



Bionic ear creator wins the Wark Medal

The future of the bionic ear is greater clarity of hearing, music appreciation, and help for people with only partial hearing loss, according to its inventor, Professor Graeme Clark FAA, who received the Ian Wark Medal at a lecture and dinner held in his honour in Melbourne on 27 July.

The Ian Wark Medal and Lecture honours the contributions to Australian science and industry by the late Sir Ian Wark, CMG, CBE, FAA, FTSE. The award recognises contributions to the prosperity of Australia where such prosperity is attained through the advancement of scientific knowledge or its application, or both. The award is normally made every two years.

The Academy's President, Professor Kurt Lambeck said, 'The creation of the bionic ear – over 20 years ago – was a scientific and commercial triumph. Today, 70 per cent of the world's cochlear implants are made by one company, Cochlear Ltd, using Graeme's invention. He is now helping the next generation of researchers to take the next step forward to a better bionic ear'.

Three provisional patents, which Clark hopes will lead to the cochlear implant of the future, have been lodged. The patents should not only allow profoundly deaf people to hear with greater clarity than ever before, but even to appreciate music, Professor Clark said.

'Gone will be the days when a cochlear implant involved destruction of any residual hearing.'

The three patents derive from recent work at the Bionic Ear Institute in collaboration with Melbourne, Monash and Wollongong universities and St Vincent's Hospital, Melbourne.

The patents focus on techniques to preserve, enhance and utilise any of the auditory hair cells retained by people requiring bionic ears. The patents suggest ways in which these remaining fragile hair cells:

- can be stimulated to enhance quality of hearing – by mechanical and electrical stimulation
- can be protected during bionic ear implantation – by driving a steerable electrode into the inner ear, and
- can even be encouraged to grow as a result of being fitted with a bionic ear – by using conducting plastics and other materials.

More information on Professor Clark's latest work can be found at www.science.org.au/media/27july06.htm, or visit The Bionic Ear Institute at www.bionicear.org/bei/index2.html.

*Graeme Clark and James Cornfoot.
(Photo: The Bionic Ear Institute)*



New President for Academy

At the Academy's annual general meeting on 4 May, Fellows welcomed Professor Kurt Lambeck as their new President.

Kurt Lambeck is Distinguished Professor of Geophysics at the Australian National University. His research interests range through the disciplines of geophysics, geodesy and geology with a focus on the deformations of the Earth on intermediate and long time scales and on the interactions between surface processes and the solid earth. Past research areas have included determination of the Earth's gravity field from satellite tracking data and tidal deformations and rotational motion of the Earth. His recent work has focused on aspects of sea level change and the history of the Earth's ice sheets during past glacial cycles.

Professor Lambeck has been at the Australian National University since 1977, including ten years as

Director of the Research School of Earth Sciences. He is currently also strategic science advisor to National Geospatial Reference System of Geoscience Australia. He was elected to the Australian Academy of Science in 1984 and to the Royal Society in 1994. He is a foreign member of the Royal Netherlands Academy of Arts and Sciences (1993), Norwegian Academy of Science and Letters (1994), Academia Europaea (1999), and the Académie des Sciences, Institut de France (2005). He has received a number of prestigious international prizes and awards.

Looking forward to his term as President, Kurt Lambeck said, 'It is a great honour to have been elected President of the Australian Academy of Science. I will be working hard during the next four years to advance science at all levels – through school programs, at universities and, importantly, in the development of the careers of Australia's young scientists.'

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Professor Kurt Lambeck

Secretary (Physical Sciences)

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Douglas Scholarship winner

Jacqueline Boyle, a PhD candidate in Reproductive Indigenous Women's Health at the Menzies School of Health Research in Darwin, is the 2006 winner of the Academy's Douglas and Lola Douglas Scholarship in Medical Science.

The Douglas and Lola Douglas Scholarship has been made possible through a bequest, from the estate of Miss Lola Douglas, to support young researchers. The scholarship is awarded annually to a high-ranked PhD candidate who has been awarded an NHMRC Training Scholarship in indigenous or primary health care, with preference given to the area of indigenous health research.

Jacqueline's research will investigate the burden of Polycystic Ovary Syndrome (PCOS) in Aboriginal women of the Northern Territory. It will also compare metabolic disturbances and PCOS in women from urban and more



Miss Lola Douglas

westernised lifestyles through to women from remote and traditional lifestyles.

Forthcoming events

- Boden Conference – *Epithelial stem cells and cutaneous regeneration* (Australasian Society for Dermatological Research), Stradbroke Island, Queensland, 22–26 September. <http://ilcfmp5.facbags.uq.edu.au/smms/dcb/index.htm>
- Fifth annual High Flyers Think Tank – *Innovative technical solutions for water management in Australia*, Adelaide, 30 October.
- Fenner Conference – *Integrating agricultural and environmental imperatives for a profitable and sustainable future*, The Shine Dome, Canberra, 8–9 November. www.pi.csiro.au/FennerConference/index.htm

New topics on Nova

- It's an advanced material world
- Prions – morphing agents of disease, first published in 1997, has been updated and relaunched.

www.science.org.au/nova

Important dates 2006

- Early-career and career awards for outstanding research. Closing date 30 August.
- Travelling Fellowships. Closing date 30 September.

- Research Conferences. Closing date 30 September.
- Support for research on Endangered Australian Vertebrate Species. Closing date 30 September.

International exchanges

- Expressions of interest are being sought for the Adam J Berry Memorial Fund for visits to the National Institutes of Health in the United States. Closing date 13 October.
- The Academy will shortly be seeking applications for the Japan Society for the Promotion of Science short-term, long-term and postdoctoral fellowships.

See www.science.org.au/internat for application forms and selection criteria.

Annual report

The Academy's annual report is now available online at www.science.org.au/reports/2006anrep.pdf. For printed copies please email eb@science.org.au.

Gifts to the Academy

If you would like to make a gift or a bequest to the Academy please contact the Executive Secretary, Professor Sue Serjeantson, on (02) 6201 9400 or es@science.org.au.

The Academy shines at the Dome

The Academy held the annual *Science at the Shine Dome* event from 3–5 May. Academy Fellows and the new President, Professor Kurt Lambeck, were joined by newly elected Fellows, Academy award winners, early-career researchers and award-winning science teachers. The farewell address was given by the outgoing President, Dr Jim Peacock, and is available at www.science.org.au/events/agm2006address.htm.

The social highlight for Fellows and guests was the annual black tie dinner in Parliament House, Canberra, where Professor Ian Frazer FAA, Australian of the Year 2006, was the after-dinner speaker. At the dinner Professor Mike Gore was presented with the Academy Medal in recognition of his outstanding contribution to Australian science through his establishment and leadership of the Questacon National Science Centre that has been an exemplar for the creation of other science museums, nationally and internationally.

Award winners

Recipients of the Academy's awards for 2006 were presented with their medals and gave a presentation on their research. Professor Jenny Graves FAA, from the Australian National University (ANU), delivered the Macfarlane Burnet Lecture, exploring the genomes of Australia's mammals and what they reveal about us. For more information on the award winners see www.science.org.au/awards/2006awards.htm.

New Fellows

Newly elected Fellows also gave a short talk about their research the day before being officially admitted to the Academy (see pages 6–8 for more on the new Fellows). The New Fellows Seminar and Jenny Graves' lecture are available on DVD. For more information contact Jacinta Legg on (02) 6201 9417 or jacinta.legg@science.org.au.

Teachers and early-career researchers

The Academy offered once again a special program for early-career researchers and science teachers during *Science at the Shine Dome*. Eighty teachers and early-career researchers attended the event and had the opportunity to exchange ideas with Fellows and



Passing the gavel.



A group of 2006 award winners at Science at the Shine Dome.

participate in workshops. Professor Will Steffen, Director, Centre for Resource and Environmental Studies, ANU, set the background to the symposium, by presenting a workshop on global climate change to teachers, while early career researchers attended a workshop on media skills, presented by Narelle Curtis and Alyssa Jones from the Murdoch Children's Research Institute. Professor David Vaux FAA, La Trobe University, also presented a seminar to the young researchers, giving useful advice on presenting data in publications. Feedback from the teachers and early-career researchers praised the Fellows and the presentations:

- 'It was interesting to see the quality and depth of research being done here in Australia.'
- 'The New Fellows Seminar was

fascinating. It provided great insight into a wide range of recent research.'

- 'It is a privilege to be among the best people in science. The opportunity to network with Fellows, symposium speakers and workshop presenters was invaluable.'
- 'The symposium on the hydrogen economy was excellent. I now feel more confident to teach this topic to my classes.'

Annual symposium

The final day of *Science at the Shine Dome* was set aside for the Academy's annual symposium. This year the symposium, *Science on the way to the hydrogen economy*, brought together leading researchers from Australia and the USA. For more on the symposium see page 5.



Julie Campbell



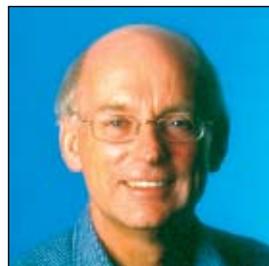
Jenny Marshall Graves



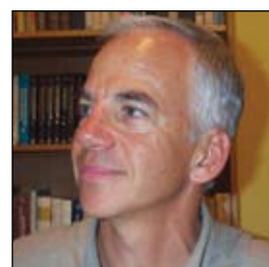
Bob Graham



Pauline Ladiges



John Ralston



Tony Guttman

New members of Council

Professor Julie Campbell is the new Secretary, Education and Public Awareness. She is currently the Director of the Centre for Research in Vascular Biology at the University of Queensland; Director, The Wesley Research Institute, Wesley Hospital, Brisbane; and NHMRC Senior Principal Research Fellow at the University of Queensland. Her research on the cell biology of cardiovascular disease and atherosclerosis has profoundly influenced concepts of the formation of atherosclerotic plaques and stimulated ideas on smooth muscle cell diversity.

Professor Jenny Marshall Graves is the new Foreign Secretary. She is Research Director at the Australian Research Council (ARC) Centre for Kangaroo Genomics and Head of the Comparative Genomics Research Group at the Research School of Biological Sciences, Australian National University. She is internationally acclaimed for her work in mammalian genetics and comparative genomics on Australian marsupials and monotremes. Jenny was selected as the 2006 laureate for the Asia-Pacific region L'Oréal-UNESCO Awards for women in science.

Professor Bob Graham is a member in the biological sciences. He is the Des Renford Professor of Medicine at the University of New South Wales and Executive Director of the Victor Chang Cardiac Research Institute in Sydney. His research focus is molecular cardiology, with an emphasis on

circulatory control mechanisms, receptor signalling and cardiac hypertrophy.

Professor Pauline Ladiges is a member in the biological sciences. She is Professor (Personal Chair) and Head of the School of Botany, University of Melbourne. Her research interests include the systematics, biogeography and ecology of Australian plants and she is best known for using molecular data to resolve uncertainties about the classification of Australia's eucalypts.

Professor John Ralston is a member in the physical sciences. He is Director of the Ian Wark Research Institute and Professor of Physical Chemistry and Minerals Processing, University of South Australia. His scientific contributions cover areas of physical chemistry, colloid and surface chemistry. He provided the inspiration and motivating force for the establishment of the Ian Wark Research Institute that is known worldwide for its fundamental research in interfaces.

Professor Tony Guttman is a member in the physical sciences. He is Professor of Mathematics (Personal Chair) in the Department of Mathematics and Statistics, University of Melbourne, and Director of the ARC Centre of Excellence for Mathematics and Statistics of Complex Systems. His research interests are in equilibrium statistical mechanics, phase transitions, combinatorial problems and their applications in many areas of science.

Lemberg Fellow

The 2006 Lemberg Fellow, Professor Jan Vymazal, a wetland biologist from ENKI ops, Czech Republic, gave lectures and seminars in Lismore, Sydney, Newcastle and Brisbane on the demonstrated benefits of natural and constructed wetlands. He also attended the Society of Wetland Scientists conference, *Catchment to Coast*, in Cairns.

Professor Vymazal played a major role in pioneering and developing wetland technologies for the treatment of wastewater throughout Europe and around the world. He is an expert in the use of ecology based systems for the management of sewage from rural communities, an important issue in Australia.



Jan Vymazal

The Lemberg Fellowship, which commemorates Professor Max Lemberg FAA FRS, is generally awarded for research on biochemistry, conservation or Australian flora.

For more information on Professor Vymazal's lectures please contact theadley@scu.edu.au.

Conserving colours

By Dr Sarah Pryke

Research Fellow, School of Biological, Earth and Environmental Sciences, University of NSW

The Academy's Award for research on the conservation of endangered Australian vertebrate species has substantially helped in my research of the Gouldian finch in the wild.

Gouldian finches (*Erthyura gouldiae*) are one of Australia's most endangered birds, with recent estimates suggesting that less than 2500 individuals now remain in small, isolated patches across northern tropical Australia. From an evolutionary perspective, the Gouldian finch is also exceptionally unusual as it displays a genetic colour polymorphism - the occurrence of distinct genetically-determined colour forms (morphs) within the species - in its head colour; both males and females display one of three discrete head colours - black, red or yellow. These colour morphs uniquely co-occur at different frequencies; black-headed birds are the most common (~70 per cent), red-headed moderately common (~30 per cent) and yellow-headed extremely rare (~ 0.03 per cent). The aim of my work was to determine what mechanisms are responsible for sustaining the three colour morphs at their different frequencies.

Another part of the work was to determine whether there were any behavioural differences between birds that related to the three head colours. During last year's breeding season (March to July) I went to the Kimberley



The three colour morphs (yellow, red and black) of male Gouldian finches. (Photo: Sarah Pryke)

region of Western Australia to investigate the breeding status and mate preferences of birds in a wild population. Gouldian finches nest deep in tree hollows, and typical of many socially monogamous birds, both parents invest heavily into rearing their young. Although the three colour morphs naturally coexist in wild populations Gouldian finches tend to mate assortatively: red-headed birds preferentially breed with other red-heads, while black-headed birds typically prefer other black-heads. Unfortunately no breeding pairs of the very rare yellow-heads were located.

This work, still at an early stage, has opened up a wealth of opportunities to further explore aspects of life-history such as differential survival, reproduction and physiology, which together are likely to have a profound influence on the genetic dynamics of the remaining small populations and the maintenance (or loss) of colour morphs.

Pryke, S R and Griffith, S C 2006. Red dominates black: Agonistic signalling among head morphs in the colour polymorphic Gouldian finch. *Proceedings of the Royal Society of London B* 273: 949-957.

Symposium on the hydrogen economy

This year's annual symposium, convened by Professor Michael Barber FAA, was held on 5 May as part of the Academy's *Science at the Shine Dome*. It was an intriguing exposé of the science on the way to the hydrogen economy.

Dr John Wright, Director of the CSIRO Flagship Program *Energy Transformed* set the scene for the symposium and the compelling multi-faceted discussions that took place, with a brief history of hydrogen and a description of one possible future scenario.

The keynote speaker, Dr George Crabtree, Senior Scientist at the Argonne National Laboratory, USA, spoke of the research challenges for creating a mature hydrogen economy. He said, 'From the

point of view of business, there is big investment required to convert to a hydrogen economy, as well as a long time horizon, an uncertain payoff, and not much incentive to do it.'

He cited air pollution as an example of how a challenge like this can be overcome. 'In the last 20 or 30 years the air has become cleaner, and that is because some governments around the world have simply passed laws that say, "It is better for us as a society to have clean air, and we'll pay the cost. We'll all pay it."

Dr Crabtree concluded by saying, 'Hydrogen can meet the energy challenges as a carrier. There is an incremental hydrogen economy that we can put in place today, but it also has an



George Crabtree

incremental effect on energy challenges. We need the mature hydrogen economy and there are research challenges to getting there.'

The symposium proceedings are available at www.science.org.au/sats2006/symposium.htm.

New Fellows



David Allen



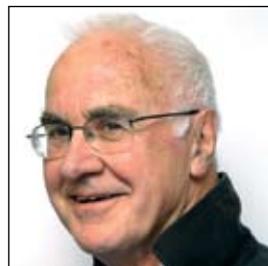
Brian Boyle



Mark Burgman



David Celermajer



Barry Egan



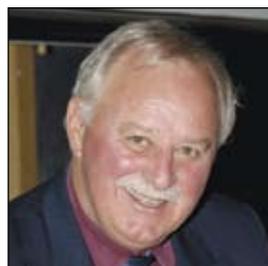
Lorenzo Faraone



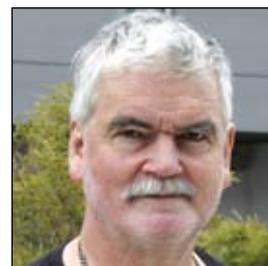
David Hinde



Andrew Holmes



Brian Kay



Roger Powell

Sixteen of Australia's leading scientists were honoured on 24 March by election to the Academy. Election recognises a career that has significantly advanced, and continues to advance, the world's scientific knowledge.

Professor David Grant Allen

Professor of Physiology, School of Medical Sciences, University of Sydney

David Allen has made exceptional pioneering contributions to cardiac and skeletal muscle physiology. His demonstration of the role of calcium in controlling heart rate has reshaped heart physiology and advanced the understanding of component functions such as cardiac pacemaker cells. His research has been utilised by the pharmaceutical industry to develop improved drugs for treating heart malfunction.

Dr Brian John Boyle

Director, CSIRO Australia Telescope National Facility, Sydney

Brian Boyle is a leader at the forefront of research in cosmology and the evolution of quasi-stellar objects in astronomy. He pioneered the use of special fibre-optic spectroscopic techniques, leading the team responsible for the largest ever sample of quasars. His research led to uncovering the origin of the cosmological X-ray background, the direct determination of the black hole mass function, and knowledge of the clustering of quasars at high redshift.

Professor Mark Alexander Burgman

Professor, School of Botany, University of Melbourne

Mark Burgman is an outstanding researcher in the fields of ecology, applied mathematics, statistics, and environmental management. He has applied his expertise to substantially improve rigour and objective

assessment in decision-making for conservation biology. His methods for the quantification of risk provide a superior framework for examining uncertainty in environmental planning.

Professor David Celermajer

Scandrett Professor of Cardiology, University of Sydney, Department of Cardiology, Royal Prince Alfred Hospital

David Celermajer is an accomplished professor of medicine who has made major contributions to the science of health. His research led to the identification of pre-symptomatic arterial damage and revolutionised the field of cardiovascular prevention by providing novel treatment options for patient care. He is recognised for publishing a wealth of original research articles on the prevention and treatment of heart disease.

Professor (John) Barry Egan

Professor, School of Molecular and Biomedical Science, University of Adelaide

Barry Egan has made impressive discoveries in molecular biology, genetics and virology. He has developed novel practical models for systems biology and mathematical analyses of genetic circuits which can govern switching between patterns of gene expression. His dedicated research on bacterial and bacteriophage genetics has been of critical importance in this area.

Professor Lorenzo Faraone

Professor, School of Electrical Engineering, University of Western Australia

Lorenzo Faraone has revolutionised sensor technology and is an impressive researcher of semi-conductors, micro-electro-mechanical systems and nanotechnology. His research has led to the development of the world-leading Quantitative Mobility Spectrum Analysis technique and tuneable infra-red detectors.

Professor David John Hinde

Professor, Department of Nuclear Physics, Research School of Physical Sciences and Engineering, Australian National University, Canberra

David Hinde is a leading authority in nuclear physics. He has developed novel experimental equipment and techniques that allow elucidation of the time-scales involved in heavy-ion reactions. His work is pivotal and has led to a significant change in our knowledge of nuclear dynamics resulting in re-direction of the international research focus in this field.

Professor Andrew Holmes

ARC Federation Fellow and VESKI Inaugural Fellow, Bio21 Institute, University of Melbourne

Andrew Holmes is an expert in synthetic organic chemistry and electro-active polymers whose shape is modified when an electric field is applied. His work led to the discovery of the first example of light-emitting polymers and he is distinguished for contributions to the synthesis of biologically-important natural products and pioneering work relating to the development of flat panel colour displays, photovoltaic cells for solar energy production, and field-effect transistors.

Professor Brian Herbert Kay

Deputy Director, Australian Centre for International and Tropical Health and Nutrition, Queensland Institute of Medical Research

Brian Kay is a celebrated expert in epidemiology, insect vectors, and mosquito control. He has made valuable contributions to understanding a range of regional arbovirus problems, especially dengue but also Ross River and Murray Valley encephalitis viruses. His research has

led to the control of arbovirus diseases in northern Australia and Asia.

Professor Roger Powell

Professorial Fellow, School of Earth Sciences, University of Melbourne

Roger Powell is an expert in metamorphic geology and world leader in the application of thermodynamics to predict the production of certain mineral assemblages and phase relationships in natural rocks. He pioneered the development of quantitative methods to rigorously examine the effects of temperature and pressure conditions under which certain metamorphic reactions occur.

Dr Stephen Rintoul

Senior Principal Research Scientist, Marine and Atmospheric Research, CSIRO, Tasmania

Stephen Rintoul is an authority on Australian oceanography. His innovative research that spans ocean physics, biology, chemistry and studies of ocean-atmosphere interactions has greatly contributed to the international understanding of circulation patterns in the Southern Ocean. This has led to a much deeper appreciation of the pivotal role that the Southern Ocean, particularly the Antarctic Circumpolar Current, plays in the global climate system.

Professor Igor Shparlinski

Professor, Department of Computing, Macquarie University, Sydney

Igor Shparlinski is an exceptional mathematician who has made superior contributions to number theory and number theoretic algorithms. He has solved several well-known problems including an Erdős problem, which had remained unsolved for decades. He applies advanced methods of analytical number theory to computer science and cryptography.

Professor Michelle Yvonne Simmons

ARC Federation Fellow, Experimental Condensed Matter Physics, Centre for Quantum Computer Technology, School of Physics, University of New South Wales

Michelle Simmons is an expert in nanotechnology and has identified important new phenomena in condensed matter physics. She has a talent for research on the fundamental understanding, design and construction of quantum electronic devices. Her research and development of technologies to fabricate tiny silicon devices operating at the atomic level has set the stage for a new era in nanotechnology.

Professor Evan Rutherford Simpson

Director, Prince Henry's Institute of Medical Research, Monash University, Melbourne

Evan Simpson is an acclaimed expert in steroid hormone physiology, particularly synthesis and regulation, and is a world authority on oestrogenic hormone production. His research has influenced the science of embryo development, reproductive biology, human physiology and the pathology of tumours. This has led to the development of new drugs for treating breast tumours.

Professor Jonathan Sprent

Professor, Garvan Institute of Medical Research, Sydney

Jonathan Sprent is a distinguished immunologist who has made important contributions to understanding the immune system and preventing the rejection of transplants. His research on T-cell tolerance, positive selection of functional cells in the thymus gland, and antigen targeting by T-cells has significantly advanced the science of how the body combats infections.



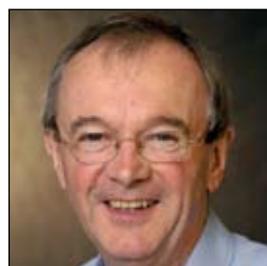
Stephen Rintoul



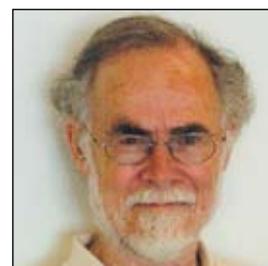
Igor Shparlinski



Michelle Simmons



Evan Simpson

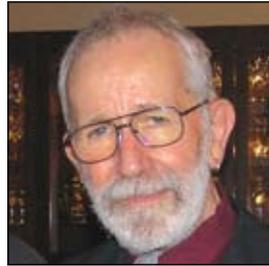


Jonathan Sprent

New Fellows *(continued from page 7)*



Susanne von Caemmerer



Robin Warren



John Zillman

Professor Susanne von Caemmerer

Professor, Molecular Plant Physiology Group, Research School of Biological Sciences, Australian National University, Canberra

Susanne von Caemmerer is an eminent researcher in the fields of plant physiology, biochemistry, molecular biology, and photosynthesis. She has made important contributions to knowledge of carbon acquisition and fixation in plants. Her unique research strength lies in her ability to combine mathematical modelling with experimental approaches to allow discovery of mechanisms underlying photosynthesis. This has important implications for global climate change.

Nobel Prize Winner addresses the NPC

Nobel Laureate, Professor Barry Marshall FAA, gave a special Academy address to the National Press Club on 12 July, which delivered a message to the scientific community and its supporters.

In the talk, entitled *Talking science – creating a community conversation*, Marshall described some of the difficulties he and fellow Nobel Laureate, Professor Robin Warren FAA, faced in the early days of their research discoveries.

'We had the truth and our research provided enough data – the tangible, hard evidence to support that scientific truth [but] there did not seem to be anyone listening.'

He also discussed the current stem cell issue saying, 'I believe that in many ways stem cell research is emblematic of the challenges confronting our community as we seek to write regulations to keep pace with scientific advances.'

The complete address is available on the Academy's website at www.science.org.au/events/npc-marshall.htm.

Special Elections

This year the Academy has elected by Special Election two eminent Australians who have 'rendered conspicuous service to the cause of science or whose election would be of signal benefit to the Academy and to the advancement of science.'

Professor Robin Warren

Emeritus Professor, University of Western Australia and formerly Senior Pathologist, Royal Perth Hospital

Robin Warren is a most distinguished clinical pathologist and prestigious Nobel Laureate. He made the discovery that a bacterium, later

named *Helicobacter pylori*, was responsible for causing a range of gastric disorders, including peptic ulcers, gastritis and gastric cancer. His persistent, determined approach and collaboration with Barry Marshall led to the successful demonstration of how *H. pylori* survives in stomach acid. This discovery has had profound implications for the clinical field of gastroenterology and resulted in the development of effective treatments for a variety of gastric ailments ultimately sparing many people around the world a lifetime of pain and distress.

Dr John Zillman

President, Australian Academy of Technological Sciences and Engineering

John Zillman is a world leader in the science and management of meteorology and has made exceptional contributions to science policy. He is recognised for his distinguished service on a wide range of scientific national and international panels and advisory bodies. He served two terms as President of the World Meteorological Organization, and has been Australia's principal delegate on the Intergovernmental Panel on Climate Change since 1994.

White Conference

The 2006 Elizabeth and Frederick White Research Conference, *Mastering the data explosion in the Earth and environmental sciences*, was held at the Shine Dome on 19–21 April. The Conference organisers were Dr Malcolm Sambridge, Australian National University; Dr Louis Moresi, Monash University; and Dr Fabio Boschetti, CSIRO Exploration and Mining.

The Conference focused on the Earth and environmental sciences and brought together Australian and international

experts in spatial statistics, data mining, inversion, grid computing, computer visualisation and numerical simulation of natural processes, together with those solving real world problems using these tools.

A key issue discussed throughout the Conference was how to deal with the enormous amount of data that is being collected and generated as researchers try to make sense of new and complex observations about the world around us.



From left: Conference organisers, Louis Moresi and Malcolm Sambridge with keynote speaker Noel Cressie, Ohio State University.

International news

Chinese Academy of Sciences

The Chinese Academy of Sciences held a special invited seminar in Beijing on 10–11 April, on the topic of membership affairs of national academies. The Academies of Australia, India and the USA were invited to participate in the seminar. The Australian delegation comprised Dr Jim Peacock (President), Professor Bruce McKellar (Foreign Secretary) and Professor Sue Serjeantson (Executive Secretary).

International Students Forum

Professor Andrew Smith FAA represented the Academy at the 2nd International Students Forum organised by the Graduate University of the Chinese Academy of Sciences (GUCAS), in Beijing from 30 June to 2 July 2006. The University of Melbourne, RMIT and the University of Wollongong sponsored a total of five Australian students to attend this event. The International Students Forum was established to promote friendship and cooperation between China, Japan and the USA. Australia was invited to participate for the first time in 2006.

Meetings of Nobel Laureates in Lindau

For the second year, a group of seven Australian researchers attended the Lindau Foundation Nobel Laureate meeting at Lake Constance in Germany, from 25–30 June. The 2006 meeting was on the topic of Chemistry. Some 23 Nobel Prize winners and 530 young scientists from 53 countries attended. The students participated in plenary sessions, round table debates and small group discussions. Professor Max Crossley FAA represented the Academy at the meeting.

National Science Foundation

Under a program between the National Science Foundation and the Academy 20 US graduate students in science and engineering are visiting Australia between June and August for a period of eight weeks during the American Summer, to conduct research in laboratories and to initiate personal collaborations with their Australian counterparts.



Lindau participants.



Visiting US graduate students.

The host research institutions such as universities, CSIRO and museums, are providing the students with office accommodation, access to laboratory, library and computing facilities, as well as technical assistance and the time and expertise of the host researcher.

The Academy organised a series of lectures and site visits as part of an orientation session in Canberra from 14–16 June. A number of participants of previous years' programs have been offered postdoctoral positions in Australia.

This activity is funded by the Department of Education, Science and Training's International Science Linkages Programme and has been renewed for a further three years.

ICSU

Dr Catherine Brechignac, incoming President of the International Council for Science (ICSU) visited the Academy on 24 June. She is a specialist in nanotechnology, member of the Académie des sciences and of the Académie des technologies, and President of the CNRS. Dr Brechignac was in Australia as part of a French nanoscience delegation. Other members of the group who met with Academy Council members were Dr François Guinot, President of the Académie des technologies, Dr Bruno Jarry, Académie des technologies, and Dr Jean-Marc Grognet, Department of technological research of Commissariat à l'Énergie Atomique.

News from our National Committees

The biennial meeting of Chairs of all National Committees and Task Forces was held at the Shine Dome on 13 April. The program for the day included presentations by the Chairs of the Committees for Medicine and Astronomy, followed by breakout discussion groups. The discussion focused on the national and international roles and responsibilities of National Committees and the Productivity Commission Review of Public Support for Science and Innovation. A summary of proceedings of the meeting can be viewed at www.science.org.au/natcoms.

The **Committee for Chemistry** met by teleconference on 26 May, and noted the need for a scientific view in relation to national security, and the importance of monitoring the toxicological and related aspects of nanotechnology. The selection of voting delegates for the 2007 General Assembly of the International Union of Pure and Applied Chemistry was also discussed.

The **Earth Sciences Committee** met in Canberra on 2 June. Discussion included methods for implementation of the *National Strategic Plan for the Geosciences* and monitoring of outcomes. International Unions and the forthcoming International Year of Planet Earth, International Polar Year and Electronic Geophysical Year (eGY) were also covered. The Committee agreed to sign the eGY Declaration for a Geoscience Information Commons.

The **Committee for History and Philosophy of Science** met at Ian Potter House on 4 July. The meeting was followed by the presentation ceremony for the inaugural National Museum Student Essay Prize, established by the National Committee with support from the National Museum of Australia. The Committee was very pleased with the number and quality of entries, and the prize-winning essays will be published in the Academy's *Historical Records of Australian Science*.

The International Geographical Union (IGU) Regional Congress in Brisbane was the venue for an informal meeting of the **Committee for Geography** on 6 July. The Committee noted the success of the Congress in promoting the discipline of geography in the region.

The **Scientific Committee on Antarctic Research (SCAR) XXIX** and Council of Managers of National



Kurt Lambeck and Craddock Morton, Director, National Museum of Australia, congratulate Sara Maroske, joint winner of the student essay prize. (Photo: George Serras, © NMA 2006)

Antarctic Programs (COMNAP) XVIII conference was held in Hobart from 8–19 July, together with associated meetings, including the SCAR National Delegates meeting. Nine hundred delegates, many from overseas, attended the second SCAR Open Science Conference. Hundreds of papers and posters were presented, and the abstracts are available at www.scarcomnap2006.org/abstract. Most members of the National Committee for Antarctic Research (NCAR) attended the conference, and a NCAR meeting was held at the conclusion of the Open Science Conference. The Committee congratulated members of the organising committees on the success of the conference.

The Committee on Space Research (COSPAR) Scientific Assembly was held in Beijing from 16–23 July. The space science research community contributed to a substantial report to COSPAR, entitled *Australian Space Research 2004–2006*, which was presented to the Assembly, available at www.science.org.au/natcoms/cospar2006.pdf.

Professor Andrew Somogyi and Dr Sab Ventura represented Australia as voting delegates at the International Union of Pharmacology General Assembly in Beijing, 2–7 July 2006. The General Assembly of the International Union of Biochemistry and Molecular Biology (IUBMB) was held in Kyoto on 24 June. Professor Phillip Nagley and Dr Rohan Baker were Australia's voting delegates.

The Academy through the **Committee for Earth System Science** co-sponsored a workshop entitled *Earth system feedbacks: Vulnerability of the carbon cycle to drought and fire*, held at the Shine Dome from 5–9 June. The workshop attracted international participation, and a report can be found on page 11 of this newsletter.

Academy farewell

The Academy's long-serving Building and Facilities Coordinator, Nerida Dunn, retired on 7 July. The President joined Academy staff at the Hyatt in Canberra to farewell Nerida over high tea. We wish her all the best in her retirement.



Honours to Fellows

Professor Ken Campbell, Australian National University, received the Geological Society of Australia W R Browne Medal for 2006.

Professor Peter Doherty, University of Melbourne, has been made an Honorary Fellow of the Royal Society of Edinburgh.

Professor Graham Farquhar, Australian National University has been awarded the R M Johnstone Medal of the Royal Society of Tasmania.

Professor Simon Gandevia, Prince of Wales Medical Research Institute, Sydney, received the International Research Promotion Council Eminent Scientist of the Year Award and is the 2006 Exchange Lecturer for the Australian Physiological Society.

Professor Jagadish, Australian National University, has been elected a Fellow of both the International Society for Optical Engineering and the Electrochemical Society.

Professor Grant Sutherland, Women's and Children's Hospital, Adelaide, has been made an Honorary Member of the European Cytogeneticists Association.

Professor Susanne von Caemmerer, Australian National University, has been elected a Member of Leopoldina, the German Academy of Sciences.

Queen's Birthday honours

Professor Julie Campbell, University of Queensland, was appointed an Officer of the Order of Australia (AO) 'for service to science and to medical research, particularly in the area of cell biology of coronary artery and other vascular diseases, and to education'.

Professor David de Kretser, Governor of Victoria, was appointed the Companion of the Order of Australia (AC) 'for distinguished contributions to public life as a medical researcher of international reputation in the field of reproductive biology, to the development of the biotechnology industry, and to bioethics'.

Professor David Green, Australian National University, was appointed a Member of the Order of Australia (AM) 'for service to the earth sciences, particularly in the fields of petrology and geochemistry through research, educational and advisory roles and contributions to public policy formulation'.

Vulnerability of the carbon cycle to drought and fire

Pep Canadell, Michael Raupach, Jason Beringer, Andy Pitman

An international workshop on *Earth system feedbacks: Vulnerability of the carbon cycle to drought and fire* took place from 5–9 June 2006 at the Australian Academy of Science.

The workshop was organised by the Global Carbon Project, the ARC Network for Earth System Science, CSIRO Marine and Atmospheric Research, the Australian Climate Change Science Program, the Australian Academy of Science, the Analysis, Integration and Modeling of the Earth System project, and the European Space Agency. It was held to discuss new findings on the feedbacks between terrestrial carbon and water cycles, especially the effects on terrestrial carbon sinks of changes in patterns of drought and fire induced by climate change.

Global Climate Models predict major changes of the water cycle over the next 100 years including the increase of i) global precipitation, ii) water stress in some regions, and iii)

inter-annual variability and extreme events (eg, droughts, floods).

A major outcome of the workshop was the finding that droughts have become more frequent around the world since the last major El Nino event in 1997. These droughts all have in common the unique feature of being among the hottest on record. In every case, this has led to large impacts on the net terrestrial carbon balance. As vegetation and soils become drier, there are large carbon emissions from fires.

The workshop was followed up by a 2-day meeting of the Australian carbon cycle community to begin discussion on the implementation of the Blueprint for Australian Terrestrial Carbon Cycle Research published by the Australian Greenhouse Office. A number of priorities and key developments were agreed to be followed up over the next year including discussions on coupled Nitrogen and Phosphorus cycles into the land surface scheme and appropriate representation of fires.

Launching into evolution

The Academy launched its public lecture series for 2006–07, *The origin of species: The Australian connection*, at the Shine Dome during National Science Week.

The monthly lectures will highlight the science of evolution by providing evidence from Australia's fauna, flora and geology.

Professor Jenny Graves FAA and Dr Hugh Tyndale-Biscoe FAA presented the first lecture, *Australian mammals: Curious sex and reproduction*. During their talks, they explored the strange genetics and extraordinary sex lives

of marsupials, providing examples of some 'not-so-intelligent' design features of Australian animals.

The lecture series will culminate in a celebration of the 300th anniversary of the birth of Carl Linnaeus on 23 May 2007, whose taxonomic binomial nomenclature for plants and animals was developed in the 1750s.

Register to receive email alerts about the Academy's public events, including this lecture series, or read transcripts of the lectures at www.science.org.au/events/publiclectures.

Review of learned academies

In 2005, the Department of Education, Science and Training conducted a review of the four learned academies and the National Academies Forum. The then Minister Brendan Nelson appointed a three-person committee comprising Bruce Alberts (outgoing President of the US National Academy of Sciences), John Ralph, AC, FAA (Chair of the Australian Foundation

for Science) and John Hay, AC (Vice-Chancellor and President, University of Queensland). The committee met in Canberra on 17–18 September and interviewed representatives from the four academies. The report from the review is now available at www.science.org.au/reports/2005-review-learned-academies.pdf.

Primary Connections

In April, professional development workshops were held in five capital cities (Perth, Adelaide, Melbourne, Sydney and Brisbane) for *Primary Connections* trial teachers and professional learning facilitators. The workshops aimed to support the development of networks of facilitators, trial teachers and trial schools and to introduce curriculum resource units for trial in 2006.

The Education Queensland science program, 'Spotlight on Science', held workshops in Brisbane and Cairns for over 200 teachers who were new to the project. The teachers have committed to teaching at least one *Primary Connections* unit in their classes and leading professional development activities for their colleagues.

The 37th annual Australasian Science Education Research Association (ASERA) conference took place in July. The Academy President, Professor Kurt Lambeck, gave an address. Prior to the opening of the conference 30 participants attended an information session about *Primary Connections* conducted by Professor Mark Hackling, one of the consulting co-directors of *Primary Connections*. The aim was to introduce the audience to the project by highlighting the professional learning program and the curriculum resources.

Professor Sue Serjeantson opened the session and four students from Fadden Primary School gave a presentation about their class work using the curriculum units *Plants in action* and *Weather in my world*.

The annual conference of the Australian Science Teachers Association, CONASTA 55, was held at the University of Adelaide in July attracting approximately 400 participants from across Australia. Shelley Peers, Louise Rostron and Nola Shoring represented the Academy.

Primary Connections was well publicised in the keynote address by Professor Mark Hackling, a seminar run by the Academy and an interactive workshop by some of the trial teachers.

The third set of units will be trialled during Term 3:

Stage 1 – *Water works* (Life and Living)

Stage 2 – *All sorts of stuff* (Natural and Processed Materials)

Stage 3 – *Electric circuits* (Energy and Change)

Following critical feedback and revision, these units will be available for purchase by mid 2007.

Further information on the project can be found at www.science.org.au/primaryconnections.



Fadden Primary School participants.

Primary Connections wins award

Primary Connections has won the 2006 Australian Publishers Association Award for Excellence in Educational Publishing in the Primary Teaching and Learning category. The award recognises the high standard of the first four published curriculum resource units and the *Questioning Minds* DVD.

Fenner Conference addresses health and cities

The 2006 Fenner Conference on the Environment was held at the Shine Dome on 25–26 May 2006. The purpose of the Conference was to bring researchers together with counterparts in policy, private sector and community to discuss and debate the important topic of urbanism, environment and health. The Conference was organised by a team led by the National Centre for Epidemiology and Population Health at The Australian National University.

Professor Frank Fenner FAA welcomed Conference participants and spoke of the global importance of urbanism given 2007 is the year in which, for the first time in history, more people will live in cities than in rural areas.

In his opening address, Professor Tony McMichael spoke from a historical perspective of phases of public policy interest in the urban environment and health. He argued that sustainability policy and debate should focus on outcomes including



Frank Fenner with his grand-daughter Sally Marshall at the Conference.

human opportunity, security, wellbeing and health. Larry Frank, Bombardier Professor of Sustainable Transportation at the University of British Columbia, presented a plenary lecture on research into the relationships between health and the built environment, particularly the 'walkability' of residential areas.

Speakers represented Australian leaders in the fields of urban management, transport, sustainability, and health and wellbeing. The

Conference included an interactive session, which introduced many of the Conference participants to systems thinking.

Peer-reviewed papers from the Conference are available on the Conference website (<http://nceph.anu.edu.au/Fenner2006/index.htm>) and in 2007 the *New South Wales Public Health Bulletin* will publish a special issue on urban health containing selected papers from the Conference. Following the Conference, The National Centre for Epidemiology and Population Health has made a further submission to the current government inquiry into a Sustainability Charter for Australia.

Outcomes of the Conference include a proposal for a Charter on the urban environment and health to be developed with the support of interested professional societies, including the Public Health Association of Australia, and a number of collaborative research funding submissions.