AUSTRALIAN ACADEMY OF SCIENCE

NEWSLETTER

September 2010 www.science.org.au Number 81

The Science of Climate Change: Questions and Answers launch

The Academy's publication *The Science of Climate Change: Questions and Answers* was launched at a press conference held at the Shine Dome on 16 August as part of National Science Week before an audience of approximately 100 people, including Fellows and journalists. Academy President, Professor Suzanne Cory, Professor Kurt Lambeck FAA, Dr Michael Raupach FAA and Dr Ian Allison addressed the audience and explained the rationale behind the publication. The document is based on a series of key questions that aim to address confusion created by contradictory information in the public domain about climate science. It explains the current situation, including where there is consensus in the scientific community and where uncertainties exist.

The 16-page illustrated publication is the result of over 1500 hours of work by the Working Group and the Oversight Committee made up of Academy Fellows and other Australian scientists with internationally recognised expertise in climate science. Work started in late 2009 on the initiative of immediate past President, Professor Kurt Lambeck, with the support of the Australian Government Department of Climate Change (DCC).

The launch was well publicised to the media and also webcast by the Australian Science Media Centre, enabling journalists elsewhere in Australia and overseas to view the presentations and ask questions. The publication received excellent media coverage by broadcast and print media outlets, including ABC and SBS TV news, ABC Radio news and other radio stations. The publication was also discussed on the ABC's *Four Corners* program that aired on 16 August. Articles were published in the *Australian*, *Age*, *Sydney Morning Herald*, *Courier Mail* and *Canberra Times* newspapers, *Cosmos* magazine and online. In the 48 hours after its release, the document was downloaded from the Academy website over 16,000 times, reaching 100,000 downloads by 1 September. The initial 5000 copies were quickly consumed by strong demand, and DCC funded a further reprint of 15,000 copies. This will enable copies to be sent to all Australian high schools.

The document is available from **www.science.org.au/policy/climatechange.html** or by contacting **science.policy@science.org.au**

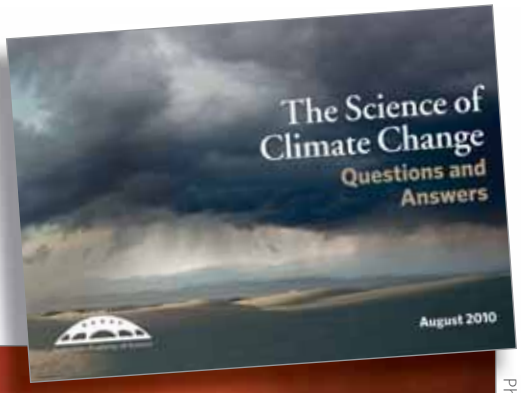

Photo: iStockphoto

Photo: iStockphoto

Climate change may have severe impacts across Australia

2010 THEO MURPHY HIGH FLYERS THINK TANK SEE PAGE 12

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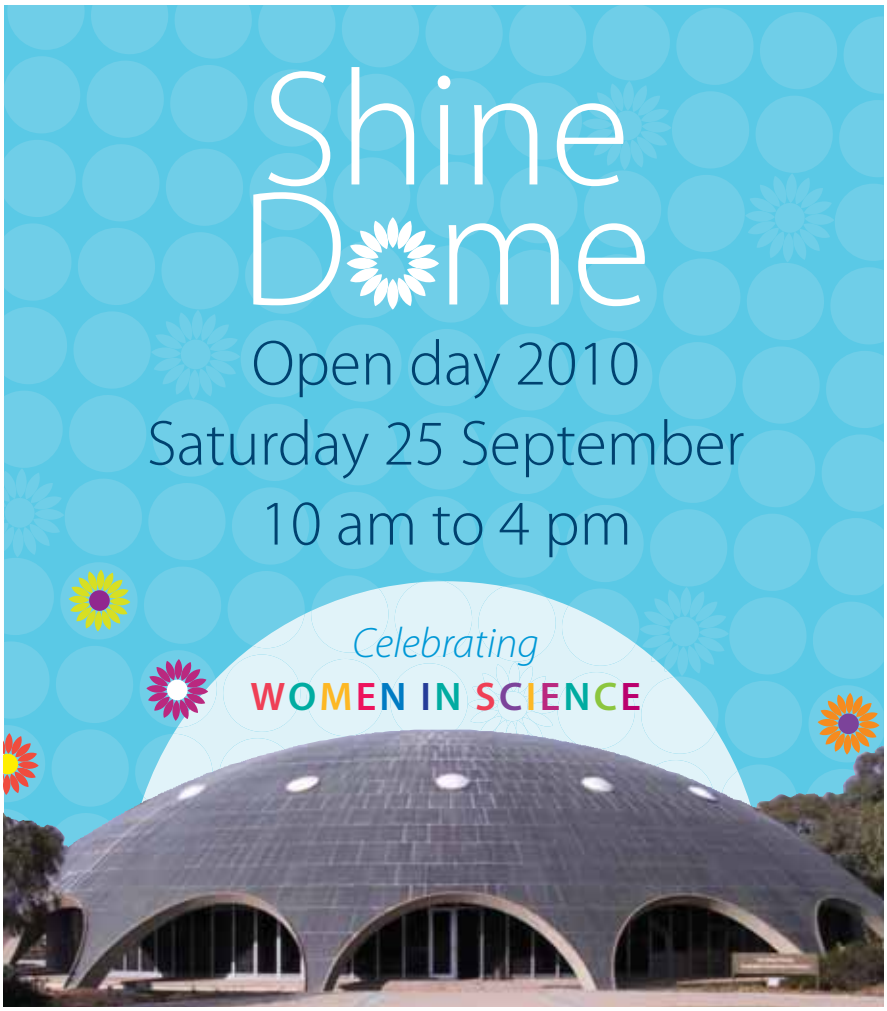
If you would like to make a gift or a bequest to the Academy, please contact the Chief Executive, Dr Sue Meek, on (02) 6201 9400 or ce@science.org.au



Important dates

23 September: *Discovery of* Australopithicus sediba *in South Africa: Implications for our family tree*. Public lecture by Professor Paul Dirks, Shine Dome, Canberra. Please RSVP by contacting **julia.munro@science.org.au** or on 02 6201 9459

25 September: Annual Shine Dome open day featuring women in science, Canberra, 10 am to 4 pm

5 October: *The changing face of the urban water industry in the context of cities of the future*. Public lecture in the water series by Ross Young, Shine Dome, Canberra. Contact **savita.khiani@science.org.au** or on 02 6201 9462

7–8 October: ARC Centre of Excellence for Coral Reef Studies symposium, Coral Reefs in a Changing Environment, Shine Dome, Canberra

9–12 October: 2010 UK–Australia Frontiers of Science – Marine Science Meeting, Perth

2 November: Public lecture in the water series by Professor Craig Simmons, Shine Dome, Canberra

7 December: Public lecture in the water series by Professor Barry Hart, Shine Dome, Canberra

9–10 December: First Australian Earth System Outlook Conference, Shine Dome, Canberra. Contact **connie.berridge@science.org.au** or on 02 6201 9448

International news

2010 US summer program in Canberra

The Academy hosted 20 American PhD students selected to participate in the 2010 East Asia and Pacific Summer Institutes (EAPSI) program, run by the Academy and the US National Science Foundation.

This is the seventh summer program held in Australia, and enables American students in science and engineering to visit Australia for a period of eight weeks during the American summer to undertake research in laboratories and to initiate personal relationships with their Australian counterparts.

This year's orientation session, held from 15 to 17 June, was the beginning of the students' stay in Australia. The participants of the program come from a number of research areas and are hosted by various institutions including universities, CSIRO divisions, museums, teaching hospitals and government institutions.

The Academy organised a series of lectures and site visits to cultural institutions as part of the orientation session. Dr Sue Meek, Chief Executive of the Academy, welcomed the group during the orientation session. Professor Jenny Graves FAA delivered a presentation on Australian mammals and Dr Joe Hlubucek, Executive Director of the Australian–American Fulbright Commission, spoke about postdoctoral research opportunities in Australia. Dr Martin Callinan, the Academy's Science Policy Manager, presented on science policy in Australia. The Australian Government Department of Innovation, Industry, Science and Research (DIISR) International Science Linkages program funded this activity.

American students at the Shine Dome as part of the EAPSI program

CALL FOR APPLICATIONS FOR 2011 SUMMER PROGRAM

The US National Science Foundation has opened a call for applications for the 2011 EAPSI program. Applications must be submitted by US graduate students to the Foundation by 10 November 2010. Information and application procedures may be found at **www.nsfsi.org**

SOLAR PHOTOVOLTAIC RESEARCH FUNDING

The Academy is managing a one-off call for applications with Germany on behalf of DIISR. Eight applicants were approved by DIISR and the German Federal Ministry of Education and Research to receive a share of $200,000 funding for their research. The list of successful applicants and their projects can be found at **www.science.org.au/internat/solar-pv-participants-2010-11.html**

Shanghai World Expo 2010 science week

Thirty years of scientific and research cooperation between China and Australia was celebrated at the Shanghai World Expo during Australia and China Science and Technology Week from 2 to 6 August.

A diverse program titled *Partners for a Better Future* commenced with an Australia–China Astronomy Roundtable on 2 August, which was chaired by the Chief Scientist Professor Penny Sackett. The roundtable was attended by Professor Brian Boyle FAA, Director of the Square Kilometre Array, and Professor Elaine Sadler FAA, chair of the National Committee for Astronomy. This was followed by three workshops aimed at promoting new collaborations between Australian and Chinese researchers in areas of common research interests and strengths.

Professor Robin Batterham FAA presided at the opening ceremony of the Impacts of Climate Change on Future Urban Societies workshop on 3 and 4 August, which included presentations by Australian and Chinese experts in urban planning, water management, environmental science, human health and climate science.

Professor Jim Peacock FAA presided at a joint opening of concurrent biotechnology and nanotechnology workshops on 5 and 6 August. Professor John Shine FAA and Professor Charles McKay FAA presented at the workshop Biotechnology Improving Food Production and Food Quality and Human Health. Academy Fellows Professors Frank Caruso, Chennupati Jagadish and Michelle Simmons presented at the Nanotechnology Benefiting Society workshop.

Both workshops examined the potential of these emerging technologies to contribute to economic and social benefits, including improved energy efficiency, human health outcomes and sustainable production.

The Academy and the Australian Academy of Technological Sciences and Engineering assisted DIISR to organise these events, in collaboration with the Chinese Academy of Sciences, the Science and Technology Commission of Shanghai Municipality and the Shanghai Association of Science and Technology.

...continued on page 4

International news *continued*

Agriculture and food security workshop

The Academy and the Indonesian Ministry of Research and Technology, on behalf of DIISR, organised the Australia–Indonesia Agriculture and Food Security Workshop.

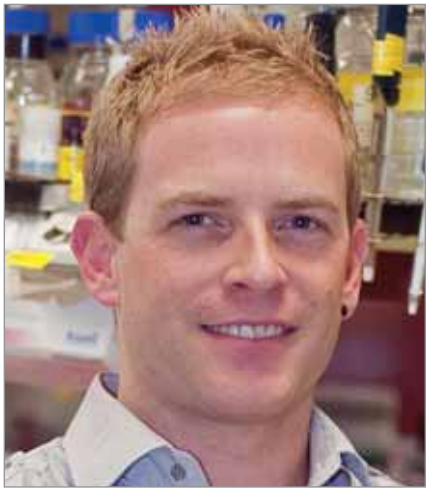
The Indonesian delegation was led by Dr Listyani Wijayanti, adviser to the Minister of Research and Technology for Food and Health Technology. Professor Jim Fox, from the Resource Management in Asia-Pacific Program at the Australian National University and an Indonesia expert, was the Australian co-convener and led a delegation of 10 prominent scientists in the fields of agriculture and food security.

The workshop participants explored collaborative opportunities during plenary discussions and presentations in the areas of rice, sugarcane, beef cattle, soybeans, maize and sorghum.

The two-day workshop was followed by a day of site visits for the Indonesian delegation at the University of Sydney's Plant Breeding Institute.

Rod Rickards Fellowship

The Rod Rickards Fellowship was established in 2009 by the family of Professor Rod Rickards FAA in memory of Professor Rickards' important contributions to Australian science through his outstanding achievements in the chemistry of compounds of medical, biological, agricultural and veterinary importance. The award provides funding for a researcher to travel to Europe to undertake research in the area of chemistry or biology.



Justin Boddey was one of two researchers awarded the Rod Rickards Fellowship this year

In 2010 two Rod Rickards Fellowships were awarded. **Dr Justin Boddey** of the Walter and Eliza Hall Institute of Medical Research will visit the Institute of Molecular Medicine in Portugal to undertake the project *Protein export by malaria parasite using liver cell infection*. **Professor Barbara Meserlle** of the University of New South Wales will undertake her project, *Rational design of bimetallic catalysts for efficient synthesis*, at the French National Centre for Scientific Research. ■

SCIENTIFIC GRANTS FOR COLLABORATIONS ANNOUNCED

Sixty-nine leading Australian scientists have been awarded scientific grants, for the final year of funding, to undertake important international collaborative research under the *International Science Linkages – Science Academies Program*. The diverse range of topics to be studied includes cancer research, climate change, genomic sequencing, health and ageing, nanotechnology, solar cells and women's health.

The program supports Australian scientists from both the public and private sectors to collaborate with international partners on leading-edge science and technology to contribute to Australia's economic, social and environmental wellbeing. Australian scientists will travel to institutions in Asia, Europe and North America to commence their research projects.

The grant funding is part of $3.9 million provided to the Academy by DIISR over the five years of the *International Science Linkages – Science Academies Program*.

The complete list of recipients and projects is available from **www.science.org.au/internat/SAP-participants-2010-11(Round2).html**

Copies of *A big, bold, simple concept* can be ordered from www.science.org.au/publications/history-and-biographies.html

Farewell to managers

The Academy secretariat said farewell to two highly valued staff members. Sharon Abrahams first applied her research skills to produce *Nova: Science in the news* topics. As Publications Manager she created many professional and quality publications, including *A big, bold, simple concept* which documented the history of the Academy's dome building. Mr Phil Greenwood brought both wit and dedication to the role of Business Manager, overseeing many improvements to the operations of the secretariat, particularly the refurbishment of the ground floor of Ian Potter House. ■

Photo: Naton Ramsay

Phil Greenwood and Sue Meek

Honours to Fellows

Queen's birthday honours

Professor Yui-Wing Mai AM
Member in the General Division of the Order of Australia

Professor Robert Sutherland AO
Officer in the General Division of the Order of Australia

Professor Vicki Sara AO
Officer in the General Division of the Order of Australia

Professor James Angus AO
Officer in the General Division of the Order of Australia

Vicki Sara

ARC Centres of Excellence funding scheme for 2011

Professor Michelle Simmons
Director of the ARC Centre of Excellence for Quantum Computation and Communication Technology

Professor Gerard Milburn
Director of the ARC Centre of Excellence for Engineered Quantum Systems

Professor Suzanne O'Reilly
Director of the ARC Centre of Excellence for Core Crust Fluid Systems

Mark Westoby

Professor Hugh Possingham
Director of the ARC Centre of Excellence for Environmental Decisions

Professor Scott Sloan
Director of the ARC Centre of Excellence for Geotechnical Science and Engineering

ARC 2010 Australian Laureate Fellowship

Professor Mark Westoby
Professor Min Gu
Professor Paul Mulvaney
Professor Amnon Neeman

Australian Museum Eureka Prizes

Professor Martin Green
2010 Australian Museum Eureka Prize for Leadership in Science

Professor David Lindenmayer
2010 Australian Museum Eureka Prize for Environmental Research

Other awards

Professor Chennupati Jagadish received the Quantum Device Award for 2010 from the 37th International Symposium on Compound Semiconductors, and the IEEE Photonics Society 2010 Distinguished Service award. ■

Two Fellows turn 90

Two Fellows have turned 90 since the last issue of the *Newsletter* – Alexander (Sandy) Mathieson, whose birthday was on 17 July and Bernard Mills, who was born on 8 August.

Sandy Mathieson was born in Aberdeen, Scotland and educated at the Universities of Aberdeen (BSc) and Glasgow (PhD). He was later awarded a DSc from the University of Melbourne and an Hon DSc from the University of St Andrews in Scotland. He joined CSIR (later CSIRO) Chemical Physics in 1947, and was a Chief Research Scientist from 1965 to 1985. During this time he served as Acting Chief of the Division from 1978 to 1980 and on his retirement in 1985 he was appointed Honorary Professor of Chemistry at La Trobe University. He is an outstanding x-ray crystallographer and a world leader in x-ray studies of moderately large molecules of 20 to 50 atoms. He also initiated several important instrumental developments. His work at La Trobe involved investigation of the shapes of Bragg reflections from small single crystals in diffraction space.

Professor Mathieson was elected as a Fellow of the Academy in 1967 and served on the Council from 1975 to 1978. He received a number of other awards and honours, including the David Syme Medal from the University of Melbourne in 1954 and the Royal Australian Chemical Institute's Smith Medal in 1963.

Bernard Mills was born in Sydney and educated at the University of Sydney (BSc, BE, ME, DSc). Along with the other five students who completed Electrical Engineering Honours in 1942 he joined CSIR Division of Radiophysics to work on radar research and development. By 1957 he was a Senior Principal Research Officer in the Division. In 1960 he moved to the University of Sydney as Reader in Astrophysics, and from 1965 until his retirement in 1985 he was Professor of Astrophysics.

After World War II he spent some time developing a linear accelerator system for an x-ray tube and assisting with the development of Australia's first digital computer. He then joined the newly formed radio astronomy group and was responsible for the development of a cross-type radio antenna, the Mills Cross.

Professor Mills was elected as a Fellow of the Academy in 1959 and served on the Council from 1969 to 1971. Other honours include the Academy's Lyle Medal in 1957, election to the Royal Society in 1963, and appointment as a Companion in the Order of Australia in 1976. ■

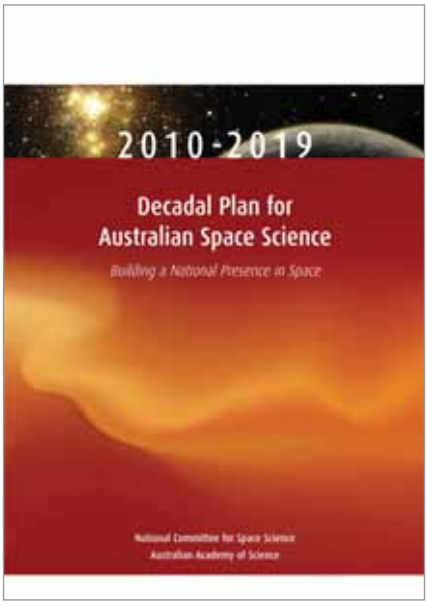
News from national committees

Space science

The *Decadal Plan for Australian Space Science, 2010–2019: Building a National Presence in Space* has been published. The document will be launched during the 10th Australian Space Science Conference, which will be held from 27 to 30 September at St Leo's College at the University of Queensland. The National Committee for Space Science is one of the organisers.

The International Committee on Space Research held its Scientific Assembly from 18 to 25 July in Bremen, Germany. Australia's voting delegate was Professor Iver Cairns, chair of the National Committee for Space Science.

Professor Brian Fraser was the Australian voting delegate to the Scientific Committee on Solar-Terrestrial Physics Scientific Assembly, held in Berlin, Germany, from 12 to 16 July.



Earth system science

The National Committee for Earth System Science will hold the First Australian Earth System Outlook Conference at the Shine Dome on 9 and 10 December. The conference is a high-profile activity proposed in the draft Australian strategic plan for Earth system science that is under preparation by this committee. Professor Johan Rockström from the Stockholm Resilience Centre will give the keynote address. Details are available from **www.science.org.au/natcoms/nc-ess.html**

Crystallography

The National Committee for Crystallography held a meeting on 26 May at the Australian Nuclear Science and Technology Organisation at Lucas Heights. Commemoration of the centenary of the publication of the first crystallography paper by Australian scientist Lawrence Bragg on 11 November 1912 was a major item for discussion. At 25 years of age, Lawrence Bragg was the first Australian, and is still the youngest ever, Nobel Prize winner. Reports on the OPAL reactor decadal plan, the Australian Synchrotron, microscopy, and the Society of Crystallographers in Australia and New Zealand were discussed. Recommendations were made for nominations for International Union of Crystallography committees.

Mechanical sciences

The National Committee for Mechanical Sciences met at the Shine Dome on 21 June. Awards for young researchers, strategic planning, raising the profile of the discipline and discipline representation were discussed. Reports were given on the International Union of Theoretical and Applied Mechanics (IUTAM) and International Federation for the Promotion of Mechanism and Machine Science (IFToMM). Committee member Professor James Trevelyan is a member of the Executive Council of IFToMM.

The 2010 IUTAM General Assembly was held in Paris from16 to19 July. Professor Jim Denier and Professor Scott Sloan FAA were the voting delegates.

Astronomy

The National Committee for Astronomy (NCA) is undertaking a mid-term review of the document *New Horizons: A Decadal Plan for Australian Astronomy (2006–2015)*. The review committee includes early- and mid-career researchers, and two Academy Fellows. Terms of reference have been developed, and an issues document has been prepared and circulated to the astronomy community. An astronomy research community briefing and discussion was held on 7 July during the Astronomical Society of Australia (ASA) conference at the University of Tasmania. The review was also discussed at the meetings of the heads of astronomy departments.

Professor Elaine Sadler FAA, incoming NCA chair, convened a meeting of the committee on 8 July during the ASA conference. The mid-term review was a major item for discussion. Professor Matthew Colless FAA was thanked for his excellent work as chair. The NCA has provided input into the inquiry into Australia's international research collaboration and DIISR has sought advice from the NCA on various matters recently. International Astronomical Union matters and the European Southern Observatory (ESO) Working Group report on development of a proposal for Australian membership of ESO were also discussed.

Antarctic research

The chair of the National Committee for Antarctic Research, Professor Bob Vincent FAA, convened a meeting of the Australian delegates to the 2010 Scientific Assembly of the Scientific Committee on Antarctic Research (SCAR) on 28 July. This was in preparation for the Scientific Assembly held in Buenos Aires from 30 July to 11 August. A major item for discussion was the SCAR strategic plan. The Standing Committee on Antarctic Data Management Report and SCAR Data Policy, authored by National Committee for Data in Science member Ms Kim Finney, were also discussed.

Mathematical sciences

The National Committee for Mathematical Sciences (NCMS) held a teleconference on 5 August. The voting delegates to the International Mathematical Union (IMU) General Assembly were also invited to the meeting. Agenda items included development of a discussion paper encouraging implementation of the committee's National Strategy for Mathematical Sciences in Australia. The General Assembly and International Congress of the International Mathematical Union was held in Hyderabad, India, from 19 to 27 August. Australia's delegates were Professor Tony Dooley, Professor Nalini Joshi FAA and Professor Brendan McKay FAA. Professor Cheryl Praeger FAA, member of the NCMS, was re-elected as Member-at-Large on the IMU Executive Committee.

Biomedical sciences

The National Committee for Biomedical Sciences met at the University of New South Wales on 15 June. The committee discussed ways in which promotion of biomedical sciences in Australia could be advanced and also opportunities for interaction between Australian biomedical science associations. The committee intends to meet again in October to further these discussions.

Earth sciences

The National Committee for Earth Science met at the Australian National University on 9 July. Progress reports on preparations for the International Union of Geodesy and Geophysics General Assembly to be held in Melbourne in 2011 (**www.iugg2011.com**) and the International Geological Congress to be held in Brisbane in 2012 (**www.34igc.org**) were presented. Also discussed was a submission made to the Australian Curriculum, Assessment and Reporting Authority regarding the draft *Senior Secondary Australian Curriculum* for the Earth and Environmental Science course.

Photo: iStockphoto

Portrayal of brain research in popular media is a point of concern

Brain and mind

The National Committee for Brain and Mind met at the Shine Dome on 10 June. The data collected by Australian brain imaging research laboratories was discussed. Addressing issues to do with how the popular media portrays brain research and developing ways to bring quality science to the public were major agenda items. Concerns over the Field of Research classifications used by the Australian Research Council to categorise R&D activity were also discussed. ■

60th Meeting of Nobel Laureates

Photo: Joel Pedro

Delegation leader Kurt Lambeck (left) and Lindau participants

The 60th Meeting of Nobel Laureates was held in Lindau, Germany, from 27 June to 2 July. The meeting brought together more than 650 young researchers from around the globe with 59 Nobel laureates from the fields of physiology or medicine, physics and chemistry. A delegation of 14 young Australian scientists led by Professor Kurt Lambeck FAA attended the meeting. The meeting gave the delegates an opportunity to exchange ideas, gain exposure to areas of science outside their chosen discipline and establish new contacts and networks.

Four members of the delegation were also selected as Robert Bosch Fellows to attend the Euroscience Open Forum (ESOF) meeting in Turin, Italy, from 2 to 7July. The ESOF meetings bring together scientists, business people, entrepreneurs, innovators, policy makers, and science and technology communicators as well as the general public to discuss new discoveries and the direction that research is taking in the sciences, humanities and social sciences. ■

Interviews with Australian scientists

Photos this page: Cecily Oakley

Roger Short (left) was interviewed by Robyn Williams (right) about his varied career from vet to environmental advocate

Academy Fellow and ABC Radio talent Adjunct Professor Robyn Williams donated his time and expertise in May and July to interview three Fellows for the *Interviews with Australian scientists* project. Interviews with Professor Roger Short, Professor John Lovering and Dr Oliver Mayo were filmed in Melbourne, Canberra and Adelaide respectively.

The topics discussed in Roger Short's interview ranged from his work on the aquatic origins of elephants, to his efforts in the fight against HIV transmission, his advocacy of upright burial, and King Canute's forest laws. The University of Melbourne's Faculty of Medicine, Dentistry and Health generously sponsored this interview.

John Lovering

Oliver Mayo

Geologist John Lovering has been privileged to study rock samples collected from many exotic places including Heard Island, Antarctica and even the moon. During the interview, Lovering shared stories from his beginnings as an assistant museum curator to his time as Vice-Chancellor of Flinders University and beyond. This interview was kindly sponsored by the Faculty of Science at the University of Melbourne.

Oliver Mayo was first inspired by the world of maths in biology when reading an article by Francis Crick on the DNA code. Throughout his career in biological statistics he never lost the passion for learning and has recently completed a BA in Italian. CSIRO Livestock Industries generously sponsored Mayo's interview.

In addition to filming these three interviews, seven new transcripts were posted to the *Interviews* website, including Charles Birch FAA, James Lance FAA, Barry Marshall FAA, James Morrison FAA, Robin Warren FAA, Fiona Wood and Roy Woodall FAA.

Nova: Science in the news

Rebuilding humans using bionics

The latest topic posted on the Academy's education website, *Nova: Science in the news* (**www.science.org.au/nova**) is *Rebuilding humans using bionics*.

You only have to watch fictional characters in films like *Terminator* and *Star Wars* to get an insight into the possibilities of artificial body parts. There are also many high-tech artificial body parts currently under development here on Earth.

Bionic limbs

The i-LIMB™ is an artificial hand with four independently powered fingers and a thumb. Each digit has a small motor which responds to small electrical signals from muscles in the arm to control movement. People using the artificial hand can grasp and pick things up, use scissors and even play cards. The Sydney-designed rehab glove is another example, allowing people with paralysed or injured hands to move their hand or grasp objects by way of a computer and artificial muscles.

Artificial legs and knees have been around for some time – even the Marquis of Anglesey had one after the Battle of Waterloo in 1815 – but now they're incorporating hydraulics, electronics and computer programming. Today's bionic legs enable better movement control by responding to the body and walking conditions, and electrically stimulate existing muscles enabling paraplegics to walk again.

Bionic ears

The cochlear implant, or bionic ear, developed by Professor Graeme Clark and his team in 1960, is one of the big success stories of medical bionics.

Deafness often results from damage to minute hairs in the ear. These normally turn sound into tiny electrical signals that the cochlear nerve then sends to the brain. The bionic ear uses an external microphone to pick up sounds which are then sent via a processor to the implant. There, a receiver turns the sound signals into electrical impulses, which are sent via an electrode array to the brain.

Bionic eyes

Thanks to significant government funding, Australian scientists are now helping to develop a bionic eye. Whilst research is still in its early days, current approaches include:

- electrical stimulation of the retina, where images from an external camera are transmitted to a microchip on the retina wall and electrodes stimulating the optic nerve send signals to the brain
- implanting 'mini telescopes' into the eye to magnify images onto the retina
- bypassing the eye, where image information collected by a tiny external camera is sent via a processor to electrodes implanted in the brain.

Image: Touch Bionics

The i-Limb™ has independently powered fingers that can pick up everyday objects

Brain bionics

Implanted neural interfaces – brain implants – are one of the most challenging technologies being developed. They allow a person to control a bionic device with their brain and turn their thoughts into action. One team of researchers has reported being able to assist a quadriplegic check emails and play video games using a computer chip implanted on the surface of his brain. Elsewhere brain-computer interfaces are being developed that let people move their wheelchairs around objects using electrical signals from their brain.

In other developments, researchers are looking at implanting electrodes in a person's brain – known as deep brain stimulation or a 'brain pacemaker' – to treat Alzheimer's disease, depression, epilepsy or Parkinson's disease.

More information is available on the Academy's *Nova: Science in the news* website at **www.science.org.au/nova**. A glossary, student activities, further reading and annotated links to relevant websites are also available for each topic.

The Australian Foundation for Science is a supporter of *Nova*. ■

FELLOWS APPOINTED TO SYNCHROTRON ADVISORY BOARD

Sir Gustav Nossal FAA has been appointed chair of the Australian Synchrotron's new National Science Colloquium. Other Academy Members include the President, Professor Suzanne Cory, and Professor Gavin Brown FAA, Director of the Royal Institution Australia. The Colloquium was established to advise on a strategy to make the most of the $206 million Melbourne-based facility. Professor Peter Colman FAA from the Walter and Eliza Hall Institute of Medical Research has also been appointed to the Synchrotron board.

Science by Doing: The continuing trial

Since the Science Leaders workshop held in April, selected schools have been busy trialling *Science by Doing* resources and approach to learning. Members of the *Science by Doing* team have been busy visiting each of the 28 schools from across the country. The main purpose of the visits is to support science leaders as they work with their staff to implement the professional learning approach. So, what is the *Science by Doing* approach to the ongoing professional learning of teachers?

Professional learning requires a continuous cycle of reflection, questioning and action. Teachers commit to this cycle to determine changes that will improve the learning outcomes of their students. Professional learning is embedded in the everyday work of teachers. It simply becomes part of what they do. This does not deny the importance of external contributors, like research, but emphasises the role that teachers have to play.

There is a growing body of research which recognises a certain synergy when teachers work together to improve student learning; what they can achieve together is far greater than the sum of efforts of individuals. One of the terms used to describe teachers working in this way is the Professional Learning Community (PLC). There are three big ideas associated with the work of PLCs. They are:

- **a focus on student learning** – striving towards high levels of learning for all students
- **a commitment to a collaborative culture** – time and support to work together
- **a focus on results** – programs and practices are continually assessed to determine their impact on student learning.

Science by Doing supports science departments or teams within a school to begin and/or continue the journey of becoming a PLC. Support is provided in the form of workshops, professional learning resources and curriculum resources.

These ideas are more fully explained in the brochure *Science by Doing: Professional Learning Approach*, available from **www.science.org.au/sciencebydoing**

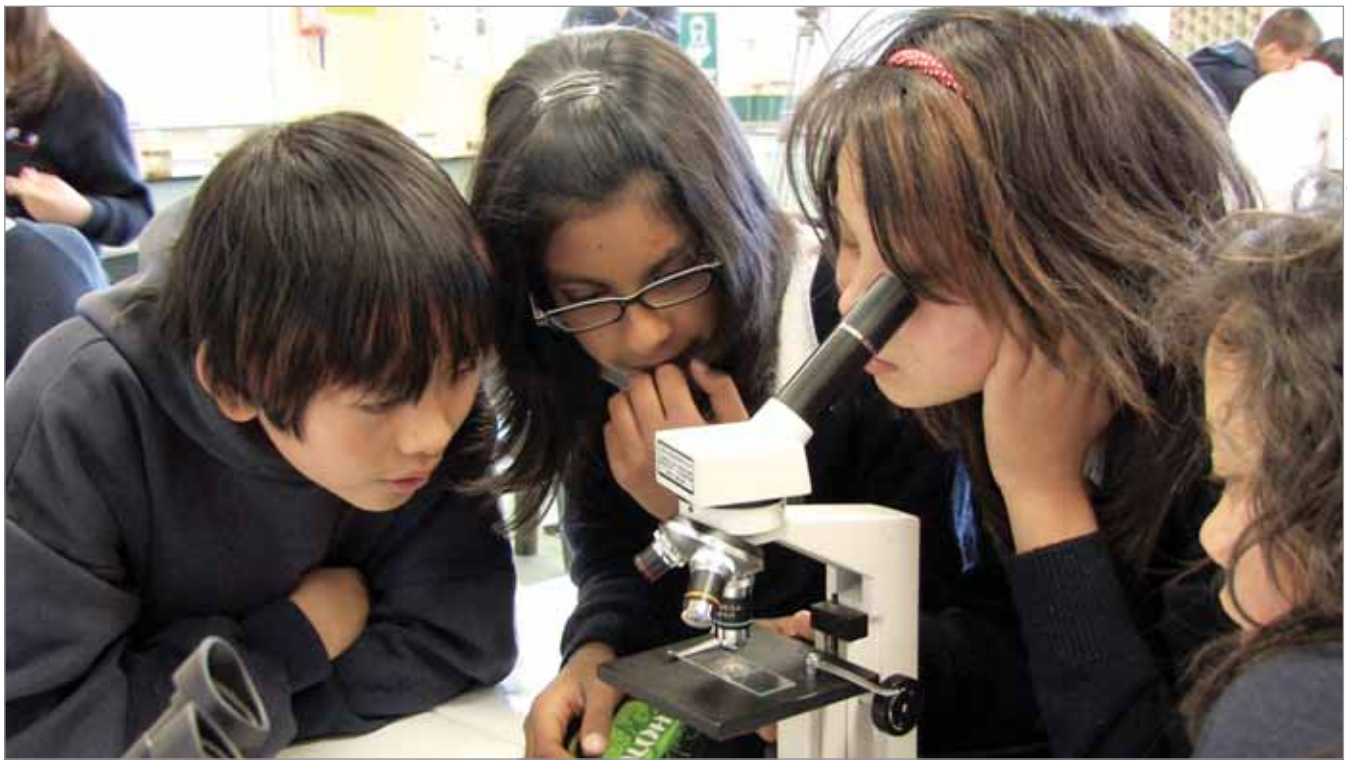


Photo: *Science by Doing*

Science by Doing **encourages inquiry-based learning**

Science by Doing is a national initiative that aims to actively engage junior secondary school students in learning science through an inquiry-based approach. The project is managed by the Australian Academy of Science in partnership with CSIRO, the Australian Science Teachers Association and education systems of the states and territories. The project is funded by the Australian Government through its Department of Education, Employment and Workplace Relations.

Primary Connections: Master Facilitator training

In early August, the *Primary Connections* team ran a unique, busy and exciting three-day training program for 23 state and territory nominated and endorsed *Primary Connections* Professional Learning Facilitators to train as Master Facilitators.

The purpose of the Master Facilitator Leadership Program was to develop a cohort of effective leaders in states and territories who:

- support the implementation, enhancement and sustainability of *Primary Connections* across all participating primary schools
- promote and facilitate Curriculum Leader Training
- build professional networks and learning communities to promote primary science education
- increase the profile of science education in primary schools
- provide strategic advice and leadership for systems to implement *Primary Connections* aligned to the *Australian Curriculum: Science, Years K–6*.

The leadership program was jointly opened by Academy representatives and Ms Suzanne Northcott, manager of the National Curriculum Branch at the Australian Government Department of Education, Employment and Workplace Relations (DEEWR). President, Professor Suzanne Cory, and Secretary for Education and Public Awareness, Professor Jenny Graves FAA, represented the Academy. The opening address was also attended by Mr Scott Lambert, Director of the Science and Maths Education Section, National Curriculum Branch, National Curriculum, Assessment and Reporting Group, DEEWR.

Photo: *PrimaryConnections*

Suzanne Cory, Suzanne Northcott, Scott Lambert, Jenny Graves and *Primary Connections* Project Director Shelley Peers

For more information on *Primary Connections* is available from **www.science.org.au/primaryconnections/images/A4-Double-sided-flyer-March-2010.pdf**

Obituary

Mollie Holman

Mollie Elizabeth Holman was born in Launceston, Tasmania on 18 June 1930 and died in Melbourne on 20 August 2010. She was educated at the University of Melbourne, obtaining her BSc in 1952 and MSc in 1955 and later receiving a DPhil from Oxford University in pharmacology in 1957. She was also awarded a DSc by Monash University in 1970. She spent another year in Oxford on a Wellcome Research Grant before returning to the University of Melbourne as a lecturer in physiology. In 1962 she was promoted to senior lecturer. The following year she moved to Monash University as a senior lecturer in physiology, with promotions to reader in 1965 and professor in 1970. She retired in 1996 with the title of Emeritus Professor.

Her research was in the areas of innervation of smooth muscle and the nervous system.

While studying for her DPhil she developed techniques that allowed accurate recording of membrane potentials from smooth muscle. In Melbourne, she studied the way in which nerves caused the guinea pig vas deferens to contract, one of the things for which she is best known. In the 1960s she spent some time at the University of Otago, New Zealand, and managed to make the first recordings of mammalian ganglion cells. Another first, with David Hirst (now FAA) came in the 1970s, with recordings of the nerve cells in the wall of the gastrointestinal tract.

Professor Holman was active in the academic governance of Monash University, taking on the roles of Associate Dean (Research), in the Faculty of Medicine, and chairing both the Faculty Committee Scholarships and Graduate Matters and the Steering Committee University Scholarships and Graduate Matters. In 1999, the University established the Mollie Holman Doctoral Medal for Excellence to recognise the best PhD thesis from each faculty. Professor Holman was a member of a number of scientific societies and was president of the Australian Physiological and Pharmacological Society from1986 to1989. Other services to science and education included membership of the following bodies: ANZAAS council, interim council of Deakin University, Executive of CSIRO and Geelong Grammar School council.

Professor Holman was elected as a Fellow of the Academy in 1970 and served on the Council from 1980 to 1983, with the role of vice-president from 1982 to 1983. She was also awarded the Edgeworth David Medal of the Royal Society of NSW in 1965, the ANZAAS Medal in 1985 and the David de Kretser Award for her contribution to the Faculty of Medicine, Nursing and Health Sciences at Monash in 2007. In 1998 she was appointed an Officer in the Order of Australia.

Mollie Holman

She is survived by her sisters Jill, Joan and Lucie and their families.

2010 Theo Murphy High Flyers Think Tank

Searching the Deep Earth: The Future of Australian Resource Discovery and Utilisation

Mining is unquestionably an important part of Australia's economy, but it is becoming increasingly difficult to discover world-class ore deposits. For this reason, a new approach to minerals exploration is needed. Australia potentially has many more high quality ore deposits that are suitable for mining, but identifying these will require innovative use of existing data, the collection of new data and the development of technologies to exploit this information.

Nearly 60 early- and mid-career researchers from across Australia participated in the Academy's 2010 High Flyers Think Tank from 19 to 20 August, to discuss the future of Australian minerals exploration. Researchers came from universities, government organisations and industry bringing skills from disciplines as diverse as geology, computational modelling and microbiology. After being inspired by presentations from senior researchers on the key issues for minerals exploration, the participants then held small group discussions, during which participants attempted to address problems surrounding a particular aspect of minerals exploration. Topics under consideration included the computational analysis required to increase the value of existing data, the identification and application of new data for minerals exploration, the new technologies and innovation necessary to undertake this exploration and the policy framework required to underpin future exploration.

Based on the animated discussions over the two days of the Think Tank, the major recommendation put forward by participants was to map Australia's crust to a depth of 300 metres. This mapping program would form part of an integrated approach to land management in Australia. Participants also proposed increased engagement with the community and greater integration of the existing research workforce to promote the ongoing development of Australian Earth sciences research.

Most significantly, participants gained an important opportunity to meet with researchers from various backgrounds who use different approaches to address the same problems.

'I met several new people with wide areas of expertise in some domains I never suspected could be useful for me. This certainly widened my view of the problem I'm tackling and convinced me that I need to keep thinking outside the box,' said one Think Tank participant.

The program of the 2010 Theo Murphy High Flyers Think Tank is available at **www.science.org.au/events/thinktank2010**. Proceedings, including an executive summary that outlines the proposals developed by attendees for the future of Australian minerals exploration, will also be available at this link soon.

Photo: Geoscience Australia

Seismic vibration machines assist in the search for resources deep within the Earth