AUSTRALIAN ACADEMY OF SCIENCE

NEWSLETTER

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Innovation action plan – 'actions louder than words'

John Howard launching the innovation action plan. Photo: AUSPIC

The Academy of Science has described the Federal Government's innovation action plan as historic. The plan, called Backing Australia's Ability, was announced by the Prime Minister, Mr John Howard, on 29 January 2001 at an event in Sydney hosted by the Academy of Science and the Academy of Technological Sciences and Engineering.

Over five years the plan will add $2.9 billion to the research base. The aims, Mr Howard said, are 'strengthening our ability to generate ideas and undertake research, accelerating the commercial application of these ideas, and developing and retaining Australian skills'.

Details of the plan are available at **www.isr.gov.au/iap/index.html**.

The President of the Academy, Professor Brian Anderson, delivered an address in reply to the Prime Minister. He said, 'This has been a key if not historic moment for innovation in Australia.'

Professor Anderson described a process which began during preparation for the National Innovation Summit in early 2000. There the Federal Government committed itself to respond to the summit's recommendations and considerations. The partnership between business, research, education and government continued through the Innovation Summit Implementation Group, which delivered its report later in the year.

Professor Anderson said, 'At the summit the Prime Minister challenged us to judge him by his actions in addressing the innovation needs of Australia. Today, I believe we can say that his actions speak far louder than words.

'These actions touch our businesses, our schools, our universities. They target excellence and they target national priorities, areas where we can do better and ought to have been doing better: biotechnology, and information and communications technology.

'The policy changes should pay immense dividends in the future. They constitute not just the implementation of a repair program. They include new policies, rather than just the old policies with extra money.

'They are hugely important symbolically too, declaring to all Australians what is crucial for our future.'

Professor Anderson applauded the inclusion, within an integrated package, of measures such as:

- the cash out for small and medium enterprises of the research and development tax concession
- the 175 per cent concession for incremental research and development
- the doubling of the COMET (commercialising emerging technologies) fund
- the doubling of funding for the Australian Research Council
- the significant expansion, in cash and access terms, of the Cooperative Research Centres scheme
- infrastructure funds for the almost-beleaguered university sector
- the creation of new centres of excellence in information and communications technology, and biotechnology.

'Today, the government has delivered, as it needed to, an innovation strategy which can only move Australia forward,' said Professor Anderson.

'It is important, however, that we keep in mind that this is only the beginning. We must continue to work together to ensure we get the most out of today.

'Certainly, the Academies are determined to be partners in building the exciting new Australia. This is an Australia in which I hope we soon will see the community honouring the corporate and individual science and technology heroes for their international successes, as we today honour our cricket teams and Olympic heroes.

'I hope that there will be general support from not just the business and research communities, but the community as a whole, as the government works to implement the strategies it has announced today. They will deliver better jobs, greater wealth, better health and a better environment, and a more secure defence.

'The next steps are up to those of us working in research and innovation.'

Shortly after the event Professor Anderson said, 'We got to this point because a number of people outside the civil service put in a great deal of time arguing the case to people whose background in a technical area was minimal. It was a long process to build understanding but the case was fundamentally a logical one. Massive changes were needed and this has been appreciated.'

He said the innovation plan in places has gone beyond the recommendations of the Chief Scientist, Dr Robin Batterham, in his report, *Chance to change*. It had responded also to suggestions in

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This newsletter is available on the Academy's web site, **www.science.org.au/academy/newslett/newslett.htm.**

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Innovation action plan

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the information and communications technology report to the Prime Minister's Science, Engineering and Innovation Council (see report on page 3). The centre of excellence for information and communications technology, the Federation Fellowships and the extra funding for cooperative research centres were all responses to this report.

'Information technology is now a generic discipline that underpins many others, in the same way as mathematics,' he said. 'But unlike mathematics, information technology has been an area where Australia has been horribly weak. The innovation plan gives us a base for the future.'

He observed that the rules for access to the tax concession for investment in industrial research and development have been changed: the investment now has to be both risky and technically innovative, rather than one or the other as previously. 'Will this cut like a scythe through companies currently entitled to tax concessions? We simply do not know. It would, however, be a major concern to the Academy (and presumably the government) if this was the effect. It is fine to do away with rorts, but we want to keep genuine research and development.' He also stated that he was hopeful that the plan would receive clear bipartisan support, to allay fears that recasting of the framework remained a possibility.

He believed that the innovation plan would get good people back to Australia. 'People go overseas for three reasons: excitement, lack of support here, and better salaries. Excitement will come from having new centres of excellence and more critical mass groups, which the Australian Research Council intends to fund. Support will get better with improvements to university infrastructure. And the opportunity to pay attractive salaries may come through larger research grants, well funded centres and the Federation Fellowships.'

Biodiversity conservation in freshwaters

Same landscape, different perspective

Fenner Conference on the Environment
5–8 July 2001
Shine Dome, Canberra

As we struggle to provide adequate freshwater to meet human needs, freshwater biodiversity is coming under threat. This conference will provide a forum for fresh approaches to biodiversity conservation in freshwaters and other inland aquatic ecosystems.

More information is at **aerg.canberra.edu.au/fenner**.

Forthcoming events

- In the round – the design and construction of the Australian Academy of Science's Shine Dome, 6 April to 27 May 2001, Canberra Museum and Gallery – see page 7
- Behind the scenes at the Dome, 11 and 27 April and 8 May 2001 – see page 7
- *Science at the Shine Dome*, 2 to 4 May 2001 – see page 7

New topics on *Nova*

- Death-defying designs for car safety
- Putting it together – the science and technology of composite materials

Nova: Science in the news is at **www.science.org.au/nova.**

Basser Library

Anyone wishing to use the Basser Library should contact the librarian, Rosanne Walker, telephone (02) 6247 9024 or email **rosanne.walker@science.org.au.**

Gifts to the Academy

If you would like to make a gift or a bequest to the Academy of Science or the Australian Foundation for Science, please contact the Executive Secretary or the Development Officer, telephone (02) 6247 5777 or email **es@science.org.au.**

Time to build IT research

Shortly before the Federal Government's innovation statement was made, a working group of the Prime Minister's Science, Engineering and Innovation Council recommended increased funding for research in information and communications technology.

The Academy's President, Professor Brian Anderson, who is Director of the Australian National University's Research School of Information Sciences and Engineering, chaired the working group. The report, titled *Australia's Information and Communications Technology Research Base: Driving the new economy*, was released in December 2000.

The report observed that Australia had failed to produce and sell information and communications technologies. This was partly due to a weak research and development effort.

The report recommended spending $555 million over five years on the creation of two major research centres of excellence, 20 research chairs, 35 research fellowships and five demonstrator programs in information and communications technology. It suggested that infrastructure be improved through the investment of $161 million in high performance computers, an experimental optical fibre broadband communication network, digital libraries and microelectronic technology.

The report also recommended that public funds of $30 million be used to stimulate the private sector, in part via a new program designed to enable small and medium enterprises to be born global or grow global.

Changes to immigration arrangements were also recommended, to try to ease the labour shortage in the information and communications technology area.

The report said that patent performance was poor and declining. Citation impact factors were unfavourable. Past government efforts to stimulate innovation had been inadequate. 'In part, this can be attributed to government research and development investment not changing to reflect the increasing economic significance of information and communications technology.'

The report also explained how the Commonwealth Department of Education, Training and Youth Affairs funding arrangements for computer science were completely anachronistic.

The report is available from **www.isr.gov.au/science/pmseic/publications.html.**

Earlier boost for Cooperative Research Centres

Even before the Prime Minister's innovation action plan expanded the Cooperative Research Centres scheme, the Minister for Industry, Science and Resources, Senator Minchin, restored the scheme to its earlier level of support with the funding of 19 centres. This earlier round of funding, bringing the program back to $140 million per year, was announced on 18 January 2001.

The Academy's Secretary (Science Policy), Professor John White, said that the Cooperative Research Centres 'highlight science's contribution to developing new national wealth and producing it sustainably'.

He said that the notion of sustainability included the capacity to discover new resources to replace those being depleted and to produce and use resources in ways that caused the least collateral damage to the environment. Several of the new centres will be devoted to these goals.

'We can be confident that, by investing in good people and addressing significant problems, we will see substantial gains to the Australian people in jobs, wealth and a better environment over the next 10 years,' Professor White said.

New CSIRO chief

The President of the Academy of Science, Professor Brian Anderson, has welcomed the appointment of the new Chief Executive of CSIRO, Dr Geoff Garrett. The appointment of Dr Garrett, the former Chief Executive of CSIR in South Africa, was announed in November 2000.

Professor Anderson said, 'I am particularly pleased to see the emphasis that Dr Garrett places on excellence in scientific research. He has said that this is what distinguishes a top research organisation from those that under-perform.'

The Chair of the CSIR Board in South Africa has said, 'he has added great value for our country'. Professor Anderson said that that is also an important goal for CSIRO.

He said, 'I wish him well in his work and offer him the wholehearted cooperation of the Academy.'

ABC takes a leap backwards

The Academy of Science has criticised the ABC's decision to close down its television science unit.

When the decision was announced in November, the Academy's Secretary (Science Policy), Professor John White, said that it was ironic that at a time when the Federal Government was considering the need for science-based innovation, that the national broadcaster should decide it could do without an in-house television science production group.

He said that the reports of the Chief Scientist, Robin Batterham, and the Innovation Summit Implementation Group both contained 'a strong sense of urgency about the need to improve Australia's performance in research, commercialisation of research and innovation.

'Both reports base the reforms we need on an enhanced public awareness of the opportunities and risks presented to Australia by a world of rapid, global changes based on new technologies,' said Professor White.

'Australia cannot afford to have its national broadcaster drop its bundle at such a critical period.'

Academy awards

The Academy of Science has announced its medallists for 2001. Details of the scientists and their work will be included in the next newsletter.

Senior scientists

Burnet Medal and Lecture – **Professor Grant Sutherland**, Director, Department of Cytogenetics and Molecular Genetics, Women's and Children's Hospital, North Adelaide

Craig Medal – **Professor Michael Paddon-Row**, School of Chemistry, University of New South Wales

Hannan Medal – **Professor Adrian Baddeley**, Department of Mathematics, University of Western Australia

Jaeger Medal – **Dr Bruce Hobbs**, Chief, CSIRO Exploration and Mining

Haddon King Medal – **Dr John Hunt**, Hunt Exploration Inc

Ian Wark Medal and Lecture – **Dr Ken McCracken**, formerly of CSIRO

Lyle Medal – **Professor Ian Sloan**, School of Mathematics, University of New South Wales

Junior researchers (under 40 years)

Fenner Medal – **Dr Barry Pogson**, Australian National University

Gottschalk Medal – **Dr Christopher Goodnow**, John Curtin School of Medical Research, Australian National University

Moran Medal – **Dr Aihua Xia**, University of New South Wales

Pawsey Medal – **Dr Brian Schmidt**, Mt Stromlo and Siding Spring Observatories, Australian National University

Foundation passes $5 million mark

By November 2000 the Australian Foundation for Science had received donations and sponsorships totalling more than $5 million. Another $1 million has been pledged as future donations and bequests. The Foundation was established in 1990.

Telstra sponsors *Nova*

Telstra has become the principal sponsor of the Academy's *Nova: Science in the news* website. The sponsorship, worth $80 000 per year for three years, will go towards *Nova*'s development and infrastructure costs.

The Telstra sponsorship builds on the support provided over the last four years by both the Australian Foundation for Science and the Science and Technology Awareness Program of the Commonwealth Department of Industry, Science and Resources. A number of companies, research organisations, government agencies and philanthropic trusts have also sponsored individual topics, with more lining up to do so.

The Academy's Treasurer, Professor Athel Beckwith, announced the Telstra sponsorship at the annual general meeting of the Australian Foundation for Science in November.

'With infrastructure support from Telstra and the Science and Technology Awareness Program, and with such keen interest from potential topic sponsors, we expect *Nova* to flourish,' Professor Beckwith said.

Nova has become a very popular website and a major educational activity of the Academy. In the 12 months to December 2000 the number of visits to the site was 992 145, nearly twice as many as in the previous year.

Part of this growth is the result of *Nova* being a favourite link from other websites. This is reflected in the prominence of *Nova* topics in the 'top ten' results for keyword searches on the web's largest search engine, *Google*.

Supported by the Australian Foundation for Science

Science for senior citizens

The Academy of Science received funding from the ACT Advisory Council on Adult and Community Education to hold a series of science lectures and activities for senior citizens. Jane Brown, a former science consultant to the ACT Department of Education, coordinated the sessions, which were held at the Woden Senior Citizens Club and the Woden Community Centre in Canberra.

The sessions consisted of a talk by a guest speaker on a scientific topic, followed by related science activities from *Primary Investigations*, the Academy's successful science, technology and environment program for primary schools. Participants not only gained knowledge of current issues and scientific processes, but they also had a lot of fun.

Funding has been received from the ACT Advisory Council on Adult and Community Education to run another series in 2001.

Supported by the Australian Foundation for Science

Professor Etienne Emile Baulieu

Baulieu visit

Professor Etienne Emile Baulieu, the Professor of Human Reproduction at the Collège de France, and a Member of the French Académie des Sciences, visited Australia under the Academy's Bede Morris Fellowship Scheme from 29 October to 4 November 2000.

At the University of Melbourne he delivered the fourth Kenneth Myer lecture on 'Steroid hormones in the control of world population and in the prevention of ageing'. At the Howard Florey Institute he gave a lecture on the role of neurosteroids in memory, nerve repair and ageing.

In Sydney he delivered two lectures on neurosteroids at the Garvan Institute of Medical Research and at the eleventh International Congress of Endocrinology.

Caughley Fellow promotes goannas and echidnas

Dr Peggy Rismiller is a wildlife ecologist at the University of Adelaide and senior researcher at the Pelican Lagoon Research and Wildlife Centre on Kangaroo Island. In August and September of 2000 she travelled to Europe with the Academy's Graeme Caughley Travelling Fellowship to share her ecological fieldwork results with scientists and the general public.

At the International Hibernation Symposium in Austria, held every four years, Dr Rismiller presented her paper entitled 'Spontaneous arousal in reptiles? Body temperature ecology in Rosenberg's goanna'. It was the only field study-based paper that reported on body temperature regulation of a non-mammalian animal and stimulated discussion about temperature evolution. In a later discussion, researchers praised the development of an interdisciplinary approach to understanding and applying principles of metabolic depression and torpor.

Following this, Dr Rismiller travelled to Hannover in Germany, where she visited World Expo 2000, an exposition of the development of human kind and its future. Pelican Lagoon Research and Wildlife Centre represented Australia with a project which emphasised the importance of maintaining habitats and ecosystems intact for the health and future of all species. A significant result was that aspects of echidna and goanna research were incorporated into an online curriculum for high school students. Dr Rismiller said the exposition 'was a living example of how people from all walks of life, all countries of the world and all ages can have a positive interaction with science.'

While in Hannover, Dr Rismiller visited the School for Veterinary Medicine, where she presented a seminar for students and staff called 'Warm reptiles and cool mammals'. This talk explained how to design transmitters and perform field surgery, how echidnas use torpor and the possible biotechnology advances that could come from using the heating physiology of a tiger snake as a model for effective solar collection.

After Hannover Dr Rismiller travelled to Philipps University in Marburg and gave a seminar at the Department of Zoology. Much of the research she observed was related to torpor and body temperature regulation. The university has developed transportable equipment which could be used for analysing the mechanisms used by Rosenberg's goanna to regulate its temperature. Cooperative field work is being planned between the German laboratory and the Pelican Lagoon Research Centre.

Next Dr Rismiller went to Winchester in England, where she spoke to the Marwell Zoological Society. Dr Rismiller talked about the biological diversity of Kangaroo Island and the conservation significance of working in a natural laboratory. Both the echidna and Rosenberg's goanna have adapted as species, but their survival is threatened by new pressures on ecosystems and habitats.

Dr Rismiller said, 'The personal contact made possible through the Caughley Travelling Fellowship has formed an invaluable international link between research and education.'

In London, Dr Rismiller participated in the British Association Festival of Science, which had the theme 'Creating Sparks'. The festival explored people's visions of the sciences and arts in the approach to the new millennium.

Dr Rismiller's presentation emphasised the necessity of long-term field research, with the echidna as an example. She recounted her studies of the echidna, possible survival strategies and their implications for human beings. The echidna, as one of the oldest surviving mammals in the world, caught the imagination of the public and the news media, resulting in extensive coverage in Britain, Australia and other countries.

On her return Dr Rismiller said, 'sharing research results, ecological and otherwise, with both the academic community and the public at large is essential for the future of science.' She appreciated the opportunity offered by the Graeme Caughley Fellowship to increase contact between scientists and the rest of the world.

Feast of cooperation with Europe

The European Union is Australia's largest scientific partner, through collaboration on bilateral and multilateral projects.

The diplomatic missions representing European countries in Australia agreed in August 2000 to embark on an initiative of the French Presidency to be known as the Forum for European-Australian Science and Technology cooperation (FEAST). In concert with major Australian science organisations, including the Academy of Science, they will take common action to highlight and improve scientific cooperation between Europe and Australia.

A joint European-Australian implementation group was established in October 2000. Australian members were the Commonwealth Department of Industry, Science and Resources, the Australian Research Council, CSIRO, the Australian National University, the Academy of Science and the Academy of Technological Sciences and Engineering. European countries represented were Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, the United Kingdom and the Delegation of the European Commission to Australia and New Zealand.

The forum has two components: an electronic forum delivering information and services, and working meetings.

The first event of the forum will be FEAST1, a conference to be held at the Academy in Canberra on 30 and 31 May 2001. This will bring researchers and leading science administrators together and describe European and Australian research frameworks and trends. There will be workshops on international exchanges, other research links and opportunities. A plenary session will plan further action.

The forum would like to hear from Europeans conducting or administering research in Australia or Australian researchers with strong European links. The website is at **www.france.net.au/feast**. For more information on FEAST1 telephone Nancy Pritchard at the Academy on (02) 6247 3966 or email **io@science.org.au**.

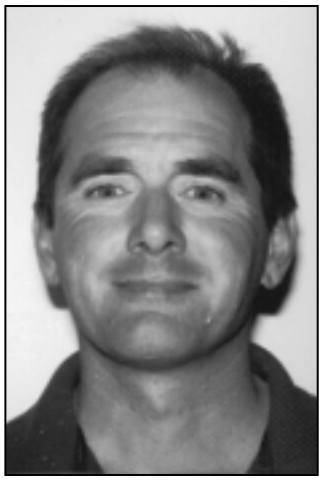
Scientific visits to Europe

The Academy of Science has selected three scientists to visit Europe in the coming year on special fellowships.

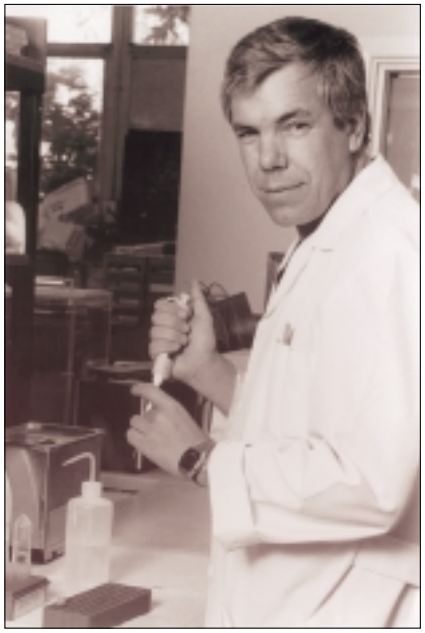
Two of the scientists will travel to France under the Bede Morris Fellowship Scheme and one will travel to England on a fellowship being supported by the British High Commission and the British Council to celebrate the Centenary of Federation.

The French Embassy Fellow, funded by the French Embassy under the Bede Morris Fellowship Scheme, is **Associate Professor Mark Adams**, from the Department of Botany at the University of Western Australia. Associate Professor Adams will go to the Institut National de la Recherche Agronomique in Nancy to study the acclimatisation of *Pinus pinaster* to increasing carbon dioxide in the atmosphere.

The increasing concentration of carbon dioxide in the atmosphere is causing the greenhouse effect. Since carbon dioxide is an ingredient in photosynthesis, an increasing concentration could also affect the growth of plants. Using *Pinus pinaster*, an important forestry species in France and Australia, Associate Professor Adams will investigate the acclimatisation of photosynthesis to increasing atmospheric carbon dioxide. He also plans to take into account changes in rainfall and cloud cover that may occur at the same time. This will help predict the productivity of forests and their response to nitrogen from the atmosphere or from fertiliser.



Associate Professor Mark Adams



Associate Professor Paul Attwood

The Centenary of Federation Fellow is **Associate Professor Paul Attwood**, from the Department of Biochemistry at the University of Western Australia. Associate Professor Attwood will visit the University of Kent, to analyse the kinetics of an enzyme-catalysed reaction.

Enzymes are proteins which promote reactions in living things and some industrial processes. While biochemists can work out what goes in (the substrate) and what comes out (the product) of reactions, because of their speed and small scale, the details of what occurs in between are very difficult to observe.

Associate Professor Attwood plans to employ recent developments in rapid mixing techniques and electrospray mass spectrometry to quickly detect intermediates – such as the complex molecule formed by the enzyme and the substrate – in reactions catalysed by trypsin. He hopes to obtain a complete kinetic profile of a reaction by measuring substrate disappearance, the formation and disappearance of intermediates, and the formation of the final product. If successful, this would be the first such analysis of an enzyme-catalysed reaction.

The Australia-France Foundation Fellow, funded by the Australia-France Foundation under the Bede Morris Fellowship Scheme, is **Dr Alain Pierret**, of CSIRO Land and Water. Dr Pierret will visit the Institut National de la Recherche Agronomique in Avignon to model water uptake by roots under limiting soil conditions.

How the roots of crop plants find their way through the soil affects the plants' ability to take up water and grow. So the structure of the soil and the availability of water (especially during drought) limit crop yields.

Dr Pierret seeks to understand the constraints to root growth and water use by studying the blue lupin, Lupinus angustifolius. This is the principal grain legume grown in the sandy soils of Western Australia. It also has a simple root system. He will model the water use efficiency of the plant under constraining conditions – dense soil and drought. He hopes to find out how to overcome these constraints and improve the efficiency with which crops use resources.

Dr Alain Pierret

Awards for endangered species research

The Academy of Science has announced the 2001 winners of research awards from the Academy's fund for the conservation of endangered Australian vertebrate species. The fund supports research which has the aim of understanding the causes of species' decline with a view to instituting, or improving, the management of the conditions necessary for the species' recovery.

Dr Peter Banks, a lecturer in zoology at the University of New South Wales, will do a project on the transmission of toxoplasmosis from feral cats to native animals.

Cats and foxes are the foremost enemies of small mammal conservation. As well as hunting the mammals, cats spread the parasite, *Toxoplasma gondii*, which causes reduced immunity, lethargy, breathing problems and death in bandicoots, kangaroos and quolls. Recent research suggests that the parasite also alters cat-avoiding behaviour and causes the mammals to be attracted to their killers.

Dr Banks plans to investigate the effects of toxoplasmosis on the behaviour of native mammals.

Russell Palmer, a PhD student in zoology at the University of Queensland, will use the fund to conduct research into the impact of feral cats on the bilby in the channel country of southwest Queensland.

The greater bilby, *Macrotis lagotis*, once inhabited most of the dry interior of Australia, but survives only in two populations in southwest Queensland and northwest Australia. These are declining. Feral cats and toxoplasmosis could be the cause.

Mr Palmer aims to conduct research which will show the ecological links between cats, toxoplasmosis and the bilby in southwest Queensland. By gaining a better understanding of feral cats, he hopes that effective management can minimise their impact on the bilby.

Dr Jonathan Webb, from the Northern Territory University, will conduct research into restoring habitat for the broad-headed snake in the Sydney basin.

The endangered broad-headed snake, *Hoplocephalus bungaroides*, was once common on Sydney Harbour foreshores. This brightly coloured nocturnal snake is restricted to sandstone habitats within 200 kilometres of Sydney. It shelters under thin rocks. The collection of bush rock for gardens has led to local extinction from much of its range.

Dr Webb, who did his PhD on the snake, will undertake a survey to find surviving populations, especially in national parks, and to learn more about the snake's decline. He will collect tissue for genetic studies and hopes to restore degraded habitats with artificial or substitute rocks.

With a special award, **Ecobyte Pty Ltd** will develop a CD-ROM for the identification of mammals from analysis of hair.

Nearly 30 years ago, Mr Hans Brunner developed a technique for identifying mammal species from samples of hair, using thin cross-sections and the special properties of the surface of the hair. This technique, described in the book *Identification of Australian Mammalian Hair*, has become an invaluable resource for wildlife biologists. Hairs in the scats of foxes and cats show what they are eating; hairs collected in fibreglass cones show what animals live in an area. This has extended the knowledge of the range of endangered mammals and helped create reserves.

Since the publication of the book, many more species of hair have been described and researchers have gained great experience in the use of the technique.

Electronic publishing would allow the original technique, accumulated expertise, and old and new information to be brought together and passed on. With seed funding from the Academy and assistance from Mr Brunner, Ecobyte will prepare a CD-ROM for field testing. If that is successful, the company would seek funding from a commercial publisher.

Shine Dome events

The Academy's refurbished Dome will soon be open for seminars, conferences and other events. It also features in a number of activities for the Centenary of Federation, which are listed at **www.science.org.au/dome/events.htm**.

Canberra Museum and Gallery

From 6 April to 27 May 2001, the Canberra Museum and Gallery will mount an exhibition called 'In the round – the design and construction of the Australian Academy of Science Dome'. The exhibition will feature original architectural sketches and plans by Sir Roy Grounds, photographs of the Dome during construction, and more than 35 Dome souvenirs – from beer mugs to matchboxes. There will also be related seminars, lectures and tours.

Behind the scenes at the Dome

Tours of the Dome will be held on 11 April as part of the ACT Heritage Festival, and on 27 April and 8 May as part of the Australian Science Festival. To find out more information or to book a tour, phone Sue Fraser at the Academy on (02) 6247 5777 or email **ds@science.org.au**.

Science at the Shine Dome

The Academy is launching its first *Science at the Shine Dome* program, in conjunction with National Science Week and the Australian Science Festival. This three-day event, from 2 to 4 May 2001, is open to the public, and there are special programs and awards for science teachers and early-career researchers.

Newly elected Fellows will present 10-minute talks about their research on 2 May, and award presentations and the Burnet Lecture by Professor Grant Sullivan will be featured on 3 May. A public symposium on research into human genetics and its impact on society, called 'Cracking the code – using the code: The Human Genome Project and its applications', will be held on 4 May. For programs and registration information visit **www.science.org.au/sats**.

2001 overseas exchanges

Scientists will travel to Asia, Europe and North America in 2001 under the Academy's international exchange programs with the three regions. The program is funded as part of the Department of Industry, Science and Resources' International Science and Technology Networks element of the Technology Diffusion Program and by agencies in the host countries.

Korea

Dr Craig Hayward, currently at Chungbuk National University, will stay at the university to study metazoan parasites of fish.

Dr Min-Seok Sohn, of the University of Western Australia, will visit the Korea Advanced Institute of Science and Technology to study properties of polymer matrix composites for acoustic sensor application.

Dr Golshah Naghdy, of the University of Wollongong, will visit Seoul National University to establish an alliance for the design and development of a computer vision chip.

Dr Robert Gulley, of the Australian National University, will visit Chungnam National University to develop an electron spectrometer to investigate problems in atomic and molecular collision processes.

Dr Srdjan Nesic, of the University of Queensland, will visit Inha University to study mass transfer in turbulent flow.

China

Dr Fawang Liu, of the Queensland University of Technology, will visit the Chinese Academy of Sciences in Guangzhou, to study the numerical modelling of seawater intrusion on the Australian East Coast.

Dr Long Yu, of CSIRO Molecular Science, will study crystalline polymers at the Chinese Academy of Sciences in Beijing.

Dr Richard Archer, of the University of New South Wales, will visit the University of Science and Technology of China to study injected liquid and bubble break up in low and high speed airstreams.

Dr Shisan Bao, of the University of Sydney, will visit the Chinese Academy of Sciences in Shanghai to study mucosal immunity.

Dr Ninghu Su, of the Queensland University of Technology, will visit the Chinese Academy of Sciences in Shijiahuang City to study seawater intrusion of coastal aquifers and related salinity problems along coastal and near-coastal regions in Australia and China.

Taiwan

Dr Lingxue Kong, of Deakin University, will visit Chung Yuan University to investigate coupled heat and moisture transfer through porous textiles.

Japan – Japan Society for the Promotion of Science

Dr Sergey Kun, of the Australian National University, will visit Kyoto University to study slow phase randomisation in nanostructures.

Dr Theodore Evans, of CSIRO Entomology, will visit Kyoto University to study termite communication.

Dr Chao Zhang, of the University of Wollongong, will visit Tokai University to study electronic transport in semiconductor nanostructures.

Professor Anthony Dooley, of the University of New South Wales, will visit Kyushu University to study ergodic theory, harmonic analysis and their application to von Neumann algebras.

Dr Hubert Chanson, of the University of Queensland, will visit Toyohashi University of Technology to study the impact of breaking waves on air-sea interactions.

Dr Ha Ming Ang, of Curtin University of Technology, will visit Himeji Institute of Technology to study the control of crystallisers.

Dr Sandra Kentish, of the University of Melbourne, will visit Osaka University to study molecular dynamics simulation.

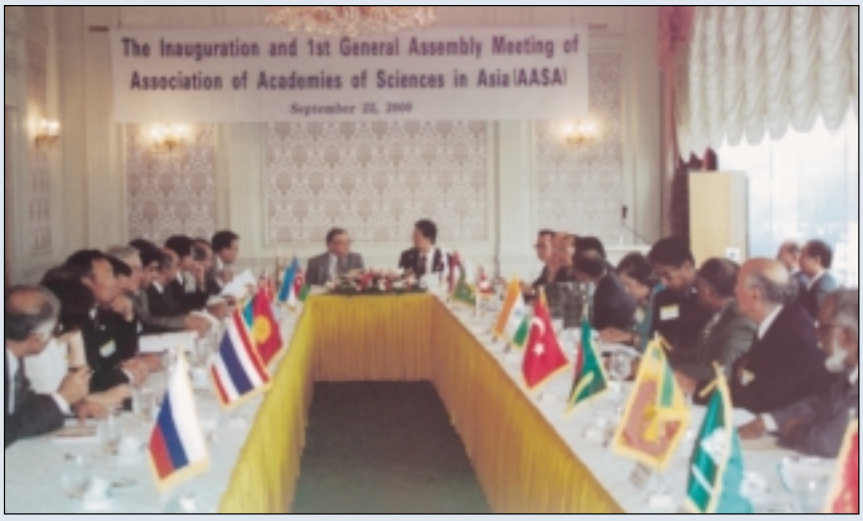
Dr Lap Van Dao, of the University of New South Wales, will visit Tohoku University to investigate quantum dots.

Dr P Sharp, of the University of Sydney, will visit Yokohama City University to study wheat genomics.

Professor Yuri Kivshar, of the Australian National University, will visit Osaka Institute of Technology to study light localisation in non-linear photonic crystals.

Dr Dong Sheng Jeng, of Griffith University, will visit Kyoto University to study non-linear wave-induced liquefaction.

Dr Jun Wang, of the Queensland



Asian academies meet

A member of the Academy's Council, Professor David Boger, attended as an observer the inauguration and first general assembly of the Association of Academies of Sciences in Asia, held in South Korea in September 2000.

University of Technology, will visit Tohoku University to study micro-machining using jetting technology.

Dr Taoufik Ksiksi, of the Queensland Department of Primary Industries, will visit Miyazaki University to study spatial heterogeneity in herbage as it relates to grazing patterns of cattle.

Mr Phillip Isaac, of the University of Queensland, will visit the University of Tokyo to study quantum spin chains.

Mr Benjamin Goss, of the Queensland University of Technology, will visit the Japan Advanced Institute of Science and Technology to study the oxidation of plastics.

Mr Christopher MacMeikan, of the University of Sydney, will visit the Science University of Tokyo to study semisimple algebraic groups.

Dr Nazrul Islam, of the University of Sydney, will visit Yokohama City University to study growth temperature variations and starch granule-bound protein in wheat.

Mr Andrew Baird, of Sydney, will visit the University of the Ryukyus to study coral larval nutrition.

Dr James Sullivan, who is currently at the University of California in San Diego, will visit the Photon Factory in Tsukuba to study electron photoprocesses in atoms.

Mr Chirag Sathe, of Monash University, will visit Hokkaido University to study the rapid pyrolysis and steam reforming of Victorian lignite.

Mr Peter Woodfield, who is at Kyoto University, will stay on to study the combustion and turbulent mixing of confined jets.

Japan – Science and Technology Agency

Dr Graciela Metternicht, of Curtin University of Technology, will visit the Environmental Agency of Japan to find better ways to use remotely sensed data and advanced image processing techniques.

Dr Izabela Konczac-Islam, of Food Science Australia, will visit Sweet Potato Breeding Laboratory of the Kyushu National Agricultural Experiment Station to study antimutagenic and antioxidative activity of anthocyanin pigment.

Dr Mark Humphrey, of the Australian National University, will visit the Institute of Physical and Chemical Research in Saitama to study alkynylruthenium dendrimers.

Dr Philip Tong, of the Australian Government Analytical Laboratory, will visit Gifu Prefectural Institute of Health and Environmental Studies to develop a sensitive method for the determination of quizalofop ethyl in biological matrix.

Dr Ilya Budovsky, of CSIRO Telecommunications and Industrial Physics, will visit the Agency of Industrial Science and Technology in Tsukuba to conduct research into a single flux quantum Josephson-effect digital-to-analog converter.

Dr Roderick Oliver, of the Murray Darling Freshwater Research Centre, will visit Lake Biwa Research Institute to study the influence of water on the growth of cyanobacteria in Lake Biwa.

Europe

Dr Colin Nexhip, of CSIRO Minerals, will visit the Institute of Space Simulation in Germany to measure the thermophysical properties of levitated metallic droplets.

Professor Istvan Toth, of the University of Queensland, will visit the Universita di Catania in Italy to study a liposaccharide-based drug and peptide delivery system.

Dr Peter Spencer, of Murdoch University, will visit Georg-August-Universität in Germany to study the use of ancient DNA to assist in the conservation of Australia's endangered mammal fauna.

Dr Patricia Ridgway, of the Australian National University, will visit the Institut Curie in Paris to study early developmental gene expression patterns and the maintenance of chromosome stability.

Dr Anatoli Kheifets, of the Australian National University, will visit Universität Freiburg in Germany to study atomic double ionisation by electron and heavy ion impact.

Dr Caroline Mohammed, of the University of Tasmania, will visit the University of Birmingham to study free radical formation in young eucalypts with stem decay fungi.

Dr Graeme Allinson, of Deakin University, will visit the DLO Winard Staring Centre for Land, Soil and Water Research in the Netherlands to study the transport of chemicals in soils and water repellency.

Dr Judith Greer, of the University of Queensland, will visit the Université Louis Pasteur in France to investigate the enhancement of autoimmune responses.

Dr Fabio Boschetti, of CSIRO Exploration and Mining, will visit the National Survey and Cadastre in Denmark to study the inversion of seismic and gravity data via interactive visualisation.

Dr Wieslaw Krolikowski, of the Australian National University, will visit the Technical University of Denmark to study modulation instability, soliton formation and interaction in non-local non-linear media.

Associate Professor Christopher Bertram, of the University of New South Wales, will visit the Universität Freiburg in Germany to study the distinction between chaotic and stochastic dynamics in forced/unforced oscillations.

Associate Professor Nicholas Sangster, of the University of Sydney, will visit the Queen's University of Belfast to identify novel neuropeptides in the parasitic nematode, *Haemonchus contortus*.

Dr Katharine Trenholme, of the Queensland Institute of Medical Research, will visit the Institute of Molecular Medicine in Oxford to study cellular and molecular aspects of clag 9.

Dr Monique Wolvekamp, of Monash University, will visit the Landbouw Universiteit Wageningen in the Netherlands to evaluate cloning technologies for the propogation of the endangered northern hairy-nosed wombat.

Professor Eugene Gamaly and **Dr Andrei Rode**, of the Australian National University, will visit the Foundation for Research and Technology in Greece to study the deposition of diamond-like films by ultraviolet laser ablation.

Dr Brett Glencross, of the Mariculture Research and Advisory Group of Fisheries Western Australia, will visit the Institut National de la Recherche Agronomique in France to assess aquaculture diet technology for the improvement of plant protein resource use.

Dr Don Gardiner, of the Menzies School of Health Research, will visit the Universiteit Leiden in the Netherlands to study rodent malarias.

Dr Julienne Harnett, of the University of Technology, Sydney, will visit the Max Planck Institüt für Radioastronomie in Germany to study magnetic fields in southern barred spiral galaxies.

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2001 overseas exchanges

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Dr Max Lederer, of the Australian National University, will visit the Universität Karlsruhe in Germany to study mirrors for lasers.

Dr Rachel Sherrard, of James Cook University of North Queensland, will visit the Université Pierre et Marie Curie in Paris to study the electrophysical properties of compensatory climbing fibres.

Dr Jin Zou, of the University of Sydney, will visit the University of Oxford to study the atomic structure of defects in engineered semiconductors.

North America

Dr Steven Bottle, of the Queensland University of Technology, will visit Colorado State University to study the use of flourescent switching radical scavengers as DNA probes.

Associate Professor Rose Amal, of the University of New South Wales, will visit DuPont in Delaware to explore different processes for coating titanium dioxide onto protected magnetic particles.

Dr Kurt Liffman, of CSIRO Building, Construction and Engineering, will visit the University of Hawaii at Manoa to study the jet flow model of chrondule and CAI formation.

Dr Mark Dieters, of the Queensland Forestry Research Institute, will visit the University of Florida to study software for the analysis of unbalanced data from clonally replicated tests of forest trees.

Dr Chris McSweeney, of CSIRO Livestock Industries, will visit Ohio State University, to study the functional genomics of fibrolytic rumen bacteria.

Dr Karen Stott, of the University of Tasmania, will visit the Instituto de Ecologia in Mexico to study the cultivation of specialty gourmet and medicinal fungi using substrate developed from waste products.

Dr Abdelmalek Bouazza, of Monash University, will visit the University of Sherbrooke in Canada to study oxygen diffusion flux through geosynthetic clay liners in mining waste cover systems.

Dr Ian Whittington, of the University of Queensland, will visit the Centro de Investigacion en Alimentacion Y Desarrollo in Mexico to study pathogenic flatworms parasitic on cultivated fin fish.

Dr Huai Yong Zhu, of the University of Queensland, will visit Michigan State University to study the synthesis, characterisation and catalytic application of metal oxide intercalated clays.

Dr Anh V Nguyen, of the University of Newcastle, will visit the University of Florida to study surface forces in the flotation separation of minerals.

Associate Professor Tailoi Chan-Ling, of the University of Sydney, will visit the University of Rochester to study type-1 astrocyte precursor cells from rat retina.

Dr Vladimir Kazakov, of the University of Sydney, will visit San Diego State University to use genetic engineering algorithms for adaptive grid generation.

Dr Jocelyn McPhie, of the University of Tasmania, will visit Northern Arizona University to study textures in large-volume felsic lavas.

Dr Arne Dahle, of the University of Queensland, will visit Ford Research Laboratory in Michigan to study the control of solidification and defects in automotive castings.

Dr Wen Xu, of the University of Wollongong, will visit Concordia University in Canada to study semiconductor systems in coupled strong magnetic fields and intense laser fields.

Dr Martin Steinbauer, of CSIRO Entomology, will visit the Canadian Forest Service to study population monitoring and behaviour of outbreak forest lepidoptera.

Dr Renate Sliwa, of CSIRO Exploration and Mining, will visit Residuum Energy Inc in Utah to identify hidden basement control on coal depositional systems in the Bowen Basin, Queensland.

Dr Irene Pestov, of the Bureau of Rural Sciences, will visit Lawrence Berkeley National Laboratory to study groundwater flow and mass transfer in the Great Artesian Basin of Australia.

Dr Marc Raimondo, of the University of Sydney, will visit Stanford University to study inverse estimation from scale-space dependent data.

Dr Louis Moresi, of CSIRO Exploration and Mining, will visit Rice University to study mantle/crust deformation during continental collision.

Professor Svetha Venkatesh, of the Curtin University of Technology, will visit the IBM T J Watson Research Center to study computational media aesthetics.

Nobel laureates to visit Brisbane

Yuan T Lee, the President of Academia Sinica, Taiwan (who won a Nobel prize for contributions to the development of a new field of research chemistry – reaction dynamics), **Sherwood Rowland** (who won a prize for atmospheric chemistry, particularly concerning the formation and decomposition of ozone) and **Jean-Marie Lehn** (whose work on the development and use of molecules with structure-specific interactions of high selectivity won a prize) will all take a prominent part in the World Chemistry Congress to be held in Brisbane from 1 to 6 July 2001.

The Academy of Science is the Australian link for the International Union of Pure and Applied Chemistry, which organises the congress every four years. See **www.ccm.com.au/wcc** for details.

Nominations for science prizes

Nominations have been called for the Prime Minister's Prize for science, the Minister's Prize for achievement in the life sciences, and the Malcolm McIntosh Prize for achievement in the physical sciences.

Eligibility is limited to Australian citizens and those who have permanent resident status as defined by the Department of Immigration and Ethnic Affairs. Nominations should be lodged with the Science Prizes Secretariat.

Additional information can be found at **www.isr.gov.au/science**.

Launch of video interviews

The President of the Senate, Senator Margaret Reid, launched a new series of video interviews with scientists, called '100 Years of Australian Science', at the Australian Foundation for Science annual general meeting in November 2000. This series, which was funded by the National Council for the Centenary of Federation, is part of the Academy's *Video Histories of Australian Scientists* project.

Copies of the interviews can be purchased from the Academy or borrowed from Cinemedia. Transcripts and teachers' notes related to the interviews are available on the Academy's website (**www.science.org.au/scientists**).

Funding for other video history projects has come from the Fenner Fund, the Commonwealth Department of Health and Aged Care through the International Year of Older Persons, the Mazda Foundation and the Australian Research Council. The Australian Research Council funding will support interviews with scientists aged 35 and under, and will also provide indexing and web links through the Bright Sparcs database developed by the the Australian Science and Technology Heritage Centre.

In total, 58 interviews have been recorded and funding is available for an additional 20. The videos, which were initiated for archival purposes, have also demonstrated great value in science education and awareness.

Supported by the Australian Foundation for Science

Senator Margaret Reid with the Chairman of the Australian Foundation for Science, Mr John Ralph AC, right, and Mr Tony Eggleton AO, Chief Executive of the National Council for the Centenary of Federation.

Professor Frank Gibson, left, interviewing Dr Liz Dennis. The camera operator is Rob Walker and Nancy Pritchard, of the Academy's staff, is directing.

AIDS symposium

The National Academies Forum, of which the Academy of Science is a member, organised a national symposium on AIDS in November 2000. The symposium was called 'Every eight seconds: AIDS revisited', and was held at the National Library in Canberra.

A debate between the Catholic Archbishop of Melbourne, Dr George Pell, and the former president of the National Association of People Living With HIV/AIDS, Ian Rankin, attracted considerable public interest.

Abstracts and some of the papers presented at the symposium are available from **www.naf.org.au/aids.htm**. The symposium was sponsored by the Commonwealth Department of Health and Aged Care, Queensland Health and the AIDS Action Council of the ACT.

Basser bits

An interesting collection acquired recently by the Academy's Basser Library is the material collected by Marjory Collard O'Dea while researching and writing the biography of Sir Ian Clunies Ross.

One of the library's most frequently consulted collections is the papers of Sir Neil Hamilton Fairley, who was in charge of malarial drug trials in Cairns during World War II. After an article criticising these trials was published simultaneously in *The Age* and *The Sydney Morning Herald*, the Repatriation Medical Authority set up an inquiry into the matter. Two staff members from the Department of Veterans' Affairs consulted the Fairley papers as part of this and, as a result, we recently received two copies of the report of the inquiry, which had also involved Professor Frank Fenner.

PM's prize to Peacock and Dennis

Two Fellows of the Academy, Dr Jim Peacock and Dr Liz Dennis, have won the inaugural Prime Minister's Prize for Science for their work on plant genetics. The prize was presented at a dinner in the great hall of Parliament House on 3 October 2000.

The prize replaces the Australia Prize, an international prize which ran from 1990 to 1999. The Prime Minister's prize, which is worth $300 000, goes to Australian scientists who promote human welfare through an outstanding achievement in science or technology. The prize winners join the Prime Minister's Science, Engineering and Innovation Council.

The Prime Minister, Mr John Howard, said that, after Australia's sporting triumphs at the Olympic games, 'these awards are a timely reminder of the world-beating research being conducted by Australia's scientists. The work by Dr Peacock and Dr Dennis is a tremendous example of how scientific research makes a direct contribution to Australia's economic and social wellbeing.

Dr Liz Dennis and Dr Jim Peacock

'Their discovery of the gene that determines when plants begin flowering has the potential to boost the productivity of the world's crops by billions of dollars per year and increase the nutritional value of those crops.'

Dr Peacock is Chief of CSIRO Plant Industry in Canberra and Dr Dennis is Program Leader in the division. They have worked together on plant molecular biology for 20 years, with Dr Peacock specialising in genetics and Dr Dennis in biochemistry.

One of the big questions of plant biology is what causes plants to stop growing bigger and start flowering after cold weather. The weather around the time of flowering can affect crop yields dramatically.

The activity of the gene they have isolated prevents flowering, so the more active the gene is, the later the plant flowers. A period of cold promotes flowering by switching off the gene.

Dr Peacock and Dr Dennis demonstrated this in an experimental plant, *Arabidopsis*. They found they could minimise the need for cold before the plant flowered by decreasing the activity of the gene. The gene they were working on turned out to be the key to the flowering process.

Further research found a similar flowering switch gene in the oilseed, canola. They are now looking for similar genes in wheat. Eventually this could allow wheat growers to select seed that heads at the right time in different climates, thereby boosting the harvest.

Dr Dennis said that the award of the prize was a tribute to all the scientists who had worked in her laboratory. Dr Peacock said the prize confirmed CSIRO Plant Industry as one of the best plant research institutes in the world.

Two prizes for younger scientists were awarded with the Prime Minister's prize. The Malcolm McIntosh prize for achievement in the physical sciences went to Dr Brian Schmidt, of the Mount Stromlo and Siding Spring Observatories at the Australian National University, for his work showing that the universe is expanding at an accelerating rate. The Minister's prize for achievement in the life sciences went to Dr Una Morgan, of Murdoch University, for her research into the parasites cryptosporidium and giardia.

The President of the Academy, Professor Brian Anderson, chaired the science prizes committee.

Honours to Fellows

Three Fellows have been recognised with honours in the Australia Day honours list announced on 26 January 2001.

Professor Robert Porter, the Director, Research Development in the Faculty of Health Life and Molecular Sciences at James Cook University, has been made a Companion of the Order of Australia (AC). **Professor Frank Larkins**, the Deputy Vice-Chancellor (Research) and Professor of Chemistry at the University of Melbourne has received a Medal (AM), as has **Professor James Pittard**, of the Department of Microbiology and Immunology at the University of Melbourne.

The US Institute of Electrical and Electronics Engineers has awarded its 2001 IEEE James H Mulligan Jr Education Medal to **Professor Brian Anderson** for 'outstanding graduate texts of lasting value and far-reaching international influence, and for outstanding leadership in the development of electrical engineering education in Australia'.

The Institution of Engineers, Australia, the Institution of Chemical Engineers in Australia and the Royal Australian Chemical Institute have awarded the 2000 Chemeca Medal to **Professor David Boger**, the Director of the Particulate Fluids Processing Centre at the University of Melbourne.

The Royal Society of London has presented its Royal Medal to **Professor Geoffrey Burnstock**, Director of the Autonomic Neuroscience Institute of the Royal Free and University College Medical School in London. The medal recognised 'his development of new hypotheses challenging the accepted views on autonomic neurotransmission'. He has also received the Janssen 2000 Award for lifetime achievement in digestive sciences and been invited to deliver the 2001 Horace W Davenport Distinguished Lecture of the American Physiological Society.

The Max Planck Institute in Germany has awarded the Max Planck Research Award 2000 to **Professor Bruce Kemp**, the Deputy Director of St Vincent's Institute of Medical Research in Melbourne.