

SCIENCE POLICY

Overview

As Australia's peak scientific body, the Academy often is invited by the Prime Minister's Science, Engineering and Innovation Council (PMSEIC) to suggest agenda topics for analysis by working groups — to which Fellows of the Academy regularly contribute.

The Council is the Australian Government's principal source of independent advice on national issues in science, engineering and innovation as well as relevant aspects of education and training. It meets in full session twice a year, chaired by Prime Minister John Howard. Meetings also are attended by Ministers with 'science' in their portfolios as well as *ex officio* representatives of major science agencies including the Chief Scientist Dr Jim Peacock — immediate past President of the Academy — and Academy President Professor Kurt Lambeck.

There were two main agenda items for the 16th Council meeting on 8 December 2006, the first a report entitled 'From data to wisdom: Pathways to successful data management for Australian science' from the working group on Data for Science, co-chaired by Professor Robin Batterham and Professor Fiona Stanley. The second item was 'Australia's science and technology priorities for global engagement', a report delivered by the working group chaired by Professor Lambeck. The main agenda item for the 15th meeting was a report from the working group on Asia entitled 'Strengthening Australia's position in the new world order'. As detailed in the following pages, the Academy provided written submissions to each of these three working groups.

The Academy also responded this year to many calls for submissions, extending from comment on a research quality framework, uranium mining and processing and nuclear energy to stem cell science and the recent review of Federation Fellowships.

Once again, the Academy held a number of symposia, including two very successful and timely events to discuss Australia's water crisis. The 2007 Fenner Conference on the Environment — Water, Population and Australia's Urban Future — brought together experts in scientific research, business, water usage, irrigation and government as well as people dealing with the public on issues and implications every day, including mayors, councillors and other key local figures. The Academy also held a Think Tank on 'Innovative technical solutions for water management in Australia'. The Think Tank was designed to bring together early- and mid-career researchers from a broad range of disciplines to:

- Engage in thinking about novel applications of existing science and technology
- Identify gaps in knowledge that might be addressed when applying science, including social science, and technology to a particular issue

It is well recognised that interdisciplinary and transdisciplinary approaches to problem-solving enable more diverse and lateral thinking and so achieve fuller outcomes. Held in an independent setting, the Think Tanks are seen by the Academy as a unique opportunity for career development and network creation — to be particularly encouraged among the nation's next generation of researchers and their institutions.

Previous Think Tanks have culminated in reports to government that have been timely, well received and instrumental in influencing policy development. Previous Think Tank topics are:

2005 Biotechnology and the future of Australian agriculture

2004 Emerging diseases – ready and waiting?

2003 Safeguarding the nation

2002 Australia's national research priorities

Think Tank proceedings are available at:

www.science.org.au/events/thinktanks.htm

Reports and submissions issued by the Academy are available at:
www.science.org.au/reports

Media releases are available at:
www.science.org.au/media

High Flyers Think Tank on innovative water solutions

The 2006 High Flyers Think Tank on water and hydroinformatics was held at the North Terrace Campus of the University of Adelaide on 30 October 2006. The Think Tank, 'Innovative technical solutions for water management in Australia' was supported by Land and Water Australia. Academy President Professor Kurt Lambeck welcomed 44 of Australia's brightest young minds, including early- to mid-career researchers and 20 senior experts representing decision support sciences, information technology sciences, social sciences and plant and soil science sectors relating to water management.

The Think Tank included some excellent presentations from experts in each of the four areas of water innovation. Presenters included Chief Scientist of South Australia Emeritus Professor Max Brennan, who said in his opening address: 'Water is now front-page news in Australia. Every day some aspect of the challenges facing us concerning the availability and use of water is covered in newspaper articles, television and radio.'

Keynote speaker was Dr Jason K Holt from the Lawrence Livermore Laboratories in California, US. Dr Holt presented cutting-edge research that could make desalination a viable solution for Australia's water shortage. His laboratory has developed permeable nanotube membranes that could reduce the energy costs of desalination by up to 75 per cent compared with conventional membranes being used now. During his visit to Australia, Dr Holt also gave a public lecture at the Shine Dome (for details see page 65).

Four other expert speakers including Ms Blair Nancarrow from CSIRO Land and Water, Dr Alex Zelinsky from the CSIRO ICT Centre, Dr Bronwyn Harch from CSIRO Mathematical and Information Sciences and Dr David Chittleborough from the School of Earth and Environmental Sciences outlined latest advances.

Think Tank participants from each sector then discussed four key areas:

1. Energy tradeoffs
2. Water transport and storage infrastructure, maintenance and engineering
3. Standards, access rights, water quality and quantity, environmental allocations and seasonality
4. Risk management

Summaries from the group discussions highlighted current issues, strengths and weaknesses in the areas of productivity, the environment and social aspects of water innovation.



Photo: Newspix/Darren Seiler

Stepping into a drier future? The mighty Darling River near Mildura

The focus groups and discussion sessions were chaired by CSIRO Land and Water's Dr Stuart Minchin, CSIRO ICT Centre's Dr Ross Wilkinson; In Fusion Consulting's Dr Paul Dalby and the University of Adelaide's Professor Steve Tyerman. The general discussion groups were chaired by Academy President Professor Kurt Lambeck.

The final report from the Think Tank was presented to the PMSEIC Standing Committee on 8 December 2006. The Think Tank attracted considerable interest and was highlighted by ABC television program Stateline South Australia in a broadcast entitled 'Should SA desalinate?'

Participants at the Think Tank observed that there is a shift under way in the approach taken toward applying science and technology to water management. They clarified some of these as key strengths and weaknesses encountered when seeking to apply innovative technical solutions for water management in Australia.

Strengths included the availability of moisture sensors, wireless computer networks and data centres that can be used for programming, monitoring coupled with rain and soil moisture sensor devices. For example, sensor networks are going to be used in North Queensland to manage saltwater intrusion into aquifers for irrigation in the Burdekin area. Other strengths included Australian research in membrane technology, which is advanced and progressing to become cheaper, more sophisticated and efficient. Australia also has many coastal cities so the increased use of seawater is an option.

Gaps in the application of scientific and technological solutions included lack of a clear position from policy makers on genetically modified plants for salinity and drought management. The coincident drought also highlighted the need for more accurate prediction for managing water allocation.

Proceedings from the Think Tank, including workshop discussions, a final report and case studies are available at: www.science.org.au/events/thinktank2006/report.pdf

Water, Population and Australia's Urban Future

Sustainable stewardship of water supplies for Australian communities was the main focus of the 2007 Fenner Conference on the Environment — Water, Population and Australia's Urban Future — held at the Shine Dome from 15–16 March 2007. The conference, organised by the Academy, examined the critical and increasingly shaky relationship between water and population in shaping Australia's urban areas and the ever-expanding suburban fringe.

The keynote speaker, internationally-renowned climate change and sustainability expert and Academy Fellow Dr Graeme Pearman, drew attention to the need for a flexible strategy when addressing water sustainability, saying: 'A strategy needs to build on what we do know, but keep flexibility, keep resilience in the system, because we will actually get some surprises and there will be new things that come on the horizon from science and from other fields that will change what we do as we go forward. To me, part of acting sustainably is keeping that resilience open.'

In a presentation entitled 'The Murray-Darling Basin: Down the drain or a vision splendid', Professor John Langford of Uniwater — a joint venture of the University of Melbourne and Monash University — stressed that if the autumn-winter of 2007 is dry, Australia will be in a critical position and that 'for the first time in our history all the irrigation storages are at critically low levels'. He added: 'If short-term political influence results in over-allocation of water, it is like printing money in a time of inflation: all they are doing is degrading the security of all the other irrigators' entitlements.'

Academy President Professor Kurt Lambeck concluded his address by saying: '... drought and flood cycles are very much part of the Australian scene but with the superimposition of long-term climate trends the period between extreme cycles will probably shorten. There is the potential that politicians and policy makers will only pay attention to these issues once the two cycles — the political cycle and the climate and drought cycle — begin to have similar time constants.'

The conference proceedings are available at: www.science.org.au/events/fenner2007/index.htm



Looking to the future: (from left) Dr Graeme Pearman, Professor Frank Fenner and Professor Kurt Lambeck (see previous page)

Data for Science

The Academy made a submission to the PMSEIC working group on Data for Science on 11 August 2006. The Academy did not support the idea of a centralised national approach for managing data for science because science is considered an international activity with international, discipline-based databases and is underpinned by publication of scientific findings in prestigious journals. The Academy also commented that editorial policies that support the professional maintenance and use of international databases are the most cost-effective way to ensure access to publicly and privately funded research.

The PMSEIC working group report is available at:

www.dest.gov.au/sectors/science_innovation/publications_resources/profiles/presentation_data_for_science.htm

Australia's Science and Technology Priorities for Global Engagement

The Academy made a submission to the PMSEIC working group on 12 September 2006 on 'Australia's science and technology priorities for global engagement'. The Academy commented on its role in maintaining formal linkages to global activities — particularly the National Committees for Science that underpin those global activities, the international networks of Learned Academies and the International Science Linkages Program, administered by the Academy on behalf of the Australian Government Department of Education Science and Training. Other comments were made on informal networks and international collaborative links, formal Australian Government arrangements to promote global engagement in science and technology and the US Department of State Embassy Science Fellows Program.

The PMSEIC working group report is available at:

www.dest.gov.au/sectors/science_innovation/publications_resources/profiles/presentation_global_engagement.htm

Strengthening Australia's Position in the New World Order

The Academy made a submission to the PMSEIC working group on Asia entitled 'Strengthening Australia's position in the new world order' on 9 May 2006. This submission urged a more strategic approach in recruiting talented overseas students as these new, skilled immigrants have the potential to help Australia collaborate with China and India as those countries continue to modernise.

The PMSEIC working group report is available at:

www.dest.gov.au/NR/rdonlyres/DE53DD69-7696-433F-BC57-3F095C07BCFA/13750/PMSEICWorkingGrouponAsiaReport.pdf

Research Quality Framework

A group of research experts working outside the university sector was brought together as a Development Advisory Group to further develop the Research Quality Framework (RQF). This followed advice to the Federal Minister for Education, Science and Training Julie Bishop from the Expert Advisory Group at the end of March.

At the first meeting of the Development Advisory Group in Canberra on 1 June, it examined a timeframe not only for its own work but also for the Australian Government's implementation of the RQF. The Advisory Group met regularly throughout the year and to progress its work it formed working groups in metrics, impact, information technology and modelling.

The Academy was invited to comment on the assessment of research impact to inform the Technical Working group advancing the RQF Development Advisory Group. In a submission to the Department of Education, Science and Training on 3 July 2006, the Academy indicated that block-funding schemes should reward research quality, research outcomes, including long-term outcomes, and the impact of that research.

The Academy welcomed the commitment made to distribute all Institutional Grants Scheme funds and at least half the Research Training Scheme funds under a framework that recognises research quality, especially if additional monies are made available when central agencies and the broader community can see the value of investment in research.

At a meeting on 28 June 2006, the Academy's Executive Committee reaffirmed the Academy's commitment to support block-funding schemes that reward research quality and stated that research groups should be required to attain a threshold level of quality before they qualify for assessment of 'impact'. The guiding principles were endorsed for release for consultation by the RQF Development Advisory Group in August 2006.

The Development Advisory Group made a strong recommendation on the implementation timeframe for the RQF. As a result, it will come into operation in 2008 with the next RQF exercise to be undertaken six years later in 2014. Under this timeframe, data gathering will take place in 2008, with financial consequences to flow from 2009. This means 2007 will be a year for universities to refine the processes and finalise details of the data gathering.

The Academy's submission is at:

www.science.org.au/reports/3july06.htm

Stem Cell Science — Review of the human cloning and embryo research Acts

On 17 June 2005, then Minister for Ageing Julie Bishop appointed a committee to conduct independent reviews of *Australia's Prohibition of Human Cloning Act 2002* and the *Research Involving Human Embryos Act 2002*. The report from the review committee, chaired by the late John S Lockhart QC, was released in December 2005 and made 54 recommendations.

Recommendation 23 was: 'Human somatic cell nuclear transfer should be permitted, under licence, to create and use human embryo clones for research, training and clinical application, including the production of human embryonic stem cells, as long as the activity satisfies all the criteria outlined in the amended Act and these embryos are not implanted into the body of a woman or allowed to develop for more than 14 days.'

The Academy, as the peak scientific body in Australia, welcomed the opportunity to present its views on the Lockhart Review to the Community Affairs Committee of the Australian Senate in its inquiry into legislative responses to recommendations on 3 October 2006. Chair of the National Committee for Medicine Professor Bob Williamson, Secretary for Science Policy Professor Philip Kuchel and Professor Marilyn Renfree addressed stem cell research in the Senate Committee inquiry. Professor Williamson commented that: 'We believe that stem cell science represents a real opportunity for better clinical care . . . My personal view as an adult stem cell scientist is that we need to encourage this kind of research.'

The Academy strongly urged Members of the House of Representatives to support the passage of the Patterson Bill and the recommendations of the Lockhart report on stem cell research. On 6 December 2006, Members of Parliament passed the *Patterson Bill Prohibition of Human Cloning for Reproduction and the Regulation of Human Embryo Research Amendment Bill 2006* by 82 votes to 62.

The Academy's submission to the inquiry into the legislative responses to recommendations of the Lockhart Review is at:

www.science.org.au/reports/3october06.pdf

Productivity Commission review of publicly funded research

A review of the Public Support for Science and Innovation was announced by Treasurer Peter Costello and Minister for Education, Science and Training Julie Bishop, on 10 March 2006. The Productivity Commission then called for submissions and released an issues paper on 12 April.

The Academy's submission on 27 July 2006 stated that certain points warranted special emphasis. For instance, immediate and tangible economic benefits should not be the only focus of what constitutes 'productivity' in research. Productivity involves our ability, as a country, to produce high-quality research outputs and retain a highly skilled and innovative workforce. This enables us to interact in a timely way with colleagues in other countries to take advantage of international advances. This type of flexibility is a hallmark of Australian science and as a principle it must be preserved to provide the nation with a broad portfolio of options. This also provides Australia with the tools necessary for rapid response to environmental, climatic, geological and medical challenges.

The Productivity Commission released its draft report on *Public Support for Science and Innovation* on 2 November 2006. Academy staff attended a workshop at CSIRO headquarters and the Academy was invited to attend a meeting at the Productivity Commission on 28 November 2006.

In response, Secretary for Science Policy Professor Philip Kuchel wrote: 'The Academy strongly promotes science and innovation as critical in enhancing Australia's socioeconomic prosperity. We are pleased that the Commissioners have given unequivocal support for public funding for basic research. The Academy agrees that the trend to increase public spending on applied research should be monitored carefully, to ensure that support for basic and strategic research is not eroded or diverted . . . Strong Government support encourages broad community confidence and interest in science and technology, gives the Government credibility on national issues involving science and technology and is a key element in encouraging the next generation of researchers to engage with science and innovation.'

The Academy's submission is at:

www.science.org.au/reports/27july06.pdf

The Academy's comment on the Draft Report is at:

www.science.org.au/reports/12january07-2.htm

Uranium Mining, Processing and Nuclear Energy Review

On 6 June 2006, Prime Minister John Howard announced a task force to undertake an objective, scientific and comprehensive review into uranium mining, processing and the contribution of nuclear energy in Australia in the longer term. The whole-of-government task force Secretariat, based in the Department of the Prime Minister and Cabinet, then prepared an issues paper.

The issues paper on Uranium Mining Processing and Nuclear Energy Review (UMPNER) was intended to highlight the types of questions that the task force would consider and to stimulate thinking about such questions (for details see: www.pmc.gov.au/umpner/index.cfm). The issues paper covered issues relating to: economics, the environmental, health, safety and proliferation.

Academy President Professor Kurt Lambeck met the UMPNER Task Force on 8 August for a briefing on particular issues of interest. The Academy then invited interested Fellows to lodge submissions addressing the terms of reference and some focus questions.

The Academy's submission on 18 August 2006 addressed the following six questions:

1. What new science and technologies will likely impact the relative place of nuclear energy in Australia's future energy mix?
2. What new science and technologies will likely impact the efficiency and economics of reprocessing?
3. What new science and technologies will likely impact the safe storage of waste material (eg, depth of storage, groundwater)? How should retrieval, monitoring, and security issues be best managed?
4. What new science and technologies will likely impact decommissioning of nuclear reactors?
5. What R&D of relevance is being undertaken in Australia at present?
6. What skills are available and will be needed in the future for a viable nuclear energy economy?

A draft report entitled *Uranium Mining, Processing and Nuclear Energy: Opportunities for Australia?* was released on 21 November 2006. The report was reviewed by a panel of experts, where the Academy was represented by President Professor Kurt Lambeck.

The Academy's submission to the UMPNER Task Force Secretariat on 14 December concluded that the Academy considers it important that the discussion should be transparent and cover all aspects of the nuclear energy cycle. The Academy advocated strong support for basic research in nuclear science in Australia to ensure that Australian scientists are alert to new opportunities and are poised to develop and adopt emerging technologies. In view of the long-term time scale for development of a nuclear energy industry it is appropriate to invest in development of skills and expertise in this area.

The Academy's submission is at:

www.science.org.au/reports/14december06-2.htm

Review of Federation Fellowships

The Australian Research Council reviewed the Federation Fellowships scheme in 2006-07 to provide advice on the effectiveness of the scheme in meeting its objectives and identify possible changes to the scheme. Comments were invited on the issues identified in the issues paper. Fellows of the Academy, Federation Fellows of the Academy and Chairs of National Committees were invited to send comments on the Federation Fellowships Scheme to the Academy. Responses were collated and the draft submission circulated for further comment.

In the final submission of 11 January 2007 the Academy commented that it considered the Federation Fellowship scheme was most timely and appropriate when introduced, as it helped stem an exodus of talented Australian researchers who were being recruited by UK universities under the Research Assessment Exercise (RAE) and by

North American institutions. It gave a strong signal to researchers, many of whom have worked long years and long hours with little reward, that their contributions were valued by the nation.

Three recommendations were put forward to the Review Committee of the Federation Fellowships:

1. The number of Federation Fellowships awarded each year be reduced to 5–10 in number. The remaining funds should be diverted into the Australian Research Fellowship and the Queen Elizabeth II Fellowship awards.
2. The Federation Fellowship scheme should be administered as a truly national scheme, possibly by the National Academies Forum or Office of the Chief Scientist rather than the Australian Research Council.
3. A significant component in the Federation Fellowship salary should be non-superannuable.

An article in the *Canberra Times* on 17 January and another in the March issue of *Australasian Science* outlined the Academy's submission and highlighted comments from an interview with the Secretary of Science Policy Professor Philip Kuchel.

The Academy's submission is at:

www.science.org.au/reports/12january07.htm

A celebration of the history, culture, science and technology of Récherche Bay

The National Academies Forum is the peak organisation for the four Australian learned academies — the Australian Academy of Science, Academy of the Social Sciences in Australia, Australian Academy of Technological Sciences and Engineering and the Australian Academy of the Humanities.

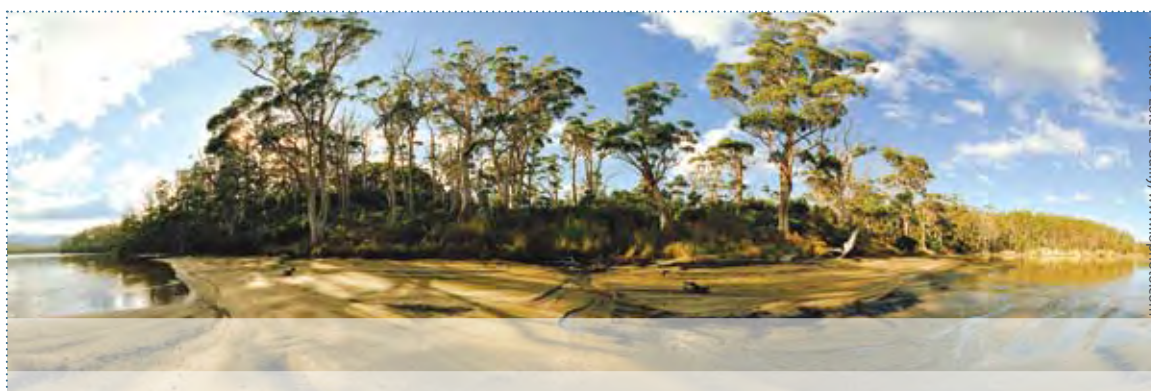
The Forum's symposium topic for 2007, convened by Dr Hugh Tyndale-Biscoe and Professor John Mulvaney, was 'A Celebration of the History, Culture, Science and Technology of Recherche Bay'. The symposium celebrated the landmark decision by the Tasmanian Government to declare Recherche Bay as a national heritage site of great scientific, historical and cultural significance. It also reviewed current work on the history of French exploration, the scientific implications of the discoveries at Recherche Bay and the socio-political significance of the site. The Forum was held at the CSIRO Marine and Atmospheric Research Auditorium in Hobart from 27–28 February 2007.

The dinner address, 'Voyaging through strange seas of thought', was given by Sir Guy Green, Chairman of the Trustees of the Tasmanian Museum and Art Gallery. A transcript of his address is at:

www.naf.org.au/recherchebay/green.htm

Established in 1995, the Forum provides a basis for cooperative activities by the four Academies and a common point of access to the Academies for external organisations and individuals. It promotes a unified national vision, helping to overcome the difficulties that have often separated science, technology and engineering from the social sciences and the humanities. Information and abstracts are available at:

www.naf.org.au/recherchebay/index.htm



Site of great significance: Recherche Bay

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