for an essay (4000 to 8000 words in length) based on original unpublished research undertaken whilst enrolled as a student (postgraduate or undergraduate) at any tertiary educational institution in the world. Essays may deal with any aspect of the history of Australian science (including medicine and technology) or Australian environmental history.

For further information or to submit an essay go to [www.science.org.au/natcoms/nc-hps/hps-award-hasaeh.html](http://www.science.org.au/natcoms/nc-hps/hps-award-hasaeh.html) or contact Connie Berridge on 02 6201 9448 or [connie.berridge@science.org.au](mailto:connie.berridge@science.org.au). The closing date for submissions is 26 February 2010.

### FELLOW TURNS 90

Birthday greetings to David Craig, who turns 90 on 23 December. David was born in Sydney and educated at the University of Sydney, where he received both a BSc and MSc and University College London, where he was awarded a PhD and a DSc. He spent the years 1941 to 1944 in war service, being recalled to the University

of Sydney in 1944. His early career as a scientist and academic was mainly at University College London, apart from the years 1952 to 1956, when he was Professor of Physical Chemistry at the University of Sydney. In 1967 he returned again to Australia as Professor of Chemistry at the Australian National University, from where he retired in 1984. His research areas have included valence, spectroscopy, excitons in molecular crystals, intermolecular forces,

chiral discrimination and molecular quantum electrodynamics. His work was a mixture of theoretical and experimental.

Professor Craig was elected as a Fellow of the Academy in 1969 and served four year terms as both Treasurer and President. He received a number of other awards and honours, including Fellowship of the Royal Society in 1968 and being made an Officer of the Order of Australia in 1985.

## Nanotechnology Linkage Learned Academies Special Project

During 2009 the Academy has undertaken an Australian Research Council (ARC) funded research project into Australian nanotechnology. Earlier in the year a survey was distributed to nanotechnology researchers in universities, government science organisations and industry via various research and industry networks. The aim of this survey was establish in which fields researchers were carrying out their work and to identify the different types of collaborations and linkages in which the researchers were involved. The survey was well received by researchers, with over 300 valid responses.

On 25 September the Academy hosted a Nanotechnology Stakeholder Day, with invited representatives from research, industry and government departments in attendance. Professor Jackie Ying, Director of the Singapore Institute for Bioengineering and Nanotechnology, provided an interesting and informative keynote address on the research of her institute. Professor Ying's address particularly emphasised the mechanisms being used by her institute and in Singapore more generally for the translation of basic research into commercial outcomes. The keynote address and a presentation of preliminary analyses of the survey data informed the Nanotechnology Stakeholder



Photo: Fiona Leves

Stakeholders in nanotechnology gathered at the Dome

Day attendees' discussion sessions during the afternoon. The stakeholder day brought together the disparate members of the nanotechnology community to identify and discuss the issues currently impacting on nanotechnology research in Australia, particularly the formation of collaborations and linkages.

Currently the project's advisory group, comprising Academy Fellows Professors Frank Caruso, Chennupati Jagadish and Gordon Wallace, is developing a final report for publication that describes the research findings. For those interested in receiving a copy of the publication, please contact [Fiona.Leves@science.org.au](mailto:Fiona.Leves@science.org.au). ■

## Awards announcements

### 2010 Honorary awards for scientific excellence

The Academy is pleased to announce the 2010 awards for scientific excellence have been awarded to the following researchers:

#### Career awards

2010 David Craig Medal for research in chemistry – **Professor Robert Gilbert FAA**, University of Queensland

2010 Haddon Forrester King Medal for research in mineral exploration – **Professor Emeritus Steven Scott**, University of Toronto

2010 Ian Wark Medal and Lecture for applied research – **Professor Aibing Yu**, University of New South Wales

2010 Mawson Medal and Lecture for research in the Earth sciences –

**Professor Patrick De Deckker**, Australian National University

The winner of the 2011 Matthew Flinders Medal and Lecture for research in the physical sciences has also been announced and is awarded to **Professor Brian Kennett FAA**, Australian National University

#### Early career awards (for researchers under 40 years of age)

2010 Fenner Medal for research in biology (excluding the biomedical sciences) – **Professor Robert Brooks**, University of New South Wales

2010 Ruth Stephens Gani Medal for research in human genetics – **Dr Stuart Macgregor**, Queensland Institute of Medical Research

2010 Gottschalk Medal for research in the medical sciences – **Professor James Whisstock**, Monash University

2010 Anton Hales Medal for research in Earth sciences – **Professor David White**, University of Western Australia

2010 Dorothy Hill Award for female researchers in the Earth sciences including reef science, ocean drilling, marine science and taxonomy in marine systems – **Dr Nicole Webster**, Australian Institute of Marine Science

2010 Le Fèvre Memorial Prize for research in basic chemistry – **Associate Professor Michelle Coote**, Australian National University

2010 Pawsey Medal for research in physics – **Professor Andrew White**, University of Queensland

2010 Frederick White Prize for research in the physical, terrestrial and planetary sciences – **Dr Amanda Barnard**, CSIRO Materials Science and Engineering

...continued page 6



## Awards announcements continued

### Research support

#### Travelling Fellowships

2010 Graeme Caughley Travelling Fellowship – **Professor David Bowman**, University of Tasmania

2010 Rudi Lemberg Travelling Fellowship – **Professor Johann Deisenhofer**, University of Texas

2010 Selby Fellowship – **Professor Peter Sadler**, University of Warwick

#### 2010 Margaret Middleton Fund for Endangered Australian Vertebrate Animals

The following researchers will receive support for their research on endangered Australian vertebrates:

**Mr Bastian Egeter**, University of Otago  
Predation on *Leiopelma* species and *Litoris reniformis* by rats, *Litoria aurea* and other introduced species in New Zealand

**Mr Adam Kerezszy**, Bush Heritage Australia and Ms Leanne Faulks, Macquarie University  
Population genetics and captive breeding –



Photo: Stockport

#### Where in Western Australia do male loggerhead turtles come from?

red-finned blue-eye and the Edgbaston goby  
**Dr Vee Lukoschek**, James Cook University  
Sea snake declines and extinctions on Australia's coral reefs: Ecological causes and genetic effective population sizes

**Dr Jane Melville**, Museum Victoria  
Immunogenetics of pardalote species in south-eastern Australia: Genetic diversity

in MHC II  $\beta$  immune genes in fragmented landscapes

**Dr Nicola Mitchell**, University of Western Australia  
Predicting the sex ratios of loggerhead turtles: Where are male loggerhead turtles produced in Western Australia? Current and future scenarios ■

## 2009 Haddon Forrester King Medal

Dr J David Lowell, of Lowell Mineral Exploration LLC in Arizona, USA, has been awarded the 2009 Haddon Forrester King Medal (sponsored by Rio Tinto) for contributions to mineral exploration. David Lowell has achieved worldwide fame as a practising exploration geologist and lecturer. His field of speciality is porphyry copper deposits and his groundbreaking research and study with John Guilbert in 1967 set the scene for his future discoveries and became a benchmark for the global exploration industry in the search and discovery of new ore deposits. He has an outstanding record spread over nearly 50 years of many discoveries of important copper and gold deposits, including finding the La Escondida porphyry copper deposits. David received a BS degree in mining engineering from the University of Arizona in 1949 and an MS in geology from Stanford University in 1957. He obtained a Professional Engineer degree



Photo: The Wonderful Earth ASTER image web library 1

#### One of David Lowell's finds: La Escondida copper mine in Chile

from the University of Arizona in 1959. Dr Lowell is also a distinguished lecturer in 10 countries, speaking of his discoveries, scientific methods and his approach to exploration, and has mentored and trained several generations of exploration scientists. He is currently CEO and President of CIC

Resources conducting exploration in South America.

Dr Lowell will receive his medal at a presentation dinner to be held in February 2010 in Canberra. For more information contact Jene Fletcher on 02 6201 9407 or [jene.fletcher@science.org.au](mailto:jene.fletcher@science.org.au). ■

## News from National committees

### Replacement Research Reactor Taskforce

The Replacement Research Reactor Taskforce met on 20 August at Ian Potter House in Canberra. The invited guest was Dr Adi Paterson, CEO of the Australian Nuclear Science and Technology Organisation. Dr Paterson provided an update on events at the Lucas Heights facility and offered insights into areas of national interest. The taskforce also received a briefing on the J-PARC facility in Japan.

### History and philosophy of science

The National Committee for History and Philosophy of Science met on 28 August at the University of New South Wales. The two major topics of discussion were a proposed series of lectures for the Academy's 60th anniversary in 2014 and the National Museum of Australia Student Essay Prize. For further information about the prize see page 4.

### Medicine

The National Committee for Medicine met at Ian Potter House on 5 October. The invited guest was Ms Mary Murnane, Deputy Secretary of the Department of Health and Ageing. Topics of discussion included research conduct, indigenous health, health policy, workforce issues and the perceived effect of R&D tax credits. The next meeting of the committee will be held in Melbourne on 30 April 2010.

### Biomedical science

The National Committee for Biomedical Science met at the Shine Dome in Canberra on 29 October. The invited guest was Professor Warwick Anderson, CEO National Health and Medical Research Council (NHMRC). Topics of discussion included NHMRC funding policies, infrastructure, career structures and the workforce.

### Antarctic research

A public lecture was held by the National Committee for Antarctic Research at the Royal Institution of Australia in Adelaide on 5 November. Presentations were given by Dr Ian Allison and Dr Mark Stevens. The public lecture was arranged as a celebration of completion of the International Polar Year. Approximately 60 people attended the event.



Chairs of the national committees and members of the Executive Committee met at Ian Potter House

### Earth system science

The National Committee for Earth System Science met at Ian Potter House on 6 November. The focus of this meeting was an evaluation of the Strategic Decadal Plan Reference Group Workshop held on 2 and 3 September and planning for the finalisation and launch of the strategic decadal plan. The committee also discussed the International Council for Science visioning process ([www.icsu-visioning.org/](http://www.icsu-visioning.org/)) and developments with the International Geosphere-Biosphere Programme. ([www.igbp.net/](http://www.igbp.net/)).

### Radio science

The National Committee for Radio Science met at IPS Radio and Space Services in Sydney on 11 November. The focus of this event was preparation for the WARS2010 conference ([www.unisa.edu.au/itee/WARS/default.asp](http://www.unisa.edu.au/itee/WARS/default.asp)) to be held at the Shine Dome on 11 and 12 February. For details of student and early-career prizes please visit the WARS2010 website.

### Data in science

Dr Lesley Wyborn presented a paper outlining the goals and activities of the National Committee for Data in Science, *Standards: A critical enabler for cross-disciplinary scientific research ... but who?*, at e-Research Australasia ([www.eresearch.edu.au/](http://www.eresearch.edu.au/)) on 12 November. The abstract of the presentation is available from [www.eresearch.edu.au/wyborn2009](http://www.eresearch.edu.au/wyborn2009). The paper highlighted the need for better

coordination of the development of standards related to digital data. It also discussed a recent submission to CODATA by the committee recommending that CODATA take on a greater role in coordinating the development and governance of standards required for the discovery of, and access to, digital scientific data.

The committee also plans to develop a data in science report. It is organising a one day seminar in mid-2010 at which each of the national committees will be invited to share the current state of play, plus critical issues relating to data capture, discovery, retention and access for their discipline. The Data in Science Report will be based on the contributions, presentations and discussions at this workshop.

### Meeting of chairs of national committees

The biennial meeting of the chairs of the national committees was held at Ian Potter House on 19 November. The invited guest to this meeting was the Hon Lindsay Tanner MP, Federal Minister for Finance and Deregulation. The main topics covered at the meeting were international linkages, science policy and future priorities.

Professor Bob McKellar FAA and Dr Tom Beer were invited as guest speakers. Their presentations highlighted issues surrounding international unions and linkages. The chairs present indicated that they found the event very useful and it is anticipated that it will now become an annual event. ■



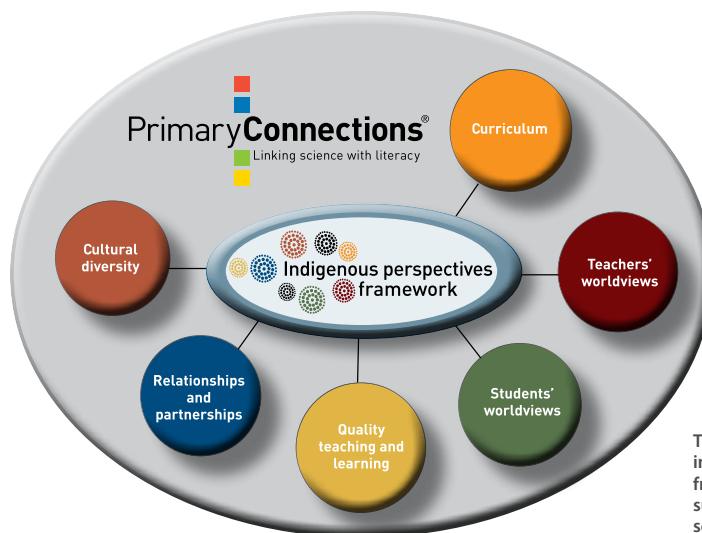
## Primary Connections

*Primary Connections: Linking science with literacy* is the Academy's primary school initiative funded through a partnership with the Australian Government Department of Education which has provided almost \$10 million in funding for the period 2005–11.

In November, the Minister for Education, the Hon Julia Gillard, approved the release of two research and evaluation reports showing the impact of the project. The findings show *Primary Connections* has increased student learning and interest in science and made it easier for more time to be devoted to science in primary schools. Students have not only enjoyed learning science but have a better understanding of scientific processes and concepts. Students' attitudes to science are more positive as a result of their experience, and it has increased the amount of science taught in schools.

The program's professional development and curriculum resources have also increased primary school teachers' confidence in teaching science.

*Primary Connections* units have activities to engage indigenous students. Preliminary research findings indicate that indigenous students in particular have benefited from teaching based on *Primary Connections* with its integration of science and literacy. Indigenous students showed



The *Primary Connections* indigenous perspectives framework is designed to support teachers to link science with literacy and indigenous perspectives

a proportionally far greater improvement compared with their counterparts than was seen with other groups. The reports indicate that *Primary Connections* is a potential mechanism for bridging the gap between the science achievement of indigenous and non-indigenous students.

The *Connecting Minds* DVD shows the linking of science with literacy and indigenous perspectives, and demonstrates

this happening in classrooms. Contact Robyn Bull at [robyn.bull@science.org.au](mailto:robyn.bull@science.org.au) if you would like a copy of the DVD.

Since the publication of the first unit in February 2007 *Primary Connections* influenced science education in 50 per cent of Australian primary schools. For more information about *Primary Connections* go to [www.science.org.au/primaryconnections](http://www.science.org.au/primaryconnections). ■

## Elizabeth and Frederick White Conference

The Elizabeth and Frederick White Conference on Nuclear Astrophysics in Australia was held on 24 and 25 August at the Shine Dome in Canberra.

Nuclear astrophysics investigates the origin of the elements via nuclear reactions in astrophysical environments, such as stars, supernovae and the big bang. About fifty scientists from the fields of nuclear physics, astrophysics, astronomy, and meteoritic and planetary science attended the conference to share information on research work going on in Australia and to launch the Australasian Network for Nuclear Astrophysics (ANNA).

The conference program covered the topics of observations of stellar abundances, stellar thermonuclear explosions, modelling of stellar nucleosynthesis and galactic



Image: Stockport

Elements evolve from nuclear reactions in space, like supernovae

chemical evolution, nuclear physics in astrophysics, and signatures of stellar nucleosynthesis in meteoritic materials. Speakers from Japan, USA and Europe talked about overseas activities, networks, and institutes in nuclear astrophysics. The

conference concluded with a discussion session to plan future ANNA activities. The speaker program for the conference is available from [www.cspa.monash.edu.au/activities/white-conference/program.html](http://www.cspa.monash.edu.au/activities/white-conference/program.html). ■



## Earth observations from space report launch

On 29 October Parliamentary Secretary for Innovation and Industry the Hon Richard Marles MP launched a report prepared jointly by the Academy of Science and the Australian Academy of Technological Sciences and Engineering, under the leadership of Professor John Zilman FAA, FTSE.

The report represents nine months work by an expert working group of 16 Academy Fellows and other space science and observation experts with strong links to the international satellite community and to a wide cross-section of providers and users of space based Earth observations in Australia.

The report *An Australian Strategic Plan for Earth Observations from Space* concluded that Australia can no longer meet its growing national needs for Earth observations through reliance on the generosity and goodwill of other countries. It recommends that Australia commit to a much stronger national role in Earth observations from space.

The report sets out an overall strategy for the future and provides nine specific recommendations for follow-up actions. Academy President Professor Kurt Lambeck said it 'will help meet Australia's rapidly expanding need for Earth observation data over the next 10 to 15 years.'

Mr Marles said that the Australian Government strongly believes space



Photo: Martin Callinan

Penny Sackett, Kurt Lambeck, Richard Marles and Julie Campbell at the launch

science is important to this country, and that 'taking a coordinated approach to Australia's space activities, teamed with our strong science, research and innovation capacity and our continued focus on

education and skill development will ensure Australia's success in the area.'

The report is available from [www.science.org.au/reports/documents/EOSfinal.pdf](http://www.science.org.au/reports/documents/EOSfinal.pdf). ■

## Howard Worner Memorial Scholarship

The University of Wollongong is pleased to announce that Jared McNeill from Bowral is the inaugural recipient of the 2009 Howard Worner Memorial Scholarship. Jared is studying mechanical engineering at the University of Wollongong.

Academy Fellows will recall that Professor Howard Worner CBE FAA FTSE FAIMM was a renowned Australian metallurgist and scientist from rural Victoria who was Professor of Metallurgy at the University of Melbourne and then went on to become director of research for BHP and then CRA. After retiring from CRA, Professor Worner became involved with the University of Wollongong where he continued his interest in continuous smelting techniques and led a group investigating the applications of microwave heating to industrial processing.



Photo: Jacinta Legg

Howard Worner being interviewed in 2005

He remained very active until his death in 2006 at age 94.

Professor Worner was interviewed for the Academy's *Interviews with Australian Scientists* project in 2005. To read more

about his life go to [www.science.org.au/scientists/hw.htm](http://www.science.org.au/scientists/hw.htm).

The memorial scholarship was established in 2008. Valued at \$10,000 per year, it recognises Professor Worner's rural origins, providing scholarships for students from rural backgrounds to study engineering or science at the University of Wollongong. With generous donations from individuals and mining companies the fund has now been established but is seeking further gifts from supporters to reach an endowment goal of \$200,000 so that at least one scholarship can be awarded in perpetuity.

To find out more about the scholarship or to contribute to the fund go to [www.uow.edu.au/donations/givingopportunities/UOW030480.html](http://www.uow.edu.au/donations/givingopportunities/UOW030480.html) or call 4221 3073. Gifts are tax deductible. ■

## Nova: Science in the news

The following topic has been posted on the Academy's educational website, *Nova: Science in the news* ([www.science.org.au/nova](http://www.science.org.au/nova)):

### Science for sustainable reefs

Pollution, overfishing, coastal development and climate change are putting the world's coral reefs under increasing pressure. With millions of people relying on them, how can science help make our reefs sustainable?

A healthy coral reef is a thing of beauty and a wonder to behold. Coral reefs make a great holiday destination but for many of the world's people they are so much more. Approximately 500 million people depend on coral reefs for food, coastal protection, building materials and income from tourism. But this precious resource is under growing pressure and in serious decline.

Nineteen per cent of the world's coral reefs have effectively been lost and a further 15 per cent are seriously threatened with loss within the next 10 to 20 years. In some regions the losses are significantly higher.

And what is threatening our coral reefs? Basically it's us and our activities. Overfishing, pollution, disease and habitat destruction are some of the direct threats, but overarching and interacting with these are a suite of more serious problems connected with climate change – warming oceans, ocean acidification and rising sea levels.

However, it's not all bad news, especially in the short term. As scientists investigate how coral reefs bounce back after major disturbances (such as storms) they are discovering that healthy coral reefs can have enormous resilience. Possibly our best preparation in the face of climate change is to focus on keeping our reef systems healthy



Photo: Stockport

Healthy coral reefs are more resilient in the face of climate change

to help them sustain themselves, but it may be that we cannot protect them all.

The future of the world's coral reefs is looking grim on many fronts, and climate change will certainly redraw the coral distribution maps of the world. As this century unfolds, unless we curb our greenhouse gas emissions and promote resilience in our reefs, corals are going to deteriorate to the point where we could lose them altogether.

This topic is sponsored by the Australian Research Council Centre of Excellence

for Coral Reef Studies. The Australian Foundation for Science is also a supporter of *Nova*.

Information on this and other topics is available on the Academy's *Nova: Science in the news* website at [www.science.org.au/nova](http://www.science.org.au/nova). A glossary, student activities, further reading and annotated links to relevant websites are available for each topic. ■

## 2009 Frew Fellowship

The 2009 Frew Fellowship has been awarded to Professor Rudolf Grimm, Research Director at the Institute of Quantum Optics and Quantum Information of the Austrian Academy of Sciences in Innsbruck.

The Frew Fellowship is awarded to distinguished overseas scientists to participate in Australian spectroscopy conferences and to visit scientific centres in Australia. Professor Grimm's Fellowship coincided with

the Australian Conference on Optics, Lasers and Spectroscopy held in Adelaide from 29 November to 3 December.

Professor Grimm is an experimental physicist whose work interests centre on ultracold atoms and quantum gases, Bose-Einstein condensation and Fermi gases, cold collisions and cold molecules, interaction of cold atoms with surfaces, atom optics, quantum optics and laser spectroscopy, laser physics and optics. ■

## Nova Sponsorship

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For more information please contact Roz Johnston on (02) 6201 9444 or [Roz.Johnston@science.org.au](mailto:Roz.Johnston@science.org.au).

## Ross Crozier



Ross Crozier

Rossiter Henry Crozier was born in Jodhpur, India, on 4 January 1943 and died in Townsville on 12 November 2009. He was educated at the University of Melbourne (BSc 1965, MSc 1966) and Cornell University, New York (PhD 1969).

Ross began his career at the University of Georgia, returning to Australia in 1975 as a lecturer at the University of New South Wales, rising through senior lecturer and associate professor to a personal chair which he held from 1989 to 1990.

He then moved to La Trobe University as Professor of Genetics, also serving as head of school from 1990 to 1995 and 1998 to 1999. In 2000 he took up a personal chair in evolutionary biology in the School of Tropical Biology at James Cook University and in 2006 was awarded an ARC Professorial Fellowship.

Professor Crozier was a broadly based evolutionary biologist who made major contributions to sociobiology, phylogeny of birds and insects and to understanding the evolution of social behaviour. He developed the first quantitative genetic models for kin recognition and was a world leader in studies of the variation in numbers of mates among social insects.

Ross was also very involved in the wider aspects of his profession, serving as an associate editor or on the editorial boards of a number of journals, largely international ones. He also served as President of the Genetics Society of Australia (1991–93) and the International Union for the Study of Social Insects (1994–98). A member of the Australian Research Council (ARC) Biology

Panel A1 in 1993 to 1995, he was convener of the ARC Access to Australia's Genetic Resources Workshop in 1994 and the ARC Revision of FORC codes group in 1996. At the time of his death he was Australia's representative on the organising committee of an IAP conference on diversity to be held in London in January 2010.

Ross was elected to the Fellowship of the Australian Academy of Science in 2003 and was a member of the Academy's Council at the time of his death. He was also a Fellow of the American Association for the Advancement of Science. In 2006 his work was recognised internationally with the inaugural Hamilton Award, presented by the International Union for the Study of Social Insects at their world congress. The award was for his lifetime contribution to the knowledge of the evolution of social insects, for studies of their evolutionary genetics and for fostering the careers of now leading researchers.

Ross was widely described as generous, caring and a great mentor. He is survived by his wife Ching and his sons Michael and Ken. ■

## Postdoctoral and Invitational Fellowships in Japan 2010

The Academy, in association with the Japan Society for the Promotion of Science (JSPS), invites applications from Australian researchers to undertake Postdoctoral and Invitational Fellowships in Japan. Postdoctoral Fellowships are for a period of 12 to 24 months; Invitational Fellowships are either short term, for 14 to 60 days, or long term, for 2 to 10 months.

Researchers in any field of natural sciences, including technology, engineering and medicine may apply. Applications in the humanities and social sciences are also accepted but only for the Postdoctoral Fellowships. Medical doctors without a doctorate are not eligible to apply for the Postdoctoral Fellowship.

Further information and guidelines are available from [www.science.org.au/internat/programs.htm](http://www.science.org.au/internat/programs.htm). Applications close on Friday 5 February 2010.

## Grants for international travel

Applications are invited for grants for short-term scientific visits to Europe, North America and Asia in 2010, to foster collaborations between Australian and overseas researchers. For more information go to [www.science.org.au/internat/programs](http://www.science.org.au/internat/programs). The closing date for applications is **Friday 26 February 2010**.



## FASTS – Women in Science report

On 19 October the Federation of Australian Scientific and Technological Societies released the report *Women in science in Australia: Maximising productivity, diversity and innovation*. Although nearly 15 years have passed since a previous Australian Government review identified the under-representation of women in the science, engineering and technology fields, there has been limited change or progress

towards increased female participation, particularly in positions of leadership. Professor Sharon Bell (the report author) said it was time for a renewed focus on women in science and technology. To read more of Professor Bell's findings go to [www.fastsof.org/images/news2009/fasts%20women%20in%20science%5B1%5D.pdf](http://www.fastsof.org/images/news2009/fasts%20women%20in%20science%5B1%5D.pdf). ■



## Research update: Survival of threatened mammals dependent on dingos

Edited from a report by Arian Wallach, School of Earth and Environmental Sciences, University of Adelaide

The invasion of exotic species is considered one of the main causes of extinction and land degradation in Australia since European settlement. Intensive poison-baiting and other pest control methods have been intensively implemented in an attempt to control invasives and enhance biodiversity, with little success overall. This study examined the idea that invasive species are not the true cause of biodiversity loss. Instead, we presented the hypothesis that the increase in invasive species and the loss of biodiversity and productivity that follow, are symptoms of the widespread lethal control of Australia's only large mammalian predator, the dingo (*Canis lupus dingo*).

Surveys were done in the arid zone of outback South Australia at five sites (between 200 and 500 kilometres<sup>2</sup> in area) where predators were poison-baited (Mungerannie station, Red Lake, Andamooka station, Vulkathunha-Gammon Ranges National Park and Nantawarrinna station) and two where predators were generally not disturbed (Pandie Pandie station and Curdimurka). Four of these sites were monitored before and after relaxation and intensification of predator control providing experimental evidence on the role of dingos and the effect of control.

The relative abundance of dingos, introduced predators (fox and cat), introduced herbivores (rabbits and camels), large native herbivores (kangaroos and emus) and small native mammals (as a group) were assessed. The number and density of animals was measured by counting footprints on transects and plots over three days.

The social stability of dingos is monitored by scent-marking and howling activity. Dingo scats, urine, and ground rakings at specific sites are signs of scent-marking, and are forms of communication within the population.

This study revealed that biodiversity loss attributed to invasive species is a consequence of predator control. Where dingo populations were allowed to recover, invasive and opportunistic species declined

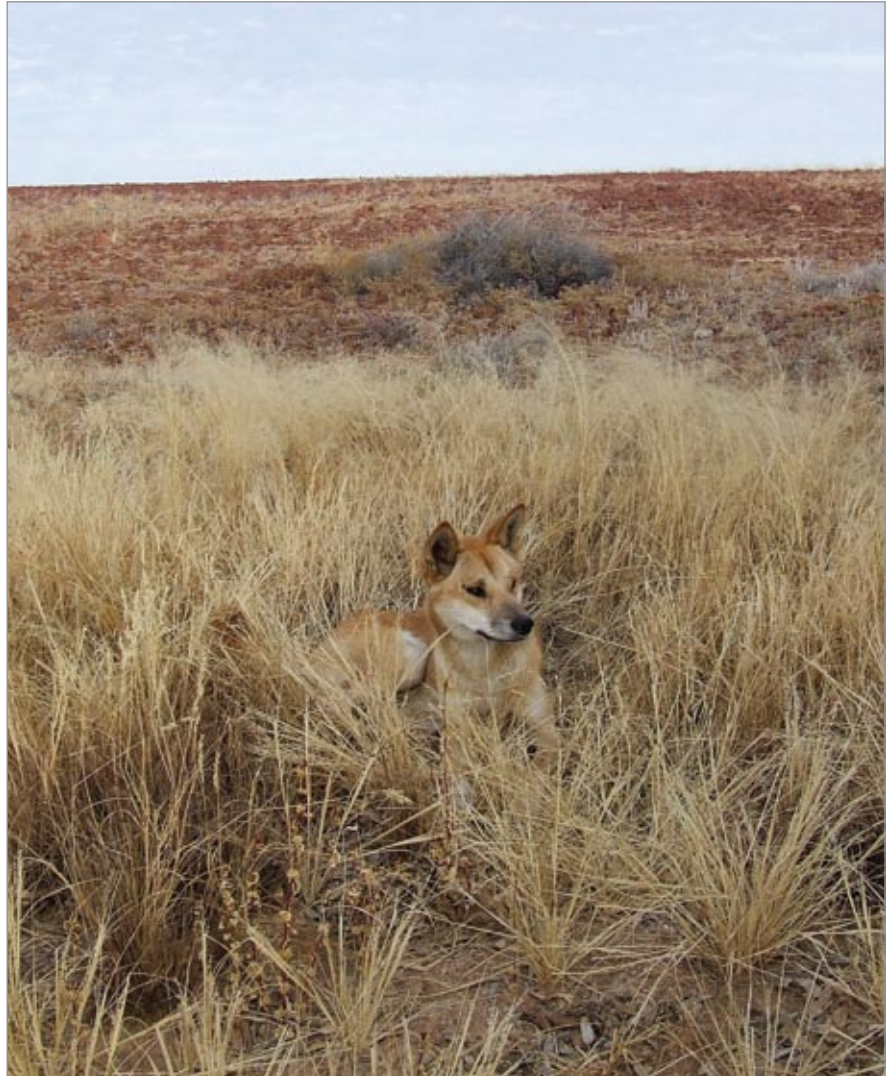


Photo: Arian Wallach

**Invasive species increase and biodiversity decreases in the absence of dingos**

considerably, and native biodiversity and productivity increased. Dingos were consistently found where threatened species survive. The ecological benefits of dingos were more pronounced and consistent when they were socially stable rather than merely abundant. The positive influence of dingos, and the negative effect of predator control, even outweighed the influence of rainfall in the desert. Whether conducted in the name of the pastoral industry or biodiversity conservation, predator control benefited neither and undermined both. Relaxing human

intervention in wilderness areas, and allowing large predators to resume their natural roles, rapidly restores ecological health and resilience.

This research was sponsored in part by the Margaret Middleton Fund for Endangered Australian Native Vertebrate Animals. Information is available from [www.science.org.au/awards/conservation.htm](http://www.science.org.au/awards/conservation.htm). The financial support provided through the Academy came at a critical period in this study and was instrumental in ensuring the continuation and stability of this work. ■