AUSTRALIAN ACADEMY OF SCIENCE

NEWSLETTER

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Science capability under scrutiny

The Academy has made a submission to the Australian Science Capability Review. In the review the Federal Government's Chief Scientist, Dr Robin Batterham, is seeking views on the capability of Australian science, the needs and opportunities for the future, and the costs and benefits of pursuing these opportunities.

Research and the science base

The Academy's submission to the review is concerned mainly with the basic research component of the science base.

The Academy characterises the science base as the base of activity in Australia for the production of new scientific and technological knowledge of international quality. In Australia the key components of the science base are research in universities and public research agencies. A key role of the science base is to produce broad-ranging 'public good' understanding of fundamental matters underpinning health, the environment and our natural resources.

The Academy's submission highlights the importance to the national innovation system of basic research carried out by publically funded universities and research institutes. As well as broadening our understanding of certain issues, this type of research can also bring international recognition and financial rewards. The submission points to three recent examples where basic research has brought large-scale benefits to Australia:

- the development of the drug 'Relenza'
- the development of the Australian Photonics Cooperative Research Centre and its spin-off companies
- the development of the SHRIMP microprobe mineral analyser.

The submission recommends policies be put in place to ease the stresses on research and teaching in science which have developed since the establishment of the unified national system of universities. Policies are required to better allocate public resources for science research and teaching, to boost industry-critical areas of research and to nurture young research talent.

Resource allocation

The allocation of resources between disciplines was identified by the submission as an area where the unified national system has failed to respond to demand. The submission states that the distribution of funds between major disciplines has become fixed in historical ratios.

In a separate submission to the review, the Academy's National Committee for Physics echoes this sentiment about resource allocation. It states that physics and engineering will continue to be essential to support progress in medicine and biology yet the funding for these disciplines is being eroded as Australia's research emphasis continues to be on agriculture, biology and mining.

'Given the importance of physical sciences and engineering, it is surprising that Australia commits so little of its resources to research in these fields,' the National Committee's submission says. It claims the erosion of staffing levels in many physics departments will render Australia uncompetitive in the field of the physical sciences. 'A country without a strong commitment to physics at the highest international levels will not be in a position to be a "clever" country.'

To ensure a more appropriate distribution of funds, the Academy's submission recommends the use of a research assessment exercise as the basis for future resource allocation.

Incentives to stay in Australia

The recruitment and retention of talented researchers are essential for the establishment and maintenance of research groups of high quality as benchmarked against world standards and performance. Employment conditions should be comparable to those in the USA and Europe. The issue of tenured positions as opposed to fixed-term or contract positions also needs to be looked at. Nurturing young talent in universities as well as in public research agencies is very important for the future health of the science base.

In its submission, the Academy believes that the lack of postdoctoral fellowships for training overseas is an important policy issue which has a bearing on future successful international collaborations. If current funding provision continues, the involvement of Australian researchers in international collaborations is likely to decrease at a time when international collaboration elsewhere is increasing.

Australia's participation in major national and international research facilities is a key method for developing overseas linkages. Australia cannot expect to afford all of the cutting-edge facilities it needs for the research base but it does have unique facilities to share and trade with other countries.

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Australian of the Year

Sir Gustav Nossal, a former President of the Academy, was named Australian of the Year in a ceremony on 25 January.

More details on page 12

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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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White paper too simplistic

The Academy has issued a critical response to the Federal Government's White Paper on Higher Education Research, *New Knowledge and Innovation*, which was released on 21 December 1999. The report, which follows consultation on the Green Paper on Higher Education Research, is aimed at promoting diversity and excellence in higher education research.

The Academy responded to the Green Paper earlier in 1999 with a number of recommended changes; however these have not been included in the White Paper.

Despite the Academy's caution that the proposed changes to higher education research would only be beneficial if accompanied by increased funding, the White Paper fails to offer new money. According to the Academy, the White Paper 'uses out-of-date figures which purport to show how generously higher education research is funded by the government. It neglects to mention that cuts of 12 per cent (in the percentage of gross domestic product) have since been applied to Australia's university research funding'.

The White Paper has not accepted the Academy's recommendation that a research assessment exercise be established to determine quality issues before funding is granted. Instead it proposes to use what the Academy sees as 'simplistic formulae as a surrogate quality measure to decide the allocation of large sums of money'.

The White Paper proposes to enhance the role of the Australian Research Council with the provision of its own Act and new arrangements for its governance and operation. Although the Academy supports this proposal, if there is no increased funding or significant change to the way funding is allocated, the efficacy of these administrative changes must be questioned.

Overall, the Academy has charged the White Paper's conclusions with being 'too simplistic and too late'.

Forthcoming events

- Symposium on Australia's Science Future (**www.science.org.au/future**), Canberra, 3–4 May (see page 4).

Conferences

The Academy's web site has a conference and events database that lists events occurring in Australia and New Zealand between now and 2003. Events include seminars, exhibitions, science fairs, summer schools, workshops and lectures on the subjects of science, health, information technology, engineering, mathematics and the environment. The database, maintained by the Royal Society of New Zealand, is at **www.science.org.au/conf.htm**.

New video histories

Professor Mollie Holman (**www.science.org.au/educatio/mh.htm**)

Sir Gustav Nossal (**www.science.org.au/educatio/gn.htm**)

New topics on *Nova*

- Calendars – keeping track of time
- Bucky balls – a new sphere of science

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 3966 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**.

National Innovation Summit

The President of the Academy, Professor Brian Anderson, and the Secretary (Science Policy), Professor John White, actively contributed to the work of the National Innovation Summit held in Melbourne on 10 and 11 February.

The summit brought together over 500 people from industry, government, research and education to discuss ways to improve Australia's performance in innovation. Most of the formal sessions were devoted to break-out sessions focused on the themes: creating a competitive environment; investing in ideas; and building industry–research linkages. The results of discussion of those themes were summarised and are available on the web site of the Commonwealth Department of Industry, Science and Resources.

The two major sponsors of the summit, the Federal Government, through Senator Nick Minchin, and the Business Council of Australia, have endorsed a communiqué expressing a commitment to promote innovation in the immediate future.

The communiqué said, in part, 'In order to progress the findings arising from the summit, a post-summit high level implementation group will be established. Representation on the group will continue the partnership model of business, research, education and government, with three senior representatives from each sector.'

The group 'will advise by 30 August 2000 on a prioritised approach on specific actions identified at the summit. In doing so, the group would assess the feasibility of proposals in consultation with affected parties.

'Following receipt of the report the aim is that relevant parties would agree to an innovation action agenda by the end of the year. The impact and effectiveness of the actions arising from the summit will be reviewed in two years time.'

Professor Anderson commented, 'The Academy will continue its work in advising government on policies to enhance the quality and output of Australia's scientific and technological research. I expect that all parties will approach with enhanced enthusiasm the task of building our capacity to innovate. I am confident that the Commonwealth will play a greater leading role'.

Professor Anderson (left), the Minister for Employment, Education and Training, Dr Kemp, and Ms Jenni Gordon, of the Department of Education, Training and Youth Affairs, in discussion at the summit.

Professor Deane Terrell, Vice-Chancellor of the Australian National University (left) and Professor John White in a working group.

Science capability under scrutiny

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Government and the private sector

For industry, solving complex problems requires access to the people who have the latest knowledge, skills and technologies in a wide range of disciplines. Published knowledge is of secondary importance to industry. The effective management of the knowledge assets of the science base requires a stronger R&D effort in the private sector and the establishment of stronger links between universities, government research agencies and industry. However, it is important that the public sector not waste resources doing research that is much better performed in the private sector.

Governments fund a large proportion of the research conducted in universities in most nations. The private sector, particularly in small and medium-sized economies, is reluctant to fund long-term, public good research, and even strategic basic research, because of the high risk and the inability of a company to appropriate the benefits of the research for competitive advantage. Research in areas of community interest, such as the environment and public health, is of increasing importance and clearly the responsibility of the government.

The full submission can be viewed (in PDF format) at **www.science.org.au/academy/media/capa.pdf**.

Australia's science future

The Academy will hold a major national symposium on *Australia's science future* to celebrate the year 2000. It will be held in Canberra on 3–4 May, during National Science Week and the Australian Science Festival.

'The aim of the symposium is to assess the exciting advances and opportunities in eight fields that are of significant public interest and likely to experience breakthroughs in the 21st century,' said the Academy's President, Professor Brian Anderson. 'Most of the speakers at the symposium will be in their 30s and 40s, and can be expected to contribute to these breakthroughs.'

The eight fields that the symposium will cover are:

- changes of the global climate
- mind and brain
- energy
- molecular structure and recognition
- information technology, telecommunications and control in the web era
- genetic engineering of plants and animals
- the universe: looking out – looking forward
- ageing.

Registration is open to scientists, industry representatives, undergraduate and postgraduate students, science teachers and interested members of the public. The symposium is structured to encourage audience participation, and discussion will focus on the future of science in relation to the areas listed above.

'We are particularly keen on having younger researchers attend,' Professor Anderson said. 'The Academy is planning to approach employers to help sponsor their participation.'

More information and a registration form are on the Academy's web site at **www.science.org.au/future**. Registration is $150 ($100 for full-time students), which includes lunch on both days. For more information email **ac@science.org.au**.

Science foundation AGM

Mr John Ralph (left), Senator Margaret Reid and Professor Brian Anderson at the annual general meeting of the Australian Foundation for Science.

The annual general meeting of the Australian Foundation for Science was held on 16 November 1999 at the Dome. About 50 people attended the open session. The President of the Academy, Professor Brian Anderson, welcomed those attending.

Professor Neville Fletcher gave a brief update on *Primary Investigations*, the Academy's science, technology and environment program for primary schools. Professors Frank Fenner and Bob Crompton described recent developments with the *Video Histories of Australian Scientists* project.

A video produced by the Academy was launched by Mr Jim Service. The video, entitled 'Building in the Round: The Design and Construction of the Australian Academy of Science Dome', explores the construction of the Dome via an interview with Jack Deeble (the Academy's Executive Secretary at the time). ACT Heritage provided funding for the project. Copies of the video are available for sale from the Academy for $59.95. Contact Nancy Pritchard on (02) 6247 5777 or email **ds@science.org.au**.

Senator Margaret Reid presented a certificate to Mr John Ralph to launch the Dome refurbishment project, which is being partly funded through a Centenary of Federation Cultural and Heritage Projects grant. Mr Ralph then announced the Dome 2001 Fundraising Appeal (see article on page 6).

World chemistry congress

The National Committee for Chemistry has been working closely with the Royal Australian Chemical Institute (RACI) in planning the program for the next World Chemistry Congress of the International Union of Pure and Applied Chemistry in Brisbane in July 2001.

This will be the largest and most influential chemical meeting ever held in Australia, and will include presentations by several Nobel Laureates. There will be special opportunities for younger chemists to meet these distinguished scientists at the congress.

The issues of chemistry explored at the congress will be grouped around themes of material chemistry for the future, chemistry by computer, chemistry in medicine and biology, environmental chemistry and the greening of industry, and modern synthetic chemistry.

For further information on the congress, please email **wcc2001@chemistry.uq.edu.au**.

Major national facilities

Australia has a number of major research facilities and is contemplating further ones. In addition, Australia has access to international facilities for instruments and methods not available here.

The Academy is about to undertake a study to assess deficiencies in the supply of and access to cutting-edge research facilities in Australia. The study will be chaired by Professor John White, Secretary (Science Policy) of the Academy. The project consultant will be Professor Sue Serjeantson.

In the last 20 years many countries have found a need to centralise costly research infrastructure in order to provide the apparatus and support for cutting-edge science and technology. This has been done either on a national scale (such as the National Institutes of Health in the United States) or through more costly international collaborations (such as the Anglo-Australian Telescope in Australia). These major research facilities have the potential to attract several thousand visitors a year to perform experiments.

The Academy's study will be linked to Australia's research strengths and weaknesses across a wide range of disciplines. It will include an assessment of best Australian and international practice, and will examine the governance and operating structures needed to run facilities in different disciplines.

If you wish to find out more about the study, please email Trish Nicholls at **nr@science.org.au**.

Rudi Lemberg Fellow

The Academy, in conjunction with the Australian Society of Biochemistry and Molecular Biology, awarded the 1999–2000 Rudi Lemberg Travelling Fellowship to Dr Vern Schramm. Dr Schramm is Ruth Merns Professor and Chair of Biochemistry in the Albert Einstein College of Medicine of Yeshiva University, New York.

As part of the Fellowship he visited several universities in Australia between 22 September and 21 November 1999 before attending the New Zealand Institute of Chemistry Conference in Wellington.

During his stay in Australia, Dr Schramm presented several lectures on transition state inhibitors. His visit was also an opportunity to meet Australian biochemists and to renew old acquaintances.

Dr Vern Schramm during his visit.

While visiting the Australian National University, Dr Schramm was able to catch up with his PhD mentor, Emeritus Professor John Morrison, and his former Departmental Chair, Emeritus Professor Frank Gibson.

Australia on track for a synchrotron

The Academy's National Committee for Crystallography, chaired by Professor John White, continues to be a focus for action on Australian and international crystallography.

In 1999 the committee and its members were strongly involved in formulating advice on Australian synchrotron radiation projects, including the possibility of constructing a synchrotron in Australia.

The Australian Synchrotron Research Program set up a strategy working group in March 1999 to advise on a coordinated strategy for Australian overseas access to synchrotrons and the eventual construction of a facility in Australia. The Centre for International Economics was contracted to assess 'the net benefits of a national synchrotron investment' and an international technical reference group has been established to report on the reference design for an Australian synchrotron.

At the Australian Synchrotron Research Program's board meeting on 23 October 1999, the recommendation from the strategy steering committee to go ahead with an Australian synchrotron was accepted, subject to various conditions suggested by the steering committee. The proposal will be forwarded to the Federal Government after assessment of the report of the technical reference group.

Lower secondary school science

A proposal to develop a pilot Collaborative Australian Secondary Science Program (CASSP) to improve science at lower secondary school level was submitted to the Department of Education, Training and Youth Affairs. The Curriculum Corporation, the State and Territory education authorities, the Australian Science Teachers' Association and the Academy were partners in the proposal.

The Department indicated that they would not take any action on the proposal until the completion of a review of primary and secondary school science that is being undertaken by Professors Denis Goodrum and Mark Hackling of Edith Cowan University and Professor Leonie Rennie of Curtin University.

As part of this review, the Academy was asked to run a focus group for scientists to give their opinions on a series of questions:

- What are the characteristics of quality teaching and learning of science in our schools? What is the nature of the science that should be taught?
- What do you see actually happening in our schools?
- What factors are currently inhibiting quality teaching and learning of science?
- How can these factors be addressed so as to improve the teaching and learning of science?

The group of 12 scientists met in September 1999. They represented a range of disciplines and institutions. Following the drafting of the report, this same group met in March to comment on the report's recommendations before they were finalised.

Dr Edward Butler

Bede Morris Fellows

Three Australian scientists will visit institutions in France during 2000–01 as participants of the Bede Morris Fellowship Scheme. The scheme, set up in 1989, honours the achievements of the late Professor Bede Morris, an immunologist at the Australian National University, who formed close ties with the French scientific community.

Sponsors of the 2000–01 program include the Australia France Foundation and the Embassy of France.

Dr Edward Butler, of CSIRO Marine Research, will take up the Australia-France Foundation Fellowship for 2000–01. He will visit the Institut Francais de Recherche pour l'Explitation de la Mer in Nantes for six weeks to study automated coastal monitoring networks.

According to Dr Butler, development in the coastal zone by nations such as Australia and France is putting extreme pressure on natural ecosystems. Environmental managers need immediate and broadly-based information at their fingertips for informed decision-making. Dr Butler's project will look at both field instrumentation and data handling for providing operational information on the coastal environment. It will also go further in seeking to add value to the raw data by deriving data products that enable forecasting, scenario testing and numerical modelling.

During the last 10 years Dr Butler has gained much experience in the planning, implementation and management of research projects in estuaries, both in the field and in the laboratory. His most recent project has been as leader of a three-year, $1.9 million study of the Huon Estuary in south-eastern Tasmania. This latest study will add to Dr Butler's wide experience of marine research.

The Bede Morris Fellow for 2000 is **Dr Andrew Gundlach** of the Department of Medicine at the University of Melbourne. Dr Gundlach will spend six weeks at the Hôpital de la Salpétrière in Paris to study the development of novel galanin peptide system neurobiology, as well as reviewing pharmacological studies in that area.

Dr Gundlach's research aims to investigate two distinct putative functions of the peptide galanin, an important and clinically relevant neurotransmitter found in the brain. Using a powerful combination of whole animal and isolated tissue models, the role of galanin in the development and function of the olivocerebellar pathway and in the control of serotonin nerves will be examined. It is predicted that galanin will provide growth-promoting support for nascent and/or damaged neurons and produce an inhibitory action on serotonin neuron activity. Apart from the benefits of advances in biological knowledge and improved international collaborative links,

Dome 2001 Fundraising Appeal

An appeal to raise funds for the renovation of Becker House (the Dome) has been approved by the Academy's Council. All donations for the renovation are tax deductible.

Following acceptance of the draft conservation management plan in July 1999, which estimated the full cost of renovation to be $2.3 million, the Council made a commitment to underwrite refurbishment of high priority items to a total of $1.1 million. Of this amount, $525 000 will be funded through a Centenary of Federation Cultural and Heritage Projects grant.

Council plans to raise further funds for the refurbishment through the Dome 2001 Fundraising Appeal, which was launched by Mr John Ralph at the annual general meeting of the Australian Foundation for Science on 16 November 1999.

Council has decided that donors who contribute $500 or more will have their names, or the name of someone they wish to recognise, engraved on a small plaque to be affixed to one of the seats in the Wark Theatre. For more information contact Nancy Pritchard on (02) 6247 5777 or email **ds@science.org.au**.

Supported by the Australian Foundation for Science

Tours of the Dome

Students of the ANU Science Communicators course recently visited the Academy to learn about its activities and to take a behind-the-scenes tour of the Dome. The tour provided an opportunity for the students to view some of the 1956 competition drawings to design the Academy's headquarters. Similar tours are being scheduled in 2000 during the ACT Heritage Festival and the Australian Science Festival. For further information on tours of the Dome, please contact Nancy Pritchard on (02) 6247 5777 or email **ds@science.org.au**.

Supported by the Australian Foundation for Science

Dr Gundlach's studies have potential long-term implications for the understanding and treatment of neurological conditions such as nerve injury and depression.

Recent research by Dr Gundlach has identified the existence of a previously undiscovered galanin pathway in the olivocerebellar system of the mouse. With his extensive research into galanin and his early doctoral studies of monoamines like serotonin, Dr Gundlach has a broad knowledge of transmitter neurochemistry that should assist his progress during the visit.

Dr Saravanamuthu Vigneswaran, from the Faculty of Engineering at the University of Technology, Sydney, will take up the French Embassy Fellowship for 2000. For one month he will be a guest of the Complexe Scientifique de Rangueil in Toulouse where he will investigate a water treatment system based on filtration-adsorption.

According to Dr Vigneswaran, natural organic matter found in surface water imparts colour and leads to problems such as the formation (upon chlorination) of carcinogenic compounds and bacterial regrowth in water supply distribution systems. Natural organic matter also increases the cost of treatment. It is a major issue, both in Australia and EEC countries. Dr Vigneswaran's project proposes to optimise the design parameters of a hybrid system of inline adsorption and/or flocculation, coupled with microfiltration. Through detailed mathematical modelling and specific experiments, Dr Vigneswaran hopes to develop a system which will remove typical organics present in water. This will then form the basis of a long-term collaborative research program, to be undertaken both in Toulouse and Sydney, which will establish a cost-effective advanced water treatment system.

In the past Dr Vigneswaran has studied the application of microfiltration, floating medium filtration and adsorption in water treatment and waste water re-use, and has published widely in these areas. Recently he has been concentrating on the optimisation of contact time of adsorption of organic matter in membrane hybrid systems by providing a novel treatment configuration. He and his team have developed a mathematical model to incorporate the adsorption of organics by powdered activated carbon.

Dr Andrew Gundlach

Dr Saravanamuthu Vigneswaran

Seven new video histories

Seven new video histories have been filmed as part of the '100 Years of Australian Science' project, which is being funded through a Centenary of Federation History and Education Projects grant. The interviewees are Dr Keith Boardman, Dr Lou Davies, Professor Neville Fletcher, Dr Phillip Law, Professor Jacques Miller, Professor Cheryl Praeger and Professor Hugh Tyndale-Biscoe. The interviews will be edited and transcribed, then reviewed by the interviewees and interviewers before being posted on the Academy's web site.

The transcript of an interview with Professor Mollie Holman has recently been posted on the web site. It is available, along with interviews with Sir Geoffrey Badger, Professor Peter Bishop, Professor David Craig, Professor Priscilla Kincaid-Smith, Professor Bernhard Neumann, Sir Rutherford Robertson, Dr Doug Waterhouse and Australian of the Year, Sir Gustav Nossal, at **www.science.org.au/educatio/educatio.htm**.

All of these activities are part of the *Video Histories of Australian Scientists* program, which is supported by the Fenner Fund. Copies of the video interviews can be purchased from the Academy for $59.95, contact Nancy Pritchard on (02) 2647 5777 or email **ds@science.org.au**. They can also be borrowed from Cinemedia, phone (03) 9929 7044 or email **access@cinemedia.net**.

Supported by the Australian Foundation for Science

Wanted: Event partners

The Academy is seeking partners to carry out joint Centenary of Federation activities in the Dome. The Academy will cover hiring costs and assist with some publicity.

If you would like to arrange an event in the Dome in 2001 that celebrates the Centenary of Federation or the history or future of science, please contact Nancy Lane as soon as possible to discuss options and booking dates. Telephone (02) 6247 5777 or email **do@science.org.au**.

Soil science to fix foundations

Fixing the foundations: A national symposium on the role of soil science in sustainable land and water management, was held at the South Australian Research and Development Institute in November 1999.

The aim of the symposium was to address the problems of natural resource management shared by farmers, land and water resource managers, and other members of Australia's agricultural industry.

The 24 speakers at the conference included graziers and landcare facilitators, as well as researchers and policy advisers from the CSIRO, governments and universities.

The symposium focused on six themes: Managing land and water resource problems; Soils, ecosystems and the Australian landscape; Soil biota and ecological function; Soil water and nutrient dynamics; How geomorphology, eco-hydrology and geochemistry can help manage the Australian landscape; and Integrating soil science knowledge with other disciplines to aid policy development and land management.

Photo: CSIRO Land and Water

Dr Barbara Hardy, eminent South Australian environmentalist and the opening speaker at the symposium, claimed that many Australian soils are among the least healthy on earth.

She said, 'Our soils are far less fertile than those in Europe – yet we have practised European-style agriculture for more than 100 years. It is only recently that soil science has taught us we must change our core agricultural practices in order to reverse the enormous soil and water degradation we have caused to Australian landscapes in such a short time.'

Dr John Williams, Deputy Chief of CSIRO Land and Water and Chair of the symposium, agreed that European-style agricultural practices must change to avoid accelerating degradation of the Australian landscape. 'Soil science in the past has been about agricultural productivity. Today we have to balance this with a focus on the sustainability of the landscape and river systems.'

The symposium agreed that Australia must adapt its agricultural techniques to suit the native landscape.

Abstracts of papers from the symposium are available at **www.science.org.au/soil.htm**. A report summarising the proceedings will be available in March at the same web address.

Statistical methods for human genome analysis

The 1999 Boden Conference, *Statistical methods for human genome analysis: Application in the discovery of genes involved in complex human diseases*, was held at Thredbo, NSW, in February 1999 and generated widespread interest and enthusiasm. The conference attracted five overseas and 68 Australian delegates. All delegates were either directly involved in human disease gene discovery or were associated with supporting industry.

Most sessions in the conference were based on the main contemporary statistical genetic methodologies. According to Eric Moses of the organising committee, the conference was 'a great opportunity for Australian geneticists to get together with leading international figures to discuss current advances and problems in this rapidly advancing field'.

The conference discussed the progress in statistical genetics during the second half of the 20th century – a time which has been marked by a technological revolution in molecular genetics and computer science. This has allowed the theoretical models of classical genetics to be empirically tested and applied to large scale mapping projects in humans. However, for common human diseases such as cancer, diabetes, asthma, hypertension, depression and so on, gene mapping results to date have not been impressive. This is probably due to the network of complex interactions among genes and a variety of environmental risk factors.

The conference discussed various statistical methods; however it was agreed that if we seriously hope to understand the genetic basis of complex characteristics it will be necessary to concentrate on study design as a means to improve power. Specifically, the time for consultation with statistical geneticists is before a study begins, since it is in the experimental design where statistical advice would be most helpful.

In this context the conference was timely, as the opportunity was taken by many to discuss project design and to initiate valuable collaborations. There was also unanimous agreement that such a meeting should be held on a regular basis (for example, every two years). Several of the organising committee have agreed to establish an interest group.

The conference was sponsored by the Academy of Science, PE Biosystems, the Human Genetics Society of Australasia, the CRC for Discovery of Genes for Common Human Diseases, the Garvan Institute, ANGIS and T'Gallant Wines.

For more information on the conference, contact Penny Ashley at the University of Melbourne, email **ashleyp@cryptic.rch.unimelb.edu.au**.

Scientific visits to Europe

Twenty-seven Australian scientists received awards from the Academy for scientific visits to Europe in 2000–01. The scheme is administered by the Academy as part of the International Science and Technology Networks element of the Department of Industry, Science and Resources' Technology Diffusion Program.

France

Dr John Forsythe, of Monash University, will travel to the National Institute of Applied Science in Lyon to study epoxy thermoplastics.

Dr Emanuela Handman, of the Walter and Eliza Hall Institute of Medical Research, will visit the Pasteur Institute in Paris to work on a vaccine against leishmaniasis.

Dr Paul Nelson, of the CSIRO, will travel to the National Institute of Agronomic Research in Versailles to study interactions between mineral and organic components in soils.

Dr Jiyuan Tu, of the Australian Nuclear Science and Technology Organisation, will visit Nuclear Reactors Management in Grenoble to investigate modelling of multiphase bubbly flow.

Germany

Dr Andreas Houben, of the University of Adelaide, will travel to the Institute of Plant Genetics and Crop Plant Research in Gatersleben to study plant centromeres.

Dr Kadaba Sriprakash, of the Menzies School of Health Research, will visit the National Research Centre for Biotechnology in Braunschweig to study extracellular matrix proteins.

Dr Christopher Steel, of Charles Sturt University, will travel to Forschungsanstalt Geisenheim to study the effects of UV radiation on antioxidant levels and the susceptibility of grapevines to diseases.

Dr Edward Szczerbicki, of the University of Newcastle, will travel to Forschungszentrum Informationstechnik GmbH in Berlin to study information flow modelling.

Ireland

Dr Michael Burton, of the University of NSW, will travel to the Dublin Institute for Advanced Studies to research the role of molecular outflows and hot molecular cores in massive star formation.

Italy

Dr Mohan Kumar, of Curtin University of Technology, will visit the National Research Council in Pisa to investigate wireless networks.

The Netherlands

Dr Kenneth Baldwin, of the Australian National University, will travel to the Vrije Universiteit Amsterdam to study high-resolution XUV laser spectroscopy.

Associate Professor Roger Lewis, of the University of Wollongong, will visit the Technical University of Eindhoven to conduct free-electron laser investigations of semiconducting and magnetoresistive materials.

Spain

Professor Eugene Gamaly, of the Australian National University, will visit the Instituto de Carboquimica in Zaragoza to study the growth mechanism of carbon nanotubes.

Dr Bai-Ling Wang, of the University of Adelaide, will travel to the Universidad Autonoma in Madrid to research instanton and monopole homology theories.

Sweden

Dr Mario Lobigs, of the Australian National University, will travel to the Karolinska Institute in Huddinge to study flaviviruses.

United Kingdom

Dr Rowena Ball, of the Australian National University, will travel to the University of Leeds to study mapping and visualisation of singular surfaces in models for critical behaviour in excitable media.

Dr Mary Beilby, of the University of NSW, will be hosted by the University of London's Wye College to study the marine alga *Ventricaria ventricosa*.

Professor Robin Chowdhury, of the University of Wollongong, will visit the Imperial College of Science, Technology and Medicine in London to study the seismic effects of natural slopes.

Professor Norman Dancer, of the University of Sydney, will travel to the University of Cambridge to study bifurcations and singularly perturbed elliptic problems.

Dr Olusegun Faniran, from Deakin University, will visit Loughborough University to research data flow modelling of construction planning systems.

Dr Michael Gardiner, of the University of Sydney, will visit the University of Sussex in Brighton to investigate metal vapour synthesis of 4-azapentalenyl lanthanide complexes.

Professor David Hill, of the University of Sydney, will travel to the University of Warwick in Coventry to research the security of deregulated power systems.

Dr Samuel Mallinson, of the University of Technology, Sydney, will travel to the Imperial College of Science, Technology and Medicine in London to study the properties of turbulent spots in compressible boundary layer flows.

Dr Ruliang Pan, of the University of Western Australia, will visit University College, London, to research craniofacial development of macaques.

Dr Andrei Rode, of the Australian National University, will travel to the University of Southampton in Highfield to study confining gallium.

Dr Graham Schaffer, of the University of Queensland, will travel to the Imperial College of Science, Technology and Medicine to study thermomechanical processing of sintered aluminium alloys.

Dr John Whitelock, of the CSIRO, will visit the Paterson Institute for Cancer Research in Manchester to analyse sequences of heparan sulfate from human perlecan.

Foundation membership

The Australian Academy of Science has received pledges of $4 712 159, with contributors recognised through membership of the Australian Foundation for Science. To date, $3 280 059 has been received.

The Foundation has 346 supporters, comprising 160 Fellows, 35 other individuals, 27 scientific societies, 24 corporations, 10 trade associations and 90 other institutions. Membership levels show 6 patrons, 13 governors, 16 trustees, 80 members, 202 donors and 29 sponsors.

For information on joining the Foundation, contact the Academy's Development Officer, Nancy Lane, on (02) 6247 5777 or email **do@science.org.au**.

Exchanges with Asia

The following schemes are administered by the Academy as part of the International Science and Technology Networks element of the Department of Industry, Science and Resources' Technology Diffusion Program.

China

Six Australian scientists will travel to the People's Republic of China under the exchange program between the Academy and the Chinese Academy of Sciences.

Dr Ying Chen, of the Australian National University, will travel to the Institute of Metal Research to study carbon nanotubes.

Dr Yihong Du, of the University of New England, will travel to the Institute of Mathematics in Beijing to study critical point theory and non-linear partial differential equations.

Dr Susan George, of the University of South Australia, will visit the Institute of Automation to study pattern recognition.

Dr Jian Qin, of Flinders University, will travel to the Institute of Hydrobiology in Wuhan to study the Chinese snakehead fish.

Dr Chao Zhang, of the University of Wollongong, will be a guest of the Shanghai Institute of Metallurgy where he will study thermal conduction, power generation and refrigeration using superlattices.

Dr Yongyi Zhen, of the Australian Museum, will visit Nanjing Institute of Geology and Palaeontology to study biogeographic links between Australia and China.

Japan

Ten Australian scientists will travel to Japan under the exchange program between the Academy and the Japan Society for the Promotion of Science.

Dr Walter Dunlap, of the Australian Institute of Marine Science, will travel to the University of Tokyo to study marine organisms.

Professor Clive Fraser, of the University of Melbourne, will visit the University of Tokyo to study automated vision metrology.

Dr Wayne Hutchison, of the Australian Defence Force Academy, will travel to Niigata University to collaborate in measuring nuclear quadrupole moments and electric field gradients.

Dr Anatoli Kheifets, of the Australian National University, will be a guest of the High Energy Accelerator Research Organisation where he will study photoemission of electron pairs from metallic vapours.

Dr James Mitchell, of Flinders University of South Australia, will visit the Tokyo University of Fisheries to study plankton ecology.

Dr Huu-Hao Ngo, of the University of Technology, Sydney, will travel to the Nagaoka University of Technology to develop a biofilter for waste water treatment.

Dr Virginia Shepherd, of the University of NSW, will travel to the Himegi Institute of Technology in Hyogo to study mechanisms of cell salinity tolerance.

Professor Patricia Vickers-Rich, of Monash University, will be a guest of the National Science Musuem in Tokyo where she will compare dinosaur faunas of Japan and Australia.

Dr Ian Whittington, of the University of Queensland, will visit the University of Tokyo to study a flatworm parasite of cultivated fin fish in Japanese aquaculture.

Dr Wen Xu, of the University of Wollongong, will travel to the University of Aizu in Aizu-Wakamatsu to study semiconductor-based, two-dimensional electron gases.

Taiwan

Four Australian scientists will travel to Taiwan in 2000–01 under the exchange program between the Academy and the National Science Council of the Republic of China.

Associate Professor Robert Flower, of Royal North Shore Hospital, will be a guest of the National Institute of Health in Taipei where he will study Asian blood group antigens.

Associate Professor Richard Huggins, of La Trobe University, will visit the National Tsing Hua University in Hsin-chu to do population size estimates.

Dr Jerome Werkmeister, of the CSIRO, will visit the Industrial Technology Research Institute in Hsinchu to study novel polymer-composites.

Dr Alan Yen, of Museum Victoria, will travel to the National Museum of Natural Science in Taichung to assess invertebrate biodiversity.

On a rainy October day in Canberra, the Academy's former International Programs assistant, Ms Yuko Kawano, married an Antarctic scientist from Hobart, Dr Robert Massom. Also present are the International Programs Officer, Ms Thérèse Lewis (second from right), and Ms Mayuko Tada, who worked at the Academy on secondment from the Japan Society for the Promotion of Science.

Overseas postdoctoral fellowships

The following schemes are administered by the Academy as part of the International Science and Technology Networks element of the Department of Industry, Science and Resources' Technology Diffusion Program.

Ten Australian scientists will spend between one and two years in Japan on the postdoctoral fellowships of the Academy and the Japan Society for the Promotion of Science.

Dr Robert Cameron, of Caltech (USA), will visit the Science University of Tokyo to study magneto-hydrodynamics.

Mr Wei-Min Chen, of the University of Tasmania, will travel to the Teikyo University of Science and Technology in Yamanashi to study the circadian timing system in rainbow trout.

Dr Adam Cronin, of Flinders University, will travel to Hokkaido University to investigate the role of environmental factors in the evolution of social behaviour.

Mr Ingo Ernst, of the University of Queensland, will travel to the University of Tokyo to study the molecular characterisation and life cycle of *Marteilioides*.

Ms Julie Hayes, of the CSIRO, will travel to Kagawa University to study aluminium resistance mechanisms in triticale.

Mr Byung Chul Kim, of the University of Wollongong, will travel to the Institute of Science and Technology in Chitose to study the synthesis of polypyrrole – DNA composites.

Ms Brenda Kranz, of Flinders University, will travel to Gifu University to study *Gynaikothrips ficorum*.

Mr Qinghong Lin, of the University of New South Wales, will travel to Nagoya University to study asymmetric catalysis.

Mr Dugald Peacock, currently working for NRMA Insurance, will travel to Osaka University to study the design of high-speed marine vessels.

Mr Aaron Stallard, of James Cook University, will travel to Shizuoka University to study numerical modelling of orogenic processes.

Four Australian scientists will travel to Japan on short-term fellowships of the Academy and the Japan Science and Technology Agency.

Information about the Academy's international programs is available at **www.science.org.au/internat**. Visitors to the site can register to be kept informed of the Academy's international programs.

Dr Andrew Feitz, of the University of New South Wales, will visit the National Institute for Resources and Environment in Ibaraki to study trace PAH adsorption during photocatalysis for a non-aqueous system.

Dr Oula Ghannoum, of the University of Western Sydney, Hawkesbury, will travel to Tohoku National Agricultural Experimental Station in Morioka to study photosynthesis of the rice flag leaf.

Dr Andreas Nataatmadja, of Griffith University, will visit the Ministry of Construction in Ibaraki to compare hot asphalt recycling practices between Australia and Japan.

Dr Howard See, of the University of Sydney, will visit the National Institute of Materials and Chemical Research in Ibaraki to study electroheological fluids.

Eight scientists will each spend two years in Japan on Science and Technology Agency postdoctoral fellowships.

Mr Zhicong He, of the University of New South Wales, will visit the Kanagawa Academy of Science and Technology to study molecular magnets.

Dr Albert Juhasz, of the CSIRO, will visit the Geological Survey of Japan in Ibaraki to study biomineralisation of iron oxides.

Dr Zongwen Liu, of Melbourne University, will travel to the National Institute for Research in Organic Materials in Ibaraki to analyse the microstructure of ZrO_2 and related materials.

Mr Nathan Lo, of the University of Sydney, will travel to the National Institute of Sericultural and Entomological Science in Ibaraki to study cloning of cellulase genes from termites.

Mr Eddie Ly, of the Royal Melbourne Institute of Technology, will travel to the National Aerospace Laboratory in Tokyo to study numerical transonic simulation of an aircraft wing.

Mr Amjad Shraim, of the University of Queensland, will travel to the National Institute of Health Sciences in Tokyo to study arsenic speciation.

Mr Gregory Wheatley, of the University of Western Australia, will visit the National Research Institute for Metals at Ibaraki to investigate fatigue strength on welded joints.

Mr Xianfang Zhu, of the Australian National University, will travel to the National Research Institute for Metals in Ibaraki to study the photoluminescence of buried nanocavities in Si.

One Australian scientist will travel to Japan as a recipient of the Japanese Government Research Award for Foreign Specialists.

Dr Mahinda Kuruppu, of Curtin University of Technology, will travel to the National Institute for Resources and Environment in Ibaraki to study fracture toughness of rock under high pressures and temperatures.

One Australian scientist will study in Korea on an APEC postdoctoral fellowship.

Dr Ramila Amirikas will study particle physics at Konkuk University in Seoul.

Stamp for Neumann

A special stamp has been arranged by the Australian Mathematics Trust to mark the 90th birthday of **Emeritus Professor Bernhard Neumann**. The portrait on which it is based was painted by Judy Cassab and hangs in the offices of the Australian Mathematics Trust.

Biographers

Biographers have been appointed to write memoirs of former Fellows in *Historical Records of Australian Science*. Following the untimely death of Dr John Philip, the memoir of **Dr Bill Priestley** will now be written by Dr Eric Webb, Emeritus Professor B R Morton and Mrs Susan McCarthy.

Nossal is Australian of the Year

Sir Gustav Nossal, a former President of the Academy, was named Australian of the Year on 25 January.

Sir Gustav emigrated to Australia from Austria as a seven-year-old in 1939 and eventually became a world-renowned immunologist. He was Director of the Walter and Eliza Hall Institute of Medical Research in Melbourne from 1965 to 1996. He was knighted for his ground-breaking work in 1977 and was made a Companion of the Order of Australia in 1989. As well as presiding over the Academy, Sir Gustav has had direct involvement with the World Health Organization, has advised governments on policy issues and is a much-admired public commentator on scientific and medical matters.

In retirement, Sir Gustav continues to contribute to the community through his involvement with organisations such as the Strategic Advisory Council for the Bill and Melinda Gates Children's Vaccine Program and the Council for Aboriginal Reconciliation. He is also involved in charitable work.

According to the National Australia Day Council, Sir Gustav 'is an outstanding example of the spirit embodied in the Australian of the Year Award'. The Academy has congratulated Sir Gustav for this well-deserved honour.

Sir Gustav was interviewed in 1998 by Dr Max Blythe as part of the Academy's *Video Histories of Australian Scientists* project. An edited transcript of the interview is available at **www.science.org.au/educatio/gn.htm**. A copy of the video, which is approximately 100 minutes long, can be purchased from the Academy. An earlier video interview from 1987, in which Sir Gustav talks about his research on cellular immunology, antibody formation and tolerance, can also be purchased. Contact Nancy Pritchard on (02) 6247 5777 or email **ds@science.org.au**. Both interviews are available for loan from Cinemedia, phone (03) 9929 7044 or email **access@cinemedia.net**.

Australia Day awards

Four Fellows were named in the Australia Day honours list on 26 January 2000.

Professor David de Kretser was named an Officer in the General Division (AO) for service to medicine, particularly in the field of male reproductive biology, and as a researcher, educator and university administrator.

A former Foreign Secretary of the Academy, **Dr Fraser Bergersen,** was named a Member in the General Division (AM) for service to scientific research in the field of microbiology, particularly through the study of symbiotic nitrogen fixation in legumes leading to improved crop performance in Australia and Asia.

Emeritus Professor Joseph Gani was named a Member in the General Division for service to mathematics, particularly in the field of statistics, and to research in the areas of applied probability and mathematical biology.

Dr Guy White was named a Member in the General Division for service to low temperature physics, particularly as a former Chief Research Scientist with the CSIRO, and through scientific publications and teaching. He is a former Vice-President of the Academy.

Other honours

Professor David Green has been awarded the Murchison Medal of the Geological Society of the United Kingdom.

New molecular laboratories at CSIRO Wildlife & Ecology in Canberra have been named after **Dr Hugh Tyndale-Biscoe**, in honour of his outstanding contributions to our understanding of the biology of Australia's native fauna.

Inaugural David Craig Medal

The inaugural David Craig Medal has been awarded to Professor Noel Hush, Foundation Professor of Theoretical Chemistry at the University of Sydney.

Establishment of the David Craig Medal was announced by the Academy at David Craig's 80th birthday dinner in Canberra in December 1999. It recognises the outstanding contribution to chemical research made by Professor Craig, a former President of the Academy. The award will be made annually to an active researcher for contributions to chemistry of a high order. The research should have been carried out substantially in Australia.

Professor Noel Hush

Professor Noel Hush has been awarded the medal in recognition of his monumental advances in theoretical and physical chemistry. During the 1950s, in parallel with the Nobel Laureate Rudi Marcus from the California Institute of Technology, Hush developed what has become the standard theory for electron transfer in inorganic and biological compounds. This theory allows chemists to understand reactions and test ideas and has, among other things, offered considerable insight into the mechanisms of photosynthesis. The Hush-Marcus theory, as it is known, had a major influence on another Nobel Laureate, Henry Taube of Stanford University, who acknowledged that his own research was underpinned by Hush's work.

The medal will be presented at the annual general meeting of the Academy in May 2000.

Information about the Academy's awards is available at **www.science.org.au/awards/awards.htm**.

Professor David Craig