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Annual symposium on life, the universe and everything

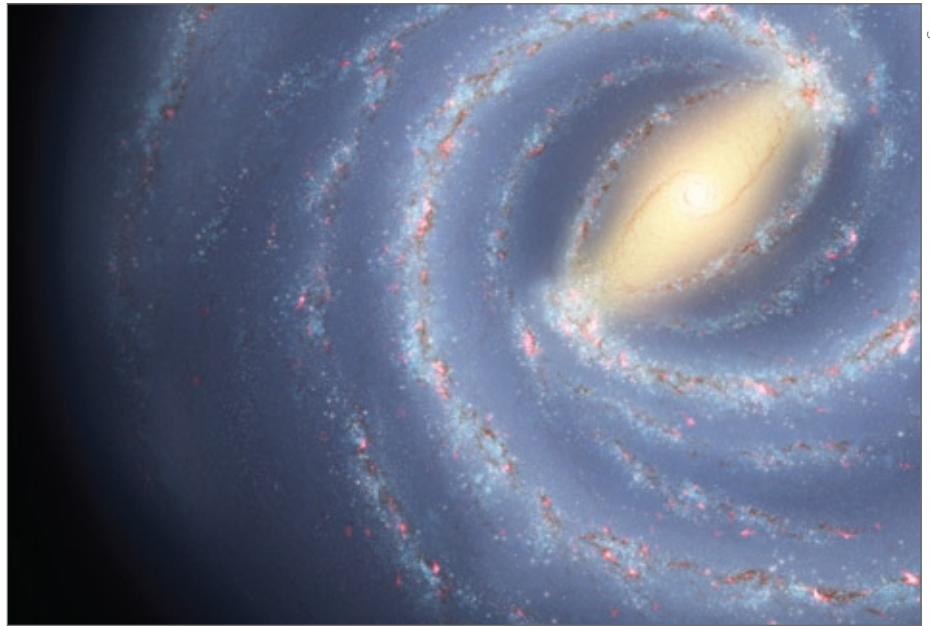
This year, as a tribute to the inspiration provided by the work of two giants of science, Galileo and Darwin, the Academy's annual *Science at the Shine Dome* symposium on 8 May was dedicated to evolution – of the universe as a whole, planets as homes for life, life itself, and thought.

This year is the 200th anniversary of Darwin's birth; the 150th anniversary of the publication his landmark book, *On the origin of species*; 400 years since Galileo founded modern astronomy by turning a telescope to the sky; and the International Year of Astronomy.

The morning session began with keynote speaker Professor Mike Turner from the Kavli Institute for Cosmological Physics at the University of Chicago. He set the scene for an exciting program that included three overseas speakers. He said cosmology is a young science, powered by ideas and instruments, and that the last 30 years have dramatically improved our knowledge of the universe as well as refined our understanding of its origin and evolution. He took the audience on a tour of the universe, to experience events such as the big bang; the discovery of cosmic background radiation; subatomic quantum fluctuations in the early universe; formation of subatomic particles; the instruments that have played a role in significant discoveries about the universe; the discovery of the accelerating nature of the universe expansion; and posing big questions about how much more there is yet to discover about the universe.

Other speakers at the morning session were Dr Tamara Davis from the Department of Physics at the University of Queensland talking about the evolution of physical law; concluding that the theory that supplants general relativity and the standard model of particle physics may indeed show that much of what we believe is constant is actually mutable. The Anglo Australian Observatory's Professor Matthew Colless FAA then used spectacular images to show the evolution of structure in the universe.

This was followed by a session on the evolution of planets, with Professor Chris Tinney of the Department of Astrophysics and Optics at the University of New South Wales on the identification of Earth-like planets with favourable conditions to support



Evolution of galaxies, like our own Milky Way (artist's impression), was one of the topics for the annual symposium

Image: NASA/JPL-Caltech

life. Professor Malcolm Walter FAA of the Australian Centre for Astrobiology at the University of New South Wales then spoke about the evidence for early life on Earth and the search for life on Mars.

The second international speaker on the program was Professor Euan Nisbet from University of London, UK, who declared his personal links with the Darwin family before discussing the role of biochemical reactions performed by early life forms in 'warm little ponds' in the creation of an atmosphere on Earth, and their influence on climate cycles through the phases of Earth's history.

The afternoon session moved on to the evolution of life, beginning with the third international speaker for the day, evolutionary biologist and author Dr Olivia Judson from Imperial College, London, who said that the diversity of life we have on Earth helped to shape the planet. Organisms have altered the atmosphere, the seas, the rocks. Humans, too, have been moulded and evolved by other living beings. She also provided examples of sexual selection in a variety of species. However she says that there are some sobering implications for this interconnectedness, namely the extent to

(continued on page 12)



The classic example of the result of sexual selection, the peacock

Photo: Stockport

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Telephone: (02) 6201 9400
Fax: (02) 6201 9494

Email: aas@science.org.au

Honorary editor:
Professor Neville Fletcher FAA

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Honours to Fellows

Academy President Professor Kurt Lambeck has been elected as a foreign associate to the US National Academy of Sciences.

Fellows of the Royal Society

Professor Chris Goodnow, John Curtin School of Medical Research at the Australian National University, was elected for 'research to solve problems of immunity, particularly autoimmune diseases.'

Professor Jeff Ellis, Genetic Engineering for Plant Improvement at CSIRO Plant Industry, was elected for 'research into applying molecular biology to improve disease and pest resistance in crops.' ■



Kurt Lambeck

Photo: © Irene Dowdy

Important dates

10–12 June: *Asia-Pacific Seminar on Chemical Safety and Security to Counter Terrorism*. Shine Dome, Canberra.

21–24 June: Sir Mark Oliphant Conferences - International Frontiers of Science and Technology, *Nanophotonics down under: Devices and applications*. Melbourne Convention Centre. www.smonp2009.com/

7 July: Public lecture on the theme of tidal energy by Dr Tim Finnigan, CEO of BioPower Systems. 5.30–7.00 pm, Shine Dome, Canberra. Please contact savita.khiani@science.org.au or call 02 6201 9462.

13 August: Public lecture *Salt in the diet: The elephant in the room: Why health professionals need a shake-up* by Dr Bruce

Neal, George Institute for International Health. 4–5 pm, George Institute for International Health (Westpac Building), Sydney.

24–25 August: *Nuclear astrophysics in Australia*, 2009 Elizabeth and Frederick White Research Conference. Shine Dome, Canberra. www.cspa.monash.edu.au/activities/white-conference/index.html

9 September: National Press Club Address by Academy President Professor Kurt Lambeck. National Press Club, Canberra.

1 October: Shine Dome open day. Canberra.

Academy participation in *Science Meets Parliament*

The Academy nominated five early-career researchers to participate in the annual *Science Meets Parliament* event, held on 17 and 18 March and organised by the Federation of Australian Scientific and Technological Societies.

The nominees were: Dr Sandra McLaren, University of Melbourne; Dr Stephen Eggins, Australian National University; Ms Alison Laing, CSIRO; Dr Aurore Delaigle, University of Melbourne; and Dr Julie McMullen, Baker IDI Heart and Diabetes Institute.

The first day was a briefing session on the following day's events, and the second included a breakfast forum, question time, scheduled meetings with two parliamentarians and lunch attendance at the National Press Club Address.

The event provided an insight into the process of policy making, the competing interests of different groups, and how to make the science message relevant to journalists, politicians and

their advisers. Those who attended the sessions discovered ways to get the science message heard, ways to become more involved in the science policy process, and gained confidence in interactions with politicians and the media. The opportunity to meet and network with other scientists throughout the event was an unexpected benefit. Participants said it was a great personal and professional development opportunity and would recommend it to other early-mid career scientists. ■

Science at the Shine Dome 2009 – a celebration of science

The Academy held the annual *Science at the Shine Dome* event from 7 to 9 May. Academy Fellows and the President, Professor Kurt Lambeck, were joined by newly-elected Fellows and Academy award winners. Other participants included early-career researchers and award-winning science teachers, as well as representatives from a range of organisations interested in the Academy's activities.

New Fellows

The morning session on Wednesday 6 May began with Professor Bruce McKellar FAA delivering the Matthew Flinders Lecture. The rest of the day comprised short talks by 15 of the newly-elected Fellows about their research. New Fellows were formally admitted to the Academy and signed the Charter Book the following day (see pages 6 and 7 for more on the new Fellows). The New Fellows Seminar and Bruce McKellar's lecture will be available on DVD. For more information contact Sharon Abrahams on 02 6201 9415 or sharon.abrahams@science.org.au

Dome 50th anniversary celebrations

On Wednesday 6 May in 1959, the dome was officially opened by the Governor-General Field Marshall Sir William Slim, providing headquarters for the Academy and secretariat. The anniversary of this event was celebrated with champagne and canapés, and the cutting of a dome-shaped cake by Professor John Shine FAA. The master of ceremonies was Professor David Curtis FAA. The first speaker for the evening was Professor Frank Fenner FAA who was elected to the Academy in 1954. The author of an upcoming book documenting the first 50 years of the dome, Dr Alan Roberts, entertained the audience with anecdotes uncovered whilst researching for the book. Professor Kurt Lambeck FAA also spoke about what the dome headquarters means to the Academy today.

Award winners

On Thursday 7 May, recipients of the Academy's 2009 early-career awards were each presented with their medal and gave a presentation on their research.

The 2008 and 2009 Fenner medallists were Dr Michael McCarthy from the



Frank Fenner with Sean Connolly and Michael McCarthy, the 2009 and 2008 Fenner medallists

University of Melbourne and Associate Professor Sean Connolly from James Cook University, respectively. Michael discussed approaches to the allocation of conservation resources by environmental managers and Sean talked about the importance of maintaining biodiversity, particularly for coral reefs.

The Ruth Stephens Gani Medal was presented to Dr Marnie Blewitt, Walter and Eliza Hall Institute of Medical Research, for research on the epigenetics of X-inactivation and the control of stem cell function. In her talk she raised the possibility that the presence of the inactive X chromosome in females, rather than the absence of the Y chromosome, accounts for some of the differences between the sexes.

Dr Carola Vinuesa from the Australian National University received the Gottschalk Medal for research on the regulation of the immune system and the causes of autoimmune diseases. Carola discussed how autoantibodies cause or contribute to autoimmune diseases such as lupus, type 1 diabetes and rheumatoid arthritis.

Dr Daniela Rubatto, also of the Australian National University, received the Dorothy Hill Award for research. In her presentation she discussed a method that uses small-scale chemical and isotopic measurements of minerals found in crustal rocks that relates their age to the pressure and temperature experienced during their formation.

The Moran medallist, Dr Melanie Bahlo of the Walter and Eliza Hall Institute of Medical



John Shine cuts the dome cake at the 50th birthday celebrations

Research, described research in which she used a combination of genetics and statistical analysis of data from genomic sequencing to identify a gene responsible for action myoclonus–renal failure (AMRF) syndrome, a rare, deadly, recessive genetic disorder.

The Pawsey medallist, Dr Stuart Wytke from the University of Melbourne, described the contribution that the joint Australian–US–Indian project known as the Murchison Widefield Array will make to our understanding of the likely structure of the early universe when the first galaxies were formed.

Science at the Shine Dome 2009 – a celebration of science

Teachers and early-career researchers

While Fellows of the Academy attended the Annual General Meeting on the afternoon of Thursday 7 May, teachers and early-career researchers participated in a separate program of activities.

Each year the Academy makes available an award for a science teacher from each state and territory to attend *Science at the Shine Dome*. The teachers who win the awards are very appreciative of the opportunity to hear about the latest developments in many different areas of science. This year their program included a workshop at Canberra Deep Space Communication Complex. Aligning with the symposium topic *Evolution of the universe, the planets, life and thought*, the group were able to find out about the latest developments in the exploration of space and strategies for teaching students about the universe. Teachers also received posters, evolution resources and CDs to use in their classrooms.

The feedback obtained from the teachers about their experience at the event was positive. Comments included:

As far as my science professional learning – by far the best opportunity I have ever had!

My personal and professional development will be invaluable in my classroom – incorporating the current work into my chemistry, physics and astronomy lessons and providing students with insights into the potential/possibility for their futures.

I enjoyed meeting teachers from other states. Our professional conversations were excellent. The early career researchers were animated about their research and I found it interesting.

Thankyou for the opportunity and privilege to enjoy the company of those whose task it is to uphold and to advance the tenets of Australian science: I found the 3 days humbling and simultaneously uplifting, to be recognised as part of Australia's scientific community.

The teacher award and conference have been a high point in my teaching career.

The Academy once again welcomed over sixty enthusiastic early-career researchers to *Science at the Shine Dome*. From a diverse range of disciplines, these scientists attended all the seminars as



Recipients of the 2009 career awards at Parliament House: (L to R) Malcolm McCulloch, Leonard Lindoy, Norman Dancer and Victor Flambaum

well as some specific career development workshops. Adjunct Professor Julian Cribb from the University of Technology Sydney presented a workshop, *Scientists and the media*. He shared his experience about what journalists want from scientists, how to effectively communicate with the media, some do's and don'ts, writing media releases and other tips with the early-career researchers. An alternative workshop was run by Professor Simon Gandevia FAA, Prince of Wales Medical Research Institute, which challenged the researchers' thinking by pointing out the cognitive errors that humans make unconsciously.

The Academy thanks the ARC and NHMRC who generously sponsored nine early-career researchers to attend *Science at the Shine Dome*. Other early-career researchers at the event were the nominees to attend the 2009 meeting of the Nobel laureates in Lindau (see page 8).

Annual dinner

The social highlight for all Fellows and guests was the annual black tie dinner at the Great Hall, Parliament House. The guest of honour at the dinner was Chief Scientist for Australia Professor Penny Sackett.

In a departure from previous years, awards were presented to, and short presentations were given by, the career awardees for scientific excellence at the annual dinner. The Matthew Flinders Medal was presented to Professor Bruce McKellar FAA from the University of Melbourne for research in particle physics, including weak interactions in the nucleus. The David Craig Medal was presented to Emeritus Professor Leonard Lindoy FAA of the University of Sydney for research on the chemistry of molecular recognition and the extraction of metal ions from mixtures. Professor Norman Dancer FAA, University of Sydney, was presented with the Hannan Medal for research in nonlinear analysis and nonlinear differential equations. For the study of the impacts of environmental change on coral reefs, such as nutrient fluxes into the ocean and increasing ocean acidity due to higher atmospheric carbon-dioxide, Professor Malcolm McCulloch FAA from the Australian National University was presented with the Jaeger Medal. The Thomas Ranken Lyle Medal was presented to Professor Victor Flambaum FAA from the University of New South Wales for research on the violation of fundamental symmetries and unification theories of elementary particles. ■

International news

InterAcademy Council

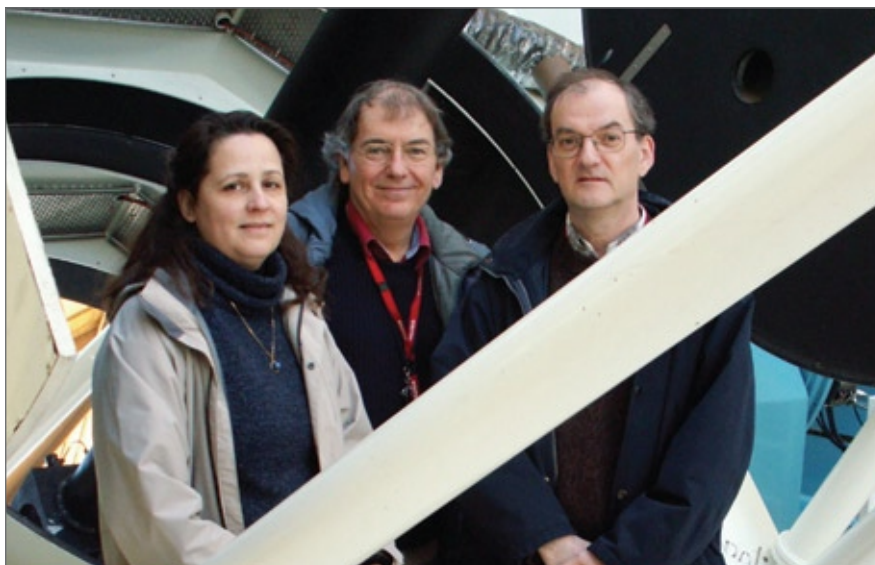
Professor Kurt Lambeck has been elected to the board of the InterAcademy Council (IAC) from 2009 to 2013. Created in 2000, the IAC mobilises the best researchers across the globe to advise international bodies such as the United Nations and the World Bank. The IAC recently released the reports *Women for science* and *Lighting the way: Toward a sustainable energy future*. Current important issues for the IAC are emerging infectious diseases and water supply and quality.

The governing board of the IAC has also elected Professor Robbert Dijkgraaf, President of the Royal Netherlands Academy of Arts and Sciences, and Professor Lu Yongxiang, President of the Chinese Academy of Sciences, as its co-chairs for the next four years.

IRSES

The Marie Curie International Research Staff Exchange Scheme (IRSES) was established in 2008 with the aim of strengthening research partnerships through short term staff exchanges and networking activities between European research organisations and organisations from countries with which the European Commission has an S&T agreement, including Australia. The Academy, on behalf of the Department of Innovation, Industry, Science and Research, manages funds for Australian participation in IRSES projects.

Dr Jean-Michel Carnus from the Forest Research Centre of the French National



Mike Dopita (centre) and Italian visitors at the Siding Springs Observatory to study the evolution of galaxies

Institute for Agricultural Research gave a presentation at the Academy on the IRSES project *Transferring research between EU, Australia and New Zealand on forestry and climate change*. The Australian partner in this project is CSIRO Sustainable Ecosystems. This project is expected to increase research collaborations between Australia, European research organisations and New Zealand, with the intent of progressing adaptive responses to critical areas of climate change impacts on forests.

Professor Michael Dopita FAA from the Research School of Astronomy and Astrophysics at the Australian National University (ANU) hosted two Italian

collaborators, Dr Paola Merluzzi and Dr Gianni Busarello, from the Osservatorio Astronomico di Capodimonte in Naples, under the IRSES project *A complete census of star-formation and nuclear activity in the Shapley super cluster*. The Italian researchers were in Australia to access a unique piece of equipment, the wide field spectrograph (WiFeS), on the 2.3 metre telescope at the ANU's Siding Spring Observatory, to probe the effect of environment on the evolution of galaxies in the Shapley galaxy super cluster. This project is expected to facilitate the integration of European and Australian expertise in the areas of data reduction and interpretation. ■

Australia extends help to earthquake-stricken University of L'Aquila

The University of L'Aquila was severely damaged in the April 2009 earthquake, which destroyed much of the mediaeval town, and killed almost 300 people. Fifty five of those who died were from the university's 23,000-strong student body. Most of the university buildings are currently not accessible and it will take at least 6 to 12 months before research staff and students will be allowed to access them (see *Nature*, Vol 459, 21 May 2009, pp306-307).

Australian universities have been among those offering aid to the University of L'Aquila, as it struggles to rebuild, and recommence its teaching and research.

Professor Silvia Bisti, who holds a chair of neuroscience in L'Aquila's Department of

Biomedical Science and Technology, was on sabbatical at the University of Sydney when the 'quake struck. The School of Medical Sciences at the University of Sydney quickly established one-off scholarships to bring Professor Bisti's research students to the laboratories she was visiting to continue their projects. The ARC Centre of Excellence in Vision Science, which supports this collaborative work, has also offered support, to ensure that the L'Aquila students can have continuity in their doctoral work.

Dr Vittorio Brando of the Association for Research between Italy and Australasia (ARIA) in Canberra contacted the Academy on behalf of other Italian researchers based in Australia to identify how to fund travel

grants to enable early-career researchers based at the University of L'Aquila to spend some time as visiting fellows in Australian universities or research centres.

Following advice from the Academy, Professor Bisti and Dr Brando engaged with the Group of Eight, which has agreed to provide \$40,000 towards travelling fellowships for students from L'Aquila to visit member universities.

The Academy will be providing some financial support towards this activity, as will Dr Nicola Sasanelli, previously Science and Technology Attaché at the Embassy of Italy in Canberra, who has agreed to donate the proceeds of his book, *What if they never existed*, towards this endeavour. ■

New Fellows

Professor Marilyn Ball
Research School of Biological Sciences,
Australian National University

Marilyn Ball is acknowledged worldwide for her exceptional research in plant ecophysiology. Her leadership in functional ecology has produced groundbreaking discoveries, based on her ability to elucidate fundamental physiological mechanisms and carry these through to outstanding field studies. Her innovative research has advanced our understanding of plant responses to complex, highly variable environments, including seminal studies of mangrove ecology.

Professor John Carter
Faculty of Engineering and Built
Environment, University of Newcastle

John Carter is an outstanding geotechnical engineer. He is renowned worldwide for his contributions to the underpinning sciences of constitutive modelling of natural materials, and their sampling and in situ testing. The outcomes of his outstanding research have been applied to the design of a variety of engineering structures, including foundations for offshore and gas production facilities.

Professor Frank Caruso
Centre for Nanoscience and
Nanotechnology, Department of
Chemical and Biomolecular Engineering,
University of Melbourne

Frank Caruso is an exceptional chemist who is recognised internationally for his strong leadership and the development of innovative technology that is making a significant impact in biomedical applications. He is a pioneer in the nanoengineering of surface structures through polymer self-assembly, imparting unique functions to colloids, especially for drug delivery and artificial cell research.

Professor Andy Choo
Murdoch Childrens Research Institute,
Royal Children's Hospital

Andy Choo is distinguished for his contributions to human molecular genetics. His pioneering work on the human centromere has revolutionised our understanding of chromosome stability and replication. He has achieved an



New Fellows, after presenting their research at *Science at the Shine Dome*

Photo: © Irene Dowdy

international reputation for his outstanding achievements in genetics: work that has given impetus to the use of synthetic minichromosomes as vectors for gene therapy.

Professor Warrick Couch
Centre for Astrophysics and
Supercomputing, Swinburne University
of Technology

Warrick Couch has made pivotal contributions to our understanding of the evolution of galaxies in rich clusters and the effects of galaxy environment on their evolution. As a distinguished international astronomer he was appointed primary investigator in an international team that, despite intense competition, secured one of the first allocations of observing time with the Hubble Space Telescope.

Professor Hugh Durrant-Whyte
School of Aerospace, Mechanical
and Mechatronic Engineering,
University of Sydney

Hugh Durrant-Whyte is very much respected by the research community for his excellence in the field of robotics. He has pioneered sensor data fusion, and the development of the simultaneous localisation and mapping paradigm, in which a robot builds a map of its environment while navigating through it. His significant achievements have transformed the subject and ensured his place as a world leader in the field.

Professor Charles Mackay
Immunology and Inflammation
Research Program, Garvan Institute of
Medical Research

Charles Mackay is an outstanding biomedical scientist, specialising in T cell immunology and migration. He has made a number of fundamental contributions to our understanding of inflammatory disease and immunity to infectious diseases, and he is an authority on immune cell behaviour and chemo-attractant receptors. This has established him as one of the world's leading immunologists.

Professor Paul Mulvaney
Bio21 Institute, University of Melbourne

Paul Mulvaney is a distinguished physical chemist specialising in the field of semiconductor nanocrystals and metal nanoparticles. He developed the technique of surface plasmon spectroscopy, which uses the unique colours of metal nanocrystals to monitor surface chemical reactions and the optical detection of electrons in metal nanostructures. This versatile tool is used worldwide and has opened up the new multidisciplinary field of plasmonics.

Professor Robert Parton
Institute for Molecular Bioscience,
University of Queensland

Robert Parton is an internationally renowned cell biologist, who has

pioneered an entire subfield on the plasma membrane organisation of mammalian cells. His fundamental discoveries have far-reaching importance for diverse areas of biomedical research, ranging from the molecular mechanisms of lipid regulation and membrane morphogenesis, to liver regeneration, obesity and cancer.

Professor George Paxinos
Prince of Wales Medical Research
Institute, Sydney

George Paxinos is acknowledged worldwide for his outstanding contributions to the field of neuroscience through the development of brain atlases. His development of nomenclature and ontologies has provided an essential and consistent language across neuroscience. He has discovered homologies between human and experimental animals that have significantly facilitated the study of human models of brain disease.

Dr Michael Raupach
CSIRO Marine and Atmospheric Research,
Canberra

Michael Raupach has made enormous contributions to theoretical research in Earth and environmental sciences. His distinguished work on micrometeorology and its applications includes connections between the atmosphere and land surface processes that have global consequences for climate change. He is leading an international team in the investigation of carbon-climate-human interactions that has revealed important trends and drivers of carbon dioxide emissions.

Professor Leigh Simmons
Centre for Evolutionary Biology,
School of Animal Biology,
University of Western Australia

Leigh Simmons is a world leader in the field of evolutionary biology and in particular behavioural ecology and sexual selection. Through his innovative study of Australian insects he has transformed our understanding of mate choice and sexual selection. In demonstrating that female insects gain genetic benefits for their offspring from polyandrous mating, he was responsible for a major paradigm shift in the study of sexual selection.

Professor Xu-Jia Wang
Centre for Mathematics and its
Applications, Mathematical Sciences
Institute, Australian National University

Xu-Jia Wang's research is having significant impact on mathematics at the highest level and he is celebrated worldwide for a long list of contributions that have fundamentally altered the field of non-linear partial differential equations. As a leading international researcher he has solved major outstanding mathematical problems in affine, complex and conformal geometry, and optimal transportation.

Professor Peter Waterhouse
School of Biological Sciences,
University of Sydney

Peter Waterhouse is an exceptional plant molecular biologist. He identified that double stranded RNA plays important roles in cell biology, including protecting cells against virus infections and silencing genes. He is recognised worldwide for his seminal discoveries on gene silencing that have huge implications not only for plant biology and agriculture but also for biological science as a whole.

Professor Mark Westoby
School of Biological Studies,
Macquarie University

Mark Westoby is acknowledged worldwide for his extensive influence in the field of evolutionary ecology. He is renowned for his unique ability to integrate understanding of variation in ecological traits of plants with understanding of genetics and relatedness among individual plants. He developed models that led to the concept of ecosystem resilience, and has made seminal contributions in many areas including self-thinning, foraging theory, and management of arid zones and rangeland.

Professor Ray Withers
Research School of Chemistry,
Australian National University,

Ray Withers is internationally recognised for his application of electron microscopy, imaging and diffraction to solving complex, incommensurately modulated structures and inherently disordered solid solution phases. He has pioneered the study of important functional oxide materials such as those used in solid oxide fuel cells. His outstanding work has benefited synthetic chemistry, crystallography, materials science and physics. ■

AWARDS FOR SCIENTIFIC EXCELLENCE OPEN

Nominations for the Academy's 2010 honorific awards for early-career and career researchers are now invited for the following:

Early-career awards

- **Anton Hales Medal** (Earth sciences)
- **Dorothy Hill Award** (Earth sciences, reef sciences, marine geology and taxonomy)
- **Fenner Medal** (biology, excluding biomedical sciences)
- **Frederick White Prize** (physical sciences)
- **Gottschalk Medal** (medical sciences)
- **Le Fèvre Memorial Prize** (chemistry)
- **Pawsey Medal** (physics)
- **Ruth Stephens Gani Medal** (human genetics including clinical, molecular, population and epidemiological genetics and cytogenetics)

Career awards

- **David Craig Medal** (chemistry)
- **Haddon Forrester King Medal, sponsored by Rio Tinto** (mineral exploration)
- **Ian Wark Medal and Lecture** (applied research)
- **Mawson Medal and Lecture** (Earth sciences)
- **2011 Matthew Flinders Medal and Lecture** (physical sciences; nominations from Academy Fellows only)

Nominations close 31 July. Information and nomination forms are available from www.science.org.au/awards

News from national committees

59th meeting of Nobel laureates

This year's meeting of Nobel laureates in Lindau is dedicated to chemistry. With the support of the Academy, seven of Australia's brightest early-career researchers in this field will be attending the meeting to be held in Lindau, Germany, from 28 June to 3 July. The group will be led by Professor Andrew Holmes FAA. Not only will this meeting provide the participants with the opportunity to meet and hear from Nobel laureates, it will also provide a fantastic opportunity for our early-career researchers to meet, discuss ideas and potentially form beneficial relationships with peers from across the globe.

Crystallography

The National Committee for Crystallography met on 16 April in the Barossa Valley, in conjunction with Crystal 26, a conference of the Society of Crystallographers in Australia and New Zealand. The committee discussed the upcoming meetings of the Asian Crystallography Association and the prospect of holding a commemorative meeting in 2012 to celebrate the centenary of crystallography. Ongoing funding for the



Photo: © Irene Dowdy

Delegates of the 2009 Meeting of the Nobel Laureates in Lindau

Access to Major Research Facilities Program (AMRFP) was highlighted as an area of concern.

Data in science

The National Committee for Data in Science met on 17 February at Ian Potter

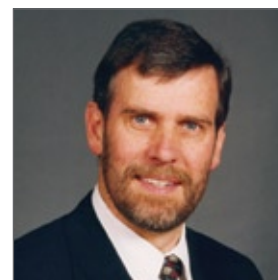
New members of council



Professor Bob Williamson is the new Secretary for Science Policy. Before he retired in 2004, Bob was director of the Murdoch Institute and professor of medical genetics at the University of Melbourne. He worked on the identification of the genes for cystic fibrosis, Friedreich ataxia and Alzheimer disease. More recently, he has taken a major interest in national science policy and ethics. He chairs the OECD Committee on Pharmacogenetics, and has worked extensively for the World Health Organization.



Professor Chris Goodnow is a new member in the biological sciences. Since 1997, he has been professor of immunology and genetics at the John Curtin School of Medical Research where he is currently division head. Chris was the founding director of the Australian Phenomics Facility – a major national research facility for mouse molecular genetics. He has illuminated the mechanism of immunological self-tolerance through innovative integration of mouse molecular genetics with cellular immunology.



Professor Andrew Gleadow is a new member in the physical sciences. Andrew trained as a geologist, and since early 1999 has been professor and head of the School of Earth Sciences at the University of Melbourne. He was also a research coordinator of the Australian Geodynamics Cooperative Research Centre. He has researched and published extensively on all aspects of the development and application of fission track dating in geology, especially in the areas of tectonics, thermochronology, sedimentary basin analysis and hydrocarbon exploration.

House. The committee discussed matters relating to identifying and relating to its constituency and the role and direction of this committee with relation to the national and international scientific community.

Earth system science

On 3 April, the National Committee for Earth System Science met in Melbourne. The major focus of this meeting was the development of the Earth System Science Decadal Plan and a stakeholder workshop to be held later in the year.

Nutrition

The National Committee for Nutrition (NCN) conducted a teleconference on 4 March. The committee discussed the development of a decadal plan, with a further meeting focusing on this topic planned for June. The committee also considered issues relating to an upcoming conference on salt reduction in the food supply and iodine monitoring. The symposium and public lecture with the same title, *Salt in the diet: The elephant in the room: Why health professionals need a shake up*, will be held at the George Institute for International Health, Sydney, on Thursday 13 August.

See www.science.org.au/natcoms/nc-nutrition.htm or call 0417 35 88 94 for further details.

Physics

The National Committee for Physics has secured funding from the Australian Research Council Linkage–Learned Academies Special Project scheme to produce *Investing in the future of physics*. The committee will evaluate the opportunities for the future growth of physics, allowing the discipline to reposition itself and to provide improved contributions to Australian and global science.

Quaternary research

A meeting of members of the Quaternary research community was held at the Australian Nuclear Science and Technology Organisation at Lucas Heights on 29 April. This meeting discussed the revitalisation of the National Committee for Quaternary Research including the committee's role nationally and internationally and the contribution the committee could make to national research priorities. ■

TRAVELLING FELLOWSHIPS AND RESEARCH CONFERENCES FOR 2010

The Academy is calling for nominations for the Graeme Caughley and the Rudi Lemberg Travelling Fellowships, and the Selby Fellowship. Expressions of interest in the Boden Research Conference, the Elizabeth and Frederick White Conference, and the Fenner Conference on the Environment are also being accepted. **The closing date is 30 August.**

Further information is available from www.science.org.au/awards/research



Professor Hugh Possingham is a new member in the biological sciences. Hugh has a degree in applied mathematics from the University of Adelaide and a doctorate from Oxford University. In July 2000 he became professor of mathematics and ecology at the University of Queensland where he is currently director of The Ecology Centre. Hugh plays public roles as chair of the federal government's Biological Diversity Advisory Committee and member of The Wentworth Group. He suffers the affliction of obsessive bird watching.



Professor Michelle Simmons is a new member in the physical sciences. She is the director of the Atomic Fabrication Facility and a Federation Fellow at the University of New South Wales. Michelle has degrees in physics and chemistry from Durham University, UK, and her PhD research was on the study of high efficiency solar cells. She came to Australia in 1999 as a Queen Elizabeth II Fellow at the Centre of Excellence for Quantum Computer Technology. Her research interests are to develop the technology to build electronic devices at the atomic-scale, and understand their quantum properties. ■

L'ORÉAL FOR WOMEN IN SCIENCE INTERNATIONAL FELLOWSHIPS

Nominations for the 2010 UNESCO–L'Oréal International Fellowships are open. The International Fellowships are worth US\$40,000 over two years and are available to female doctoral and post-doctoral scientists under 35 years old with a focus on life sciences to study at an institution outside Australia. Three of the 15 International Fellowships will be awarded in the Asia-Pacific Region, which includes Australia.

Applications close on 30 June 2009.

More information: www.unesco.org/en/fellowships/loreal

Nova: Science in the news



Photo: SKA Project Office/Xilosstudios

The Square Kilometre Array will link several thousand antennas over thousands of kilometres

A new topic has recently been posted on the Academy's educational website, *Nova: Science in the news* (www.science.org.au/nova):

Simply astronomical – the Square Kilometre Array

Australia is playing a leading part in plans to build the world's largest radio telescope.

The Square Kilometre Array (SKA) will not

be a single instrument but will consist of several thousand antennas all linked together over thousands of kilometres. In October 2006 it was announced that two countries had been short listed to host this giant telescope – Australia and South Africa.

Twentieth century astronomers discovered an expanding universe with billions of galaxies, each filled with billions

of stars, along with exotic objects such as black holes, quasars and neutron stars. A major challenge for the next century is to understand how it all got there – the evolution of the universe. The SKA will probe the universe for information on the first stars and galaxies, dark energy, magnetism and life. Even Einstein will be put to the test.

Australian astronomers (from CSIRO and a number of universities) have been backing the SKA since it was first proposed. They have teamed up with scientists from a number of countries to develop several smaller arrays that will help to test technologies for the SKA. An example is the Australian SKA Pathfinder (ASKAP) which will be a powerful new telescope in its own right. It will be able to scan the entire southern sky every day and discover millions of galaxies.

This topic is available on the Academy's *Nova: Science in the news* website at www.science.org.au/nova. Student activities, a glossary, further reading and annotated links to relevant websites are included.

This topic is sponsored by the International Centre for Radio Astronomy Research. The Australian Foundation for Science is also a supporter of Nova. ■

Primary Connections

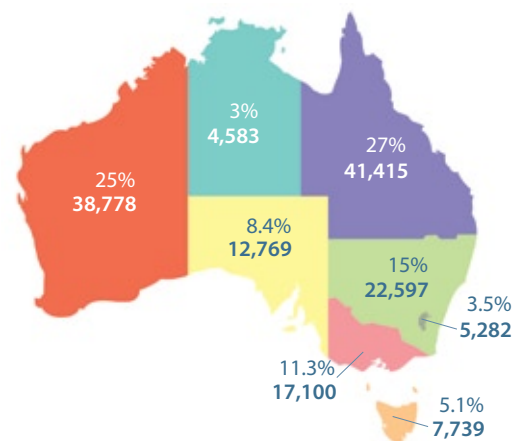
The *Primary Connections* team has now completed the suite of units for Stage 3 and the contract with the Department of Education, Employment and Workplace Relations has been signed for \$4 million over two years to complete Stage 4. The latest four units published include:

- *Staying alive*, where students investigate needs for survival of animals, including humans, and how our senses help us to stay alive;
- *Spot the difference*, which includes opportunities for students to predict the changes that happen to materials through the context of food;
- *Smooth moves*, which focuses on students exploring forces and motion and investigating how different-sized forces affect the movement of objects and;
- *Earthquake explorers*, which enables students to develop an understanding

of the causes of earthquakes and how they change the Earth's surface.

Indigenous perspectives section of the website

The *Primary Connections* team is very pleased and excited to announce the completion and launch of the indigenous perspectives section of the *Primary Connections* web pages. The pages include the indigenous perspectives framework with information and resource links, indigenous perspectives curriculum links for most of the *Primary Connections* units, a professional learning module, links to each chapter of the *Connecting Minds* DVD, and the indigenous perspectives pilot study research report, *Small Study – Big Success Story*. See www.science.org.au/primaryconnections/indigenous ■



Over 150,000 units have been distributed across Australia

Ernest Oliver Tuck

Ernest ('Ernie') Tuck was born in Adelaide on 1 June 1939 and died there on 11 March 2009. He was educated at the Universities of Adelaide (BSc, First Class Honours, 1960) and Cambridge (PhD 1963).

After a year at the University of Manchester during 1962–63 he moved to the David Taylor Model Basin in Washington DC, where he worked for three years before accepting a senior research fellow position at Caltech in Pasadena, California. He intended to stay there for a long time, but after 18 months was unable to resist the offer of a readership at the University of Adelaide at the age of 28. He returned to Adelaide at the beginning of 1968 and remained there for the rest of his career, being promoted to a personal chair in 1974. In 1990 he was appointed to the chair of applied mathematics and as Elder professor of applied mathematics until his retirement in 2002. He then had the title of emeritus professor bestowed on him.

Ernie's research interests encompassed three major areas: hydrodynamics (free surfaces, ship wave resistance and squat, jets and cavities), aerodynamics (wing and airfoil theory, separation and stall, ground

effect) and industrial fluid mechanics (coating problems, contact problems and viscous drops, which he explained to a general audience using the example of honey falling from a spoon onto a slice of toast). After retirement he became interested in Riemann's hypothesis and he also had a personal interest in game theory (backgammon and blackjack – his writing in this area was mostly in the form of unpublished notes).

Honours awarded to Ernie included election to the fellowship of both the Australian Academy of Science in 1988 and the Australian Academy of Technological Sciences and Engineering in 1995. In 1999 he was awarded the Academy of Science's Lyle Medal, the year in which he also received the ANZIAM Medal by Australian and New Zealand Industrial and Applied Mathematics, a division of the Australian and New Zealand Mathematical Society. The University of Adelaide is currently in the process of establishing the Tuck Fellowship in his honour. This will be awarded on an annual basis to a student or young researcher, in an amount sufficient to cover the expenses to participate in the International Workshop on Water Waves and Floating Bodies.



Ernie Tuck

Ernie was chair of the ANZIAM Society for two years and deputy chair for three years. He was editor of the main *Australian Applied Mathematics Journal* (now the ANZIAM Journal) for eight years from 1985–92. He was an early advocate of LaTeX, and in 1992 he established TeXAdel, an organisation responsible for automating the production of the Australian Mathematical Society journals. In 2008 he was the president of the International Congress of Theoretical and Applied Mechanics, held in Adelaide.

He is survived by his wife Helen, his sons Warren and Geoffrey and their families. ■

The Moran Award for history of science research

by Kate Rogers, University of Melbourne

My project, *Innocuous ascent: Australian eugenics in the scientific century* interrogates the social impact of eugenic ideology in accordance with the evolving ideology and image of human genetics in Australia throughout the twentieth century. By acknowledging the adaptable public image of the eugenics movement and the changing understanding of genetics throughout the century I argue that the influence of eugenics in Australia has been ongoing and that the prerogatives of the movement have evolved in line with what has become socially desirable.

A number of collections at the Basser Library contain information regarding the development of Australia's scientific understanding, and related social interest, in genetic testing and counselling during the second half of the twentieth century. This will form an important source of information for both chapters four and five for my PhD dissertation which I am currently undertaking at the University of

Melbourne. References consulted include: MS 155, The Human Genetics Society of Australia; MS 206, Australian Society for Reproductive Biology; MS 116, Genetics Society of Australia; MS 175, Genetics Society of Queensland; and MS 093, The Society for Experimental Biology of NSW.

I would like to extend my sincere thanks to the Academy, Mrs Moran and in particular the very helpful, knowledgeable librarian Rosanne Walker. ■

The Moran Award is currently open for applications. The Moran Award is aimed at postgraduate students and other independent researchers with expertise in the history of Australian science. Its purpose is to encourage use of the Basser Library collections, especially by younger researchers, and it can be used towards travel and accommodation costs. A total of \$2500 is available each year. Further information is available from www.science.org.au/academy/basser/bass-award. The closing date for submissions is 30 June.



Kate Rogers at work in the Basser Library

Photo: Richard Bray

Annual symposium on life, the universe and everything

(continued from page 1)

which we can live without other organisms and our ability to wipe species out.

Professor Lindell Bromham from the Centre for Macroevolution and Macroecology at the Australian National University provided evidence for biological evolution recorded in DNA. She is using DNA to uncover the evolution of life, revealing previously unrecognised

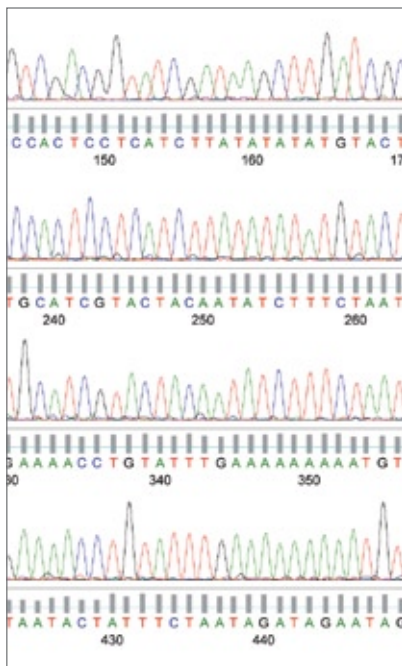


Image: Michael Ayiffe

DNA can reveal the tales of evolution



Photo: © Irene Dowdy

Annual symposium speakers considered all forms of evolution

relationships between species – such as hippos and whales. DNA also tells the story of the explosive radiation of animals in the Cambrian and the explosive evolution of mammals in the Tertiary, after the dinosaurs became extinct.

The research of Professor Steve Simpson FAA, from the School of Biological Sciences at the University of Sydney, reveals the epigenetic control of brain development. He used the example of alternative forms of the locust, showing that being reared alone or in a crowd changes their appearance and switches the behaviour from solitary to aggregating. The trigger for the transition from one form to another is touch, the mediator is the neurotransmitter serotonin,

and the motive behind the swarming behaviour is to seek protein.

The final speaker was Professor Kim Sterelny, currently based at the Australian National University, but also associated with the School of History, Philosophy, Political Science and International Relations at the Victoria University of Wellington in New Zealand, who gave a sketch of current thinking on how and why we humans became so very different from our ancestors and relatives.

Audio files are currently available from www.science.org.au/sats2009/symposium. Full transcripts and slides for all speakers will be available from links on the same page in the near future. ■

Academy welcomes science budget

Prior to this year's federal budget of 12 May the Academy stressed that the current economic situation should not delay changes essential to preventing Australia's research and education sectors from falling further behind. China, the USA and the UK have all seen the current time as a call to invest more in their science, technology and innovation sectors.

The Academy welcomed therefore the Australian Government's clear recognition of the importance of science, research and innovation to accelerate recovery through its provisions in the 2009–10 budget and the white paper *Powering ideas*.

Of particular note was the funding of the indirect costs of research in universities by the Research Infrastructure Block Grants. The Academy believes that all grant

schemes would benefit from a 'full costs of research' funding approach.

R&D tax credits for small and medium sized firms and measures to promote collaboration will be of benefit to the entire innovation sector. Replacement of the *Southern Surveyor* and support of emerging industries like biotechnology and nanotechnology places Australia in the position to advance some of its greatest research strengths.

The strong focus of the budget for science on research infrastructure was needed but must be followed by support of an adequate science workforce. Improvements in the number of Australian Postgraduate Awards and increasing the award stipend are to be applauded but the previously announced Future Federation

Fellowship scheme is inadequate to address the bottleneck in research career paths at the post-PhD stage. Leading edge facilities will require well-trained research teams, and this will only be possible if more is invested in the human infrastructure of Australian science.

The 2009–10 budget is the beginning of the ten-year plan encapsulated in the *Powering ideas* white paper that will require extensive consultation with stakeholders to implement. The Academy will work with the ministers and departments towards achieving the paper's ideal of a more productive, innovative and creative Australia.

The President's statement on innovation is available from www.science.org.au/reports/Innovation_Time_for_action_now and the media release on the budget is available from www.science.org.au/media/13may09. ■