



# Humanity's heritage: The human genome and stem cells

*Professor John Shine, the Academy's Secretary (Biological Sciences), Executive Director of the Garvan Institute of Medical Research in Sydney and Chair of the National Health and Medical Research Council, delivered the Academy of Science's 4th Annual Telstra Address at the National Press Club on 21 July 2004. Below are some excerpts from his address. The full text of Professor Shine's address is on the Academy's website at [www.science.org.au/proceedings/npc4.htm](http://www.science.org.au/proceedings/npc4.htm).*

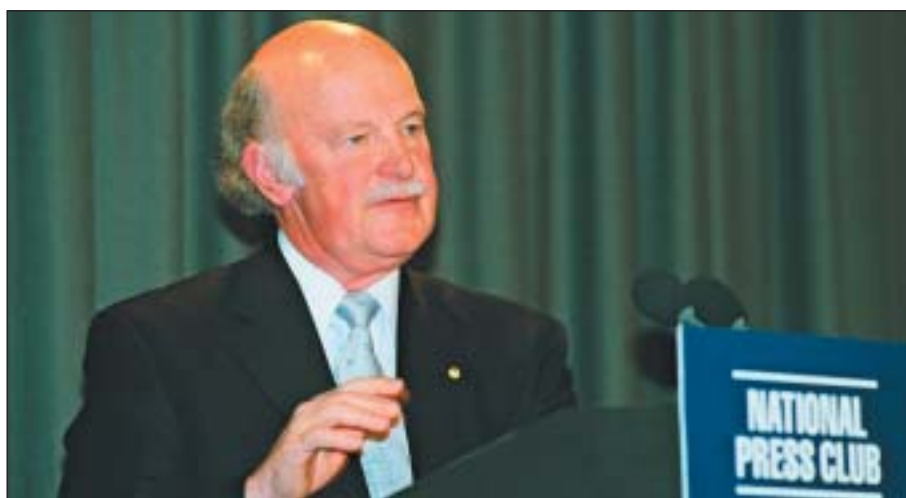
Last year was the 50th anniversary of the famous discovery of the structure of DNA by Watson and Crick. Since that seminal finding, progress has been exponential in understanding our fundamental genetic makeup.

When President Clinton and Prime Minister Blair announced the first draft of the complete human genome sequence in 2000 it was hailed as the pinnacle of 50 years of scientific endeavour.

Knowing the sequence of human genome has changed the way we do science. Previously, rigorous research was hypothesis-based, that is, a researcher would develop an hypothesis based on available evidence and then test it experimentally.

With the availability of the human genome database, it is now possible to spot gene sequences from each of the approximately 50,000 human genes onto a small silicon chip. I can then take a sample of breast cancer tissue and a sample of normal breast tissue, incubate them with the gene chips and see which genes have altered activity in the breast cancer sample, compared to the normal sample. I therefore make no prior assumptions about which gene or genes have gone wrong in development of this cancer and I can also identify new cancer-causing genes which were previously unknown. This so-called discovery approach is not limited by previous research.

Few issues in recent science have generated as much excitement and controversy as the potential use of stem



*Professor John Shine delivering the Academy's 4th Telstra Address.*

cells to treat disease. The hope is that, one day, it will be possible to grow some of your own skin or blood cells in culture, reprogram them to become new nerve or muscle cells, then re-implant them to replace cells lost to Parkinson's or Alzheimer's disease or heart failure or stroke or spinal cord injury.

It is this perception that humanity is at the threshold of reworking its own biology that troubles so many people.

Fear of the unknown is an important element of human nature. It is therefore

more critical today than ever that scientists work in partnership with the broader Australian community to share the vision of what a thriving science base and associated industries can create for our country.

At the same time we need to acknowledge, respect and address the very real concerns that many people have – not just about human genetics and stem cells, but also genetically modified foods and biotechnology in general.

## \$1.8 million for Science and Literacy Project

On 4 August the Commonwealth Minister for Education, Science and Training, Dr Brendan Nelson MP, announced that the Government would provide \$1.8 million to fund Stage 2 of the Academy's Primary Science and Literacy Project. This exciting initiative promises to break new ground in primary school education. Stage 1 involved collaboration with states, territories, independent schools, Catholic Education and professional associations

to develop a model for the project.

One hundred primary school teachers will take part in a national workshop in January before trialling the innovative curriculum resources in their schools early in 2005. The trial will be followed by Stage 3 - the full-scale development and implementation of the program.

The project builds on the Academy's long and successful track record in primary science education.

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Published by the Australian  
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ISSN 1031-9204

# Forum on measuring excellence

Problems with the formulas used to allocate funding to universities and research organisations have prompted Australian scientists and other researchers to pursue new ways of assessing the quality of research. The United Kingdom has a research assessment exercise and New Zealand has recently set up a new system to assess research performance.

On 22 June the National Academies Forum - a joint initiative of the four learned academies - held a symposium at the Shine Dome in Canberra to discuss the topic, *Measuring excellence in research and research training*. The symposium participants included scientists, scholars, administrators, research managers and policy makers from universities, research

organisations and government agencies.

The forum explored what a quality assessment framework should achieve and what it should avoid. There was talk of the need to build public confidence and industry interest in research and research training and reservations expressed about the use of counting publications and citations as measures of research quality.

The Commonwealth government will release a discussion paper on the subject later in the year. A transcript of the speeches and plenary discussion at the symposium and a summary of the issues raised in working groups is available at [www.science.org.au/proceedings/researchexcellence](http://www.science.org.au/proceedings/researchexcellence).

## Forthcoming events

- The Shine Dome Open House, 17 October. Contact [nd@science.org.au](mailto:nd@science.org.au).
- High Flyers Think Tank on Emerging Diseases. Customs House, Brisbane, 19 October. Contact [sp@science.org.au](mailto:sp@science.org.au).

## New topics on Nova

- Warmer and sicker? Global warming and human health.
- Biology meets industry — genomics, proteomics, phenomics.

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

## Award deadlines 2004

- Junior and senior 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.

See [www.science.org.au/awards](http://www.science.org.au/awards) for the conditions of each award and nomination forms.

## International exchanges

- The Academy invites applications for its next round of APEC Postdoctoral Fellowships in Science and Engineering.
- 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.
- 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/international/exchange/contscix.htm](http://www.science.org.au/international/exchange/contscix.htm) for application forms and selection criteria.

## Basser Library

Anyone wishing to use the Basser Library should contact Rosanne Walker on (02) 6247 9024 or [lb@science.org.au](mailto:lb@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) 6247 5777 or [es@science.org.au](mailto:es@science.org.au).

# The Academy celebrates its 50th AGM

Teachers and early-career researchers from around Australia attended special programs during the Academy's *Science at the Shine Dome* from 5 to 7 May 2004. They joined Academy Fellows at the new Fellows seminar, awards presentation, annual dinner and the symposium – *A celebration of Australian Science*. This symposium featured eight of Australia's top young scientists – all previous winners of the Malcolm McIntosh Prize for Physical Scientist of the Year or the Science Minister's Prize for Life Scientist of the Year. Proceedings are available at [www.science.org.au/sats2004/symposium.htm](http://www.science.org.au/sats2004/symposium.htm).

In his 50th Anniversary Address Academy President, Dr Jim Peacock, reflected on the role the Fellows of the Academy have played - and continue to play - in the scientific and everyday life of Australia. The transcript of his address is at [www.science.org.au/proceedings/2004anniversaryaddress.htm](http://www.science.org.au/proceedings/2004anniversaryaddress.htm).

The celebrations for the Academy's 50th Anniversary were a special feature of this year's event. The travelling exhibition – *Eureka moments! Highlights from 50 years of Australian science* – was launched at the National Museum of Australia and the Prime Minister, the Hon. John Howard MP, was the after-dinner speaker at the annual black tie dinner.

During the education workshop, teachers listened to a presentation from Professor Alan Trounson on stem cell research. They also shared ideas for including the information they had gained in their teaching. The young researchers, during a career development workshop, discussed media and communication skills and writing grant proposals. They also heard from two young researchers who had recently participated in the Academy's international exchanges program. Both the teachers and researchers responded positively to participating in the activities. Ann Thornton, the widow of Academy Fellow, Ian Thornton, attended the social program and kindly contributed the following report:

'It was with mixed feelings that I accepted the invitation to attend *Science at the Shine Dome*. I felt honoured to be invited, but also experienced a sense of regret at having been unable to attend with my late husband, Emeritus



The Prime Minister, John Howard, with Dr Jim Peacock at the Academy's annual dinner.



Chinese Embassy staff and social program participants.

Professor Ian Thornton. Sadly, he died in October 2002.

As well as the formal proceedings, a varied and imaginative social program had been organised by Mrs Margie Peacock for partners, wives and 'friends' of the Academy.

The program included visits to two of Canberra's Embassies: the Finnish Embassy with its minimalist approach to architecture, and the ornate but elegant Embassy of the Republic of China. At the latter we were entertained by a team of Embassy staff and their wives who were dressed in superb regional costumes. We joined in a resounding finale of *Click go the shears* (with words thoughtfully printed out in large script for the visitors!).

A guided tour of the CSIRO Discovery Centre included 'hands-on' experiences. This Centre with its sophisticated yet accessible exhibits would encourage the curiosity of any budding scientist. We were also

privileged to preview an exhibition of organza panels by the talented artist Julie Ryder.

Next we attended a lecture on stem cell research by Dr Patricia Ridgway, and one on recent findings in hormone replacement therapy by Dr Emily Banke.

Following lunch we were taken to an exhibition of recent works by internationally renowned artist, Jorg Schmeisser.

We also enjoyed the opening of *Eureka moments! Highlights from 50 years of Australian science*, with a forum hosted by ABC Science's Presenter, Robyn Williams.

The formal dinner was held in the spectacular Great Hall of Parliament House.

Congratulations to the Academy and to the Organising Committee in particular for a very successful meeting and thank you for the opportunity to attend.'

## News from our National Committees

On 29 April the **Chemistry Committee** met to discuss the *Future of chemistry: Review of the pathway to chemists-from education to employment in Australia*, a project of the Royal Australian Chemical Institute to be undertaken during 2004-2005. The Green Chemistry Symposium, to be held on 24 February 2005 at the Shine Dome, was also discussed.

In June, the Chair of the **Committee for Geography**, Professor Dave Gillieson, made a submission to the Alpine Grazing Taskforce (Victoria). It is on the Academy's website at [www.science.org.au/natcoms/geography-submission-june04.rtf](http://www.science.org.au/natcoms/geography-submission-june04.rtf).

At their meeting on 7 July the **History and Philosophy of Science Committee** continued their discussions on *World history of science online: Databases of bibliographical and archival sources*, an international project of the International Union of the History and Philosophy of Science, Division of History of Science. There was also discussion about the International Congress of the History of Science, to be held in Beijing in 2005.

The Electronic Geophysical Year (eGY), planned for 2007-2008, was discussed by the **Committee for Earth Sciences** at their meeting on 8 July. eGY will provide an impetus to geoscience similar to that provided by the International Geophysical year (IGY) in 1957-1958. The Committee also discussed Australian bids to host the International Union of Geodesy and Geophysics (IUGG) General Assembly in Melbourne in 2011 and the International Geological Congress (IGC) meeting in Brisbane in 2012.

Professor Peter Dyson, Chair of the **Committee for Space Science**, presented the 2002-2004 biennial report on space science activities in Australia to the 35th Scientific Assembly of the Committee for Space Research (COSPAR), held in Paris from 18-25 July. The report is at [www.science.org.au/natcoms/cospar2004.pdf](http://www.science.org.au/natcoms/cospar2004.pdf).

At their meeting on 22 July the **Committee for Earth System Science** discussed a proposal for a workshop on the detection and attribution of causes of trends in climate variables, to be held at the Shine Dome in late November.

Dr Ian Allison, Chair of the **Committee for Antarctic Research**,



**Back row (from left):** David Gillieson (Geography); Jim Denier (representing Theoretical and Applied Mechanics); TJ Higgins (Plant and Animal Sciences); Gerard Milburn (Physics and Spectroscopy); Allan Canty (Chemistry); Peter Dyson (Space Science); Ian Allison (Antarctic Research); Philip Kuchel (Biomedical Sciences); Bob Williamson (Medicine). **Middle row (from left):** Max Coltheart (Psychology); Ross McAree (Theory of Machines and Mechanisms); Bob Frater (Secretary, Physical Sciences); David Curtis (representing History and Philosophy of Science); Graeme Pearman (Sustainability); Mike Manton (Earth System Science); Ray Norris (representing Radio Science); John Chappell (Quaternary Research). **Seated (from left):** Bruce McKellar (Past Secretary, Physical Sciences); Rachel Webster (Astronomy); John Shine (Secretary, Biological Sciences); Jennie Brand-Miller (representing Nutrition).

attended the Scientific Committee on Antarctic Research (SCAR) Science Congress in Bremen from 26-30 July.

On 28 April the Academy held a meeting of the Chairs of the 22 National Committees for Science at the Shine Dome (see photograph); where

the national and international roles and responsibilities of the Committees were discussed. Committee Chairs are currently identifying the personnel, infrastructure and resource needs in their discipline areas, on a national basis.

### Wark Medal

Academy Fellow Professor Graeme Jameson has been awarded the 2003 Wark Medal. Professor Jameson, a chemical engineer from the University of Newcastle, invented a cell which uses flotation to remove oil, grease and suspended solids from industrial waste water and effluent.

The Ian Wark Medal and Lecture honour the contributions to Australian science and industry of the late Sir Ian Wark, a former chief of the CSIRO Division of Industrial Chemistry. The award recognises contributions to the prosperity of Australia attained through the advancement of scientific knowledge or its application.



Dr Jim Peacock presents the Wark Medal to Professor Graeme Jameson at an Academy Council lunch on 24 June.

# New members of Council



Michael Dopita



Leslie Field



Trevor McDougall



Lesley Rogers

Professor Michael Dopita is a member in the physical sciences. He is a Federation Fellow at the Research School of Astronomy and Astrophysics, Australian National University. His interests are in the physics of the interstellar medium, star formation, supernovae and active galactic nuclei. His major current project is on interstellar physics at the epoch of galaxy formation. Michael has an abiding interest in space missions and he currently sits on a NASA Scientific Oversight Committee, which is developing a new camera for the Hubble Telescope.

Professor Les Field is a member in the physical sciences. He is Professor of Organic Chemistry at the University

of Sydney and a Fellow of the Royal Australian Chemical Institute. His research is centred in the chemistry of organometallic compounds and chemical applications of NMR spectroscopy. He was founding chairman of ANZMAG (the Australian and New Zealand Society for Magnetic Resonance) and he is a member of the Senate of the University of Sydney.

Dr Trevor McDougall is a member in the physical sciences. Trevor is currently a Chief Research Scientist with CSIRO Marine Research. He is the foremost world authority on many aspects of oceanic mixing, discovering four new oceanic mixing processes and pioneering the concept of neutral surfaces along which strong

lateral mixing occurs. Through his discoveries, there has been a dramatic improvement in the ability of ocean models to simulate today's climate.

Professor Lesley Rogers is a member in the biological sciences. She is a Professor of Neuroscience and Animal Behaviour at the University of New England. She has made outstanding contributions to understanding brain development and behaviour, with a particular emphasis on hemispheric specialisation. Lesley represents the Australian Vice Chancellors' Committee on the Animal Research Review Panel.

## Lemberg Fellow

The 2004 Lemberg Fellow, Professor G Charles Dismukes, a chemist from Princeton University, USA, gave lectures in Brisbane, Sydney, Canberra and Melbourne in June and July.

Professor Dismukes helped discover the structure and means of assembly of the active manganese site where, during photosynthesis, plants produce oxygen from water. His study of the site has led to the development of bioinorganic catalysts that generate oxygen.

During his tour he presented two different lectures: one for a general audience on nature's renewable energy blueprint, the other for specialists on the biology and chemistry of the water-splitting enzyme and biomimetic catalysts. All the lectures were well attended.



Professor G Charles Dismukes. Photo: Jeff Wilson, Photography Unit, Research School of Biological Sciences, Australian National University.

Electronic copies of the general lecture are available from [tom.wydrzynski@anu.edu.au](mailto:tom.wydrzynski@anu.edu.au).

## International links

The Commonwealth has recently announced *Backing Australia's Ability - Building our Future through Science and Innovation*. As part of this package \$55.5 million over five years was announced to support international collaboration through the International Science Linkages (ISL) programme. This commitment to international science collaboration builds on and expands the funding provided through the Innovation Access Programme (IAP)-International Science and Technology (S&T).

To reflect this announcement the IAP-International S&T has been rebadged as the ISL programme. The Academy administers the International Science and Technology Networks (ISTN), a component of the ISL programme.

# New Fellows



Robert Antonia



Martin Banwell



Robert Bartnik



Robert Baxter



Matthew Colless



David Cook



Christopher Easton



Peter Forrester



Ian Frazer



Paul Haddad

Twenty of Australia's leading scientists were honoured on 25 March by election to the Academy. Election recognises a career that has significantly advanced, and continues to advance, the world's scientific knowledge. Generally, the Academy elects sixteen scientists each year to the Fellowship. In 2004, to commemorate its 50th Anniversary year, the Academy has elected an additional four Fellows.

## Professor Robert Antonia

*Professor of Mechanical Engineering in the School of Engineering at the University of Newcastle, New South Wales*

Robert Antonia's research on turbulence, the most common but least understood of fluid flows, has greatly improved our understanding of the flow of fluids over surfaces. He has made significant contributions to the field through the development of reliable, high quality measurements. His work is characterised by a deep appreciation of the mathematical difficulties of the subject, coupled with formidable experimental skills.

## Professor Martin Banwell

*Professor of Chemistry in the Research School of Chemistry at the Australian National University, Canberra*

Martin Banwell is distinguished for his diverse and innovative studies in the synthetic production of chemical compounds. He has developed new methods for the total synthesis of biologically active natural products. One such product is marine lamellarin K, an important compound in the development of novel anti-cancer agents. His approach to making natural products is used by many others, including pharmaceutical companies.

## Professor Robert Bartnik

*Professor of Mathematics in the School of Mathematics and Statistics at the University of Canberra*

Robert Bartnik is renowned internationally for the application of geometric analysis to mathematical problems arising in Einstein's theory of general relativity. His work is characterised by his ability to uncover new phenomena in space-time geometry, using elaborate numerical computations and sophisticated tools from partial differential equations. He has contributed greatly to our understanding of the Einstein equations and gravitation.

## Professor Robert Baxter

*Director of the Kolling Institute of Medical Research at the Royal North Shore Hospital, Sydney*

Robert Baxter is internationally acknowledged as a pioneer in the area of regulation of insulin-like growth factors (IGFs). His studies were central in characterising the protein complexes that transport IGFs, and in determining the regulation of the component proteins. His research has helped to elucidate the role of IGFs and their binding proteins in normal body growth and in the uncontrolled growth of cancer cells.

## Dr Matthew Colless

*Director of the Anglo-Australian Observatory in Epping, Sydney*

Matthew Colless' research has had a major impact in the fields of observational cosmology, galaxy and cluster evolution and the large-scale structure of the universe. His work has driven the development of multi-object spectroscopy in the new field of statistical astronomy. His leadership of the 2dF Galaxy Redshift Survey has firmly established the values of many key cosmological parameters, significantly advancing our understanding of the universe.

## Professor David Cook

*Professor of Cell Physiology, Epithelial Transport Laboratory, in the Department of Physiology at the University of Sydney*

David Cook is a leading international figure in ion transport research, especially in salivary gland epithelia. He has made important contributions to our understanding of the role of ion channels in exocrine gland function with his discovery that sodium channels are regulated by the intracellular, not extracellular, concentrations of sodium and chloride ions. He also characterised the molecular mechanisms underlying the regulatory systems.

**Professor Christopher Easton**

*Professor of Chemistry in the Research School of Chemistry at the Australian National University, Canberra*

Christopher Easton has made important contributions to two areas of chemistry. His work on biochemical reaction mechanisms has established ground rules to explain metabolic processes and control physiological disorders. In the area of supramolecular chemistry and molecular recognition, he has shown how molecular hosts can be constructed to control chemical processes and produce novel catalysts and agents for the administration of pharmaceuticals.

**Professor Peter Forrester**

*Professor and ARC Professorial Fellow in the Department of Mathematics and Statistics at the University of Melbourne*

Peter Forrester is a world expert on random matrix theory. He has successfully applied the theory of Painlevé equations to the topic of random matrix theory, with its relevance to the statistical analysis of large data sets. He has earned international recognition among mathematical physicists for his novel use of mathematical theories to provide the solution of difficult problems in statistical mechanics.

**Professor Ian Frazer**

*Director of the Centre for Immunology and Cancer Research at the University of Queensland*

Ian Frazer is a leading authority in the field of human papillomavirus vaccines. He has used virus-like particles to generate a prophylactic vaccine against human papillomaviruses, the major causative agent of human cervical cancer. This vaccine has shown 100 per cent efficacy in international clinical trials. He has also developed a therapeutic vaccine for cervical pre-cancer which is in clinical trial.

**Professor Paul Haddad**

*Professor of Chemistry and Deputy Head of the School of Chemistry at the University of Tasmania*

Paul Haddad has a distinguished career in the development and application of methods for the separation of inorganic ions. His work includes the application of separation techniques to foods, pharmaceuticals and trace metals. He was the first person to derive reliable mathematical models to describe the separation of ions in a variety of ion-exchange and electrophoretic systems.

**Dr T J Higgins**

*Deputy Chief of CSIRO Plant Industry*

T J Higgins has made distinguished contributions to basic science which have led to a range of applications in agriculture. He is internationally recognised for his contributions to our understanding of the biology and molecular genetics of the storage proteins formed in developing seeds and the regulation of expression of their genes. His studies provided the basis for generating transgenic crops.

**Dr Douglas Hilton**

*Principal Research Fellow at the Walter and Eliza Hall Institute of Medical Research, Melbourne*

Douglas Hilton has made seminal discoveries toward understanding the molecular genetic regulation of

blood cell formation. He purified the cytokine Leukaemia Inhibitory Factor (LIF), and showed that it suppressed the differentiation of embryonic stem cells. His discovery of a novel family of proteins, the suppressors of cytokine signalling, spawned an entirely new field of research concerned with the attenuation of signal transduction.

**Professor Richard Hobbs**

*Professor of Environmental Science and Deputy Head of the School of Environmental Science at Murdoch University, Perth*

Richard Hobbs is at the forefront of developments in conservation biology, landscape ecology and restoration ecology. His major contribution is in the synthesis of disparate influences and their application to the pressing environmental problems we face today. He is an international leader who gives direction to the discipline of ecology and promotes the effective communication of ecology to broader audiences.

**Professor Ary Hoffmann**

*Professor of Genetics and Director of the ARC Special Research Centre (Centre for Environmental Stress and Adaptive Research – CESAR) at La Trobe University, Melbourne*

Ary Hoffmann's research has led to major advances in understanding how stressful periods influence the rate of evolution, and how insects adapt to stressful conditions. He has made seminal contributions to the study of *Wolbachia* endosymbionts in insects, including the discovery of *Wolbachia* infections in *Drosophila*. He is regarded as a leader in evolutionary biology, particularly in the application of evolutionary principles to applied problems.

**Professor Rao Kotagiri**

*Professor of Computer Science and Head of Computer Science and Software Engineering at the University of Melbourne*



T J Higgins



Douglas Hilton



Richard Hobbs



Ary Hoffmann



Rao Kotagiri

## New Fellows

Rao Kotagiri is internationally known for his contributions in the area of database systems. His work on optimal multi-dimensional indexing techniques and query optimisation techniques for database systems is particularly important. Under his leadership a deductive database system has been developed. His work in machine learning and data mining has resulted in superior algorithms for computer science.

### Professor Malcolm McCulloch

*Professor of Environmental Geochemistry and Geochronology in the Research School of Earth Sciences at the Australian National University, Canberra*

Malcolm McCulloch has made important contributions to our understanding of the contemporary environment as well as to the field of geochemistry in Earth science. The common theme of his research has been the innovative use of isotopic and trace element geochemical techniques to address important questions in the Earth sciences, such as how river flood plumes have impacted coral reefs.

### Professor David Smyth

*Professor in the School of Biological Sciences at Monash University, Melbourne*

David Smyth is an internationally recognised scientist who has made important contributions to the area of genetic and molecular basis of reproductive development in plants. He has discovered genes that control the identity of floral organs, and has cloned genes that regulate carpel and ovule development. One of these genes encodes the founding member of a new family of transcription factors.

### Professor Robert Vincent

*Personal Chair in Physics at the University of Adelaide*

Robert Vincent is well known internationally for his fundamental studies into physical processes in the atmosphere, especially for his work on gravity waves. He is a leader in the development and application of ground-based radars for studying the dynamics of the atmosphere. His work provides insights into how physical

processes in the upper atmosphere influence our climate.

### Professor Malcolm Walter

*Director of the Australian Centre for Astrobiology in the Department of Earth and Planetary Sciences at Macquarie University, Sydney*

For the past 25 years Malcolm Walter has been the world's foremost authority on stromatolites and a leading expert on the geological record of Earth's earliest biosphere. He has gathered the geological evidence for the first microbial ecosystems in sediments and in hydrothermal environments. These studies led to models of ore genesis and to strategies for the exploration of Mars.

### Professor Marelyn Wintour-Coghlan

*NHMRC Senior Principal Research Fellow in the Department of Physiology at Monash University, Melbourne*

Marelyn Wintour-Coghlan is widely respected for her work in the area of fetal endocrinology and developmental physiology. She has made major contributions to the study of the development of fetal kidneys and adrenal glands, and to the study of the control of fetal fluid and electrolyte balance. Most recently her contributions have been in the area of the fetal origins of adult disease.

## Special Elections

This year the Academy has made Special Elections of 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 Nancy Millis

*Emeritus Professor in the Department of Microbiology and Immunology at the University of Melbourne*

Nancy Millis has rendered conspicuous service to the cause of science with an outstanding career in microbiology, science education and science administration. She played a critical role in ensuring public confidence in the regulation of Australian recombinant DNA research as Chairman



Malcolm McCulloch



David Smyth



Robert Vincent



Malcolm Walter



Marelyn Wintour-Coghlan



## New Corresponding Members

A Corresponding Member is a person who is eminent in respect of scientific discoveries and attainments but is not normally resident in Australia. No more than two Corresponding Members can be elected in any one year.



Nancy Millis



John Ralph

of the Commonwealth Government Recombinant DNA Monitoring Committee. This committee was replaced by the Genetic Manipulation Advisory Committee, which she also chaired. It is no exaggeration to state that the Australian community's confidence that appropriate checks and balances are in place to regulate scientific research is in large part due to the contributions of Nancy Millis.

### Mr John Ralph

*Chairman of the Commonwealth Bank of Australia, Melbourne*

John Ralph has been Chairman of the Australian Foundation for Science since 1994. During this time he has been actively involved in fundraising for Foundation projects. Most notably, he secured two significant sponsorships for the Academy's *Nova: Science in the news* website. Recently, he has established a group of influential Australians who have agreed to act as supporters of the Academy. He has a deep appreciation of the contributions of science and innovation to industry in Australia and elsewhere. In 2002 he was awarded the Grand Cordon of the Order of the Sacred Treasure by the Emperor of Japan.



### Professor John S Boyer

E I Dupont Professor of Marine Plant Biochemistry/Biophysics and Professor of Plant and Soil Sciences, College of Marine Sciences, University of Delaware, USA



### Professor Gunnar Öquist

Secretary-General of the Royal Swedish Academy of Sciences and Professor of Plant Physiology, Umeå University, Sweden

## International news

### Malaysia and Singapore

Professor Kurt Lambeck represented the Academy at the Council meeting of the Federation of Asian Scientific Academies and Societies (FASAS), which was hosted by the Academy of Sciences Malaysia in Kuala Lumpur on 17 June. The meeting was held in conjunction with the International Conference on Science and Mathematics Education 2004. A brainstorming session to discuss FASAS projects was held on the following day, where Professor Lambeck gave a presentation on science education in Australia and the Academy's *Primary Investigations* program.

While in Kuala Lumpur, Professor Lambeck met with Dato Lee Yee Cheong, the immediate past President of the Academy of Sciences Malaysia, to discuss FASAS and other international issues.

On 22 June Professor Lambeck met with Professor Lee Seng Luan in Singapore. Professor Lee is the Vice-President of the Singapore Academy of Science, an umbrella organisation for scientific societies in Singapore responsible for international relations. The Singapore Academy hopes to participate in regional science issues, either through FASAS or individual links.

### China

The Academy's Foreign Secretary, Professor Bruce McKellar, met with the Vice-President of the Chinese Academy of Sciences, Professor Chen Zhu, on 20 July in Beijing, to follow up on the visit by the President of the Chinese Academy, Professor Yongxiang Lu, to Australia in November 2003, and to discuss the forthcoming China-Australia Workshop on Sustainability to be held in Melbourne from 17 to 19 October. Professor Chen will lead the Chinese delegation to Australia. This will be the first in a series of workshops being funded by the Department of Education, Science and Training, the Chinese Academy of Sciences and the National Science Foundation of China.

### USA

The nineteen students selected by the US National Science Foundation (NSF) to travel to Australia between 23 June and 18 August 2004 under its 'East Asia and Pacific Summer Institutes for US Graduate Students' program visited the Academy for a 3-day orientation from 23–25 June. The program allows American students to conduct research in Australian laboratories and to initiate personal relationships with their Australian counterparts.

Participants in the inaugural program come from a variety of

## International news

research areas. They were hosted by various institutions including universities, CSIRO divisions, museums, and Cooperative Research Centres around Australia. The host institutions provided the students with office accommodation, access to laboratory, library and computing facilities, access to major equipment and special apparatus, as well as technical assistance and the time and expertise of the host researcher.

During their 3-day orientation program the students visited the National Botanic Gardens, CSIRO's Discovery Centre, and Question Time at Parliament House. They met the President of the Academy, Dr Jim Peacock, the Minister for Science, Peter McGauran, and US Ambassador, Tom Schieffer.

This project is proudly supported by the *International Science Linkages* programme, established under the Australian government's innovation statement *Backing Australia's Ability*, for a period of three years.

### Taiwan

The second Australia-Taiwan Conference on Higher Education was held on 7-8 July in Taipei, followed by the Australia-Taiwan Bilateral Science and Technology meeting on 9 July. The science and technology meeting provided an opportunity for each country to update the other on developments in Australian and Taiwan government science policy. The meeting then explored priority areas for collaboration, including nanoscience and nanotechnology; and biotechnology, including food science, hearing devices and bioinformatics. Strategic links between Australia and Taiwan were discussed, including co-development and access to science infrastructure, APEC projects, international science and technology exchanges and bilateral workshops. Professor Kuan-Ching Lee, from Canberra's Taipei Economic and Cultural Office in Canberra, and Professor Sue Serjeantson, the Academy's Executive Secretary, outlined for the meeting the reciprocal exchange program for researchers that has been operating since 1992.

Under this program researchers can visit their colleagues in Australia and Taiwan for up to six weeks to undertake a collaborative research project, or a specific activity, which has



Nancy Pritchard, International Programs Manager (far right), with visiting US graduate students on a chilly Canberra day.



Members of the Australian delegation to the Australia-Taiwan Conference on Higher Education with Dr Maw-Kuen Wu, Minister of National Science Council. From left: Professor Di Yerbury, Vice-Chancellor of Macquarie University; Dr Ian Smith, Executive Director of the Australian Nuclear Science and Technology Organisation; Professor Sue Serjeantson; Dr Wu; Dr Wendy Jarvie, Deputy Secretary of the Department of Education, Science and Training; Ms Frances Adamson, representative of the Australian Commerce and Industry Office in Taiwan.

been developed in consultation with host scientists.

An Australian researcher who recently visited Taiwan under this program was Associate Professor Richard Huggins of the Department of Statistical Science at La Trobe University, who visited the National Tsing-Hua University in Hsin-Chu; Feng-Chia University in Taichung; and the Institute of Biomedical

Sciences at Academia Sinica in Taipei. The visit allowed him to begin new collaborations with Taiwanese researchers in the area of statistical genetics, and analysis of capture-recapture data. Associate Professor Huggins also discussed the modelling of the recent SARS epidemic with his colleagues in the Department of Applied Mathematics at National Chung-Hsing University in Taichung.

# Deaths

## John Cowley



John Maxwell Cowley was born in South Australia on 18 February 1923 and died in Arizona in the USA on 18 May 2004. He was educated at the University of Adelaide, where he obtained an MSc in 1945 and a DSc in 1957, and the Massachusetts Institute of Technology, which awarded him a PhD in 1949.

He began his career at CSIRO Section (later Division) of Chemical Physics as an Assistant Research Officer and rose by stages to become Chief Research Officer and Head of the Crystallography Section. In 1962 he was appointed Chamber of Manufactures Professor of Physics at the University of Melbourne. He left Australia in 1969 to take up the position of Galvin Professor of Physics at Arizona State University (ASU) and remained there for the rest of his career, becoming Director of the ASU Facility for High Resolution Electron Microscopy in 1983 and Regents Professor, an honour reserved for those who have demonstrated exceptional scholarship and outstanding achievements, in 1988. He retired in 1994.

His pioneering work on high-resolution electron diffraction and structure analysis included the initiation and development of single-crystal structure analysis; the development of a theory involving the direct imaging of atomic crystal structures and structural defects, which considerably advanced the theory of electron scattering; and the discovery, interpretation and realisation of the significance of the

then new optical phenomenon of Fourier images. Some of this work, which was done in collaboration with A F Moodie FAA, was recognised 30 years later when the two were the first recipients of the International Union of Crystallography's Ewald Prize in 1987 for outstanding contributions to the science of crystallography.

Cowley also received a number of other honours. Early in his career he shared the Edgeworth David Medal of the Royal Society of New South Wales and the Research Medal of the Royal Society of Victoria. He was elected to Fellowship of the Academy in 1961 and the Royal Society in 1979. After his move to the USA he was honoured by the American Crystallographic Association with the Bertram Eugene Warren Award in 1976 and became a Fellow of the American Physical Society in 1984.

Contributions to his profession included three years as Director of the Electron Microscopy Society of America. He was also active in the international sphere, co-editing *Acta Crystallographica* from 1971 to 1980 and serving as a member of the Commission on Electron Diffraction of the International Union of Crystallography for 12 years, the final three (1987-90) as Chairman.

He is survived by his wife Roberta, daughters Jillian and Deborah, and two grandchildren.

## Brian Robinson



Brian John Robinson was born in Melbourne on 4 November 1930 and died on 22 July 2004. He was educated

at the Universities of Sydney (BSc (Hons) 1952, MSc 1953) and Cambridge (PhD 1958).

He began his career as a research officer at the CSIRO Physics Laboratory. In 1954 he went to the United Kingdom as a Rutherford Scholar of the Royal Society, and from 1958-61 worked as a visiting scientist at the Netherlands Foundation for Radio Astronomy, Leiden. In 1962 he returned to CSIRO as a Senior Research Scientist at the Radiophysics Laboratory and moved steadily upwards, serving as Director of Research at the Australian National Radio Astronomy Observatory Parkes from 1971 to 1979 and as Head of the Millimeter-Wave Facility at Epping from 1980 to 1987. He retired from the Division of Radiophysics in 1995.

Robinson made distinguished contributions to radio astronomy and was a pioneer and leader in two separate fields: the technical development of very sensitive receivers (both masers and parametric amplifiers) required for the detection of extremely weak radio signals; and the exploration of the galaxy by means of the emission and absorption of spectral lines in the microwave spectrum. He was especially noted for his studies of the maser-like emission and absorption of radiation by hydroxyl molecules near the galactic centre and in interstellar space. Later in his career his research also embraced satellite navigation systems.

A number of awards and honours came his way. He was elected to the Fellowship of the Australian Academy of Science in 1974, the year in which he also received the Walter Burfitt Medal of the Royal Society of New South Wales. He was also made a Fellow of the Royal Astronomical Society and the Australian Institute of Physics. He was active in the international sphere, where he was a Council Member of the International Scientific Radio Union (URSI) 1975-80; Chairman of the Working Group on Protection of Molecular Line Frequencies, International Astronomical Union (IAU) 1976-1994; and Chairman of the Inter-Union Commission on Allocation of Frequencies (IUCAF) 1987-1995.

He is survived by his wife Jill, his son Anthony and his stepchildren Peter and Mandy.

# No optimal population for Australia

Professor Tony McMichael, a world-renowned epidemiologist, told a recent Academy conference, 'There is no simple, bottom-line, optimal population size for Australia – the issue is too complex.' He said that 'viewed anthropocentrically, the real bottom line in the population-environment debate is our current and future well-being and health'.

Professor McMichael was speaking at the 2004 Fenner Conference on the Environment, *Understanding the population-environment debate: bridging disciplinary divides*, which was held at the Shine Dome on 24 and 25 May. It was part of the Academy's 50th Anniversary celebrations.

The conference highlighted the differences between disciplines and the need to bridge them to solve problems of demographic change and environmental quality.

The conference patron, Professor Frank Fenner, took a personal interest in the program for the conference. He said, 'The issue must be addressed within a long time-frame, which extends well beyond the usual horizons of social and political decision-making.'

Speakers included Professor Julie Thompson Klein, an expert on interdisciplinary studies from the USA; Professor Bob Wasson and Dr Barney Foran, environmental systems experts; Professor Graeme Hugo, a migration



Professor Julie Thompson Klein with Dr Jim Peacock (left) and Professor Frank Fenner.

expert; and two political strategists, Mr Lynton Crosby and Mr Bruce Hawker.

A panel session on the influence of the news media on the debate included Ms Laura Tingle from the *Australian Financial Review*, Mr Paul Kelly from *The Australian* and Mr Peter Garrett, formerly of the Australian Conservation Foundation.

There was resounding consensus from the conference delegates that the population-environment issue is

central to the urgent question of how to achieve a socially and ecologically sustainable future for Australia.

The Australian National University and the Australian Government Department of Agriculture, Fisheries and Forestry were major sponsors of the event.

The proceedings from the conference are available at [www.science.org.au/proceedings/fenner](http://www.science.org.au/proceedings/fenner).

## Honours to Fellows

Two Fellows have been elected as Fellows of the Royal Society. Professor Graeme Clark, Royal Victorian Eye and Ear Hospital, for research involving neuroscience, auditory perception and speech science, culminating in the development of the 'bionic ear'; and Professor David Solomon, University of Melbourne, for research involving polymer science and technology.

Two Fellows have been awarded Australian Research Council Federation Fellowships. Professor Richard Brent, Oxford University, for research into computer science; and Professor Ary Hoffmann, ARC Special Research Centre (CESAR), for research into population and ecological genetics.

Professor Suzanne Cory, Walter and Eliza Hall Institute of Medical Research, has been appointed a member of the Pontifical Academy of

Science, whose aim is to promote the progress of the mathematical, physical and natural sciences and the study of related epistemological problems.

Professor Brian Kennett, Australian National University, has been awarded a Humboldt Research Award for study in Germany at the University of Munich.

Professor Lesley Rogers, University of New England, was awarded the Royal Society of NSW's 2003 Clarke Medal (Zoology) at the Society's annual dinner in March.

Professor Erich Weigold, Australian Research Council, has been honoured by the Australian National University with the official opening on 2 July of the Erich Weigold Building. The new building will provide three floors of lab space for the Research School of Physical Sciences and Engineering.

## Queen's Birthday honours

Emeritus Professor Athel Beckwith was appointed an Officer of the Order of Australia (AO) 'for service to science in the field of organic chemistry as a leading researcher and academic, and through the provision of advice to government and the wider community on scientific matters'.

Professor Frederick Mendelsohn, Howard Florey Institute of Experimental Physiology and Medicine, was also appointed an AO 'for service to medicine, particularly in the fields of neuroscience and biomedical research as a leading researcher, administrator and practitioner'.