



Academy comments on priority setting in research

The Academy has expressed disappointment at the Federal Government's hasty decision to set priority areas of research for the Australian Research Council.

On 29 January 2002 the Minister for Education, Science and Training, Dr Brendan Nelson, announced that one-third of Australian Research Council funding in 2003 would be targeted at four priority research areas. The funding would support grants to individuals and centres of excellence for up to five years.

The four priority areas are:

- nano-materials – in computing, chemical processing, molecular motors, sensors – and bio-materials – for agriculture, medicine and environmental management
- the genome–phenome link – the control of gene expression for gene therapies and agriculture
- complex systems – research in mathematics, statistics, engineering and computers to improve the internet, transport control, power systems, robotics, land management, ecology, defence, manufacturing and finance, and
- photon science and technology – solar energy, telescope instruments, lasers, optic fibres for medicine, communications, industry and the visual arts.

Dr Nelson said that the nominated areas were fields of existing and emerging research strength in which Australia could achieve international leadership and which could deliver economic and social benefits to the Australian community.

The priority areas had been adopted on the advice of a working group of the Prime Minister's Science, Engineering and Innovation Council, and the Australian Research Council's board and expert advisory committees.

On 31 January, the Academy's

Secretary (Science Policy), Professor Michael Barber, issued a media release stating that while the Academy supports a role for the government in setting broad priorities for research in Australia, it believes that this decision will have serious deleterious effects on Australian research. The Academy was particularly concerned about the timing of the decision, the amount of money involved, and the apparent lack of integration with other government agencies or innovation programs.

The timing could not have been worse as researchers were just completing their grant applications. There was insufficient time to prepare strong research projects, build teams and make links with industry, within the new guidelines.

Professor Barber said, 'While the designated areas are undoubtedly of great import, there are many other worthy areas that will be left with inadequate support, including the social sciences and humanities. One obvious omission, of particular importance to Australia, is environmental sustainability.'

In a position statement on priority setting in science and innovation, released on 12 February, the Academy spelled out the conditions that priority-setting exercises needed to meet.

The Academy also holds the view that the identified priorities should not be narrowly defined. Basic research, which underpinned progress in thematic areas, should not be overlooked.

Dr Nelson said that during 2002 the government would finalise priorities across the national research effort, including for government research agencies.

The Academy urged him to take this opportunity to review his directive to the Australian Research Council and so ensure that deleterious effects were minimised. One way to do this would

be to phase in the funding for priorities, allowing effective planning and the preparation of proposals.

The Academy and its Fellows were ready to play their part in the public debate on priorities and the government's laudable objective to achieve international leadership and deliver benefits to the community.

The position statement is available at www.science.org.au/academy/media/arcfunding2.htm. The Academy's policy document, *Priorities in research and innovation for the next Australian Government*, is available at www.science.org.au/academy/media/priorities.htm.

Science at the Shine Dome

The Academy's annual show of science and scientists will be held from 1 to 3 May 2002 at the Shine Dome in Canberra.

Public events include the new Fellows seminar on 1 May, where new Academy Fellows talk about the research that brought them to national attention, the presentation of awards on 2 May, and the annual symposium on 3 May, this year on the topic *Transition to sustainability*.

Speakers at the symposium will look at the social, economic and environmental aspects of sustainability, at the integrated systems of energy and water, and at the role of science in creating visions of sustainability. The convenor of the symposium is the Chief of CSIRO Atmospheric Research, Dr Graeme Pearman.

More information and registration forms are available at www.science.org.au/sats.

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Genetic information: privacy not the only issue

The Academy has argued that privacy is not the most important issue when it comes to handling medical information that could improve the health of the community. For example, no-one argues that a person has a right to remain silent over developing Legionnaire's disease, or that a hospital should keep secret an outbreak of antibiotic-resistant infection.

Australia already uses personal medical information for public benefit: there is a compulsory notification system for some diseases, and pathologists study tissue samples from deceased patients. It would be detrimental to the community's health if specific consent was required for these essential components of health care.

The comments are contained in the Academy's response to the issues paper on protection of human genetic information released by the Australian Law Reform Commission and the Australian Health Ethics Committee.

The Academy's response states, 'Health care professionals are used to dealing with issues of confidentiality with discretion. In view of the many and diverse individual issues, we believe that health samples and records should be seen as part of our community resource for health, rather than as a form of personal property of the individual receiving care or treatment, in all but a limited set of circumstances.'

Strong anti-discrimination legislation was the key to the protection

of people who may be at risk of discrimination for reasons of health or illness, whether genetic or acquired.

The Academy strongly argued that medical research to improve health should not be impeded by limits on the use of genetic information. Clinical pathology and epidemiology could be especially hindered by new restrictions on the use of clinical data and samples.

The comments on the issues paper are available on the Academy's website at www.science.org.au/academy/media/ahec.htm.

Science legends on stamps

Australia Post issued a set of stamps featuring five Australian medical scientists on Australia Day. The 2002 Australian Legends are Professor Peter Doherty, Professor Donald Metcalf, Professor Nancy Millis, Sir Gustav Nossal and Professor Fiona Stanley.

Australia Post initiated the Australian Legends award in 1997 to honour living Australians who have made a unique contribution to our way of life. Australia Post described the scientists as 'unsung heroes'.

The stamp issue is accompanied by a book on the scientists' work, *Beyond belief: How five Australian scientists changed the world*, by Gael Jennings.

Forthcoming events

- 1 to 3 May 2002, **Science at the Shine Dome**, see page 1.

New topics on Nova

- Making packaging greener – biodegradable plastics

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 lb@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 Manager, telephone (02) 6247 5777 or email es@science.org.au.

Review of external earnings targets

The Academy has argued that external earnings are not good indicators of research performance of government science organisations.

The CSIRO, the Australian Nuclear Science and Technology Organisation and the Australian Institute of Marine Science are all subject to external earnings targets. In the case of CSIRO, the organisation is expected to find 30 per cent of its research spending from sources other than its budget allocation.

The Chief Scientist, Dr Robin Batterham, has been reviewing the policy of external earnings targets.

In a submission to the review, the Academy's Secretary (Science Policy), Professor Michael Barber, said that the policy had had a significant and generally positive influence on the links between research agencies and industry. However, the Academy was concerned that such a strong focus on a short-term revenue target could

distort the balance of research effort away from more strategic research, put pressure on agencies' capacity to collaborate with other organisations, and influence commercial decisions about whether to take fees, royalties or equity in return for research. They could also produce an incentive to charge less than cost for some services.

Professor Barber said, 'The Academy of Science is of the view that whereas external earnings targets may well have been necessary more than a decade ago, in order to effect a cultural change in government research agencies, external income is only one measure of performance, and a blunt one at that.'

The earnings targets were more indicators of demand than of performance. New performance measures needed to be developed to measure the impact of the agencies' research on the economic, cultural and social development of Australia.

The earnings targets implied that one of the primary purposes of the science agencies was to assist the growth of business. Professor Barber said that this is only one of the functions of the agencies. Too close a relationship with big business could compromise the independence of research agencies on issues of public debate, such as the environment.

The submission is available on the Academy's website at www.science.org.au/academy/media/earnings.htm.

Climate modelling workshop

Australia has a long history of climate modelling, with activities in government research agencies and universities. Because climate models have become large and complex, significant advances depend upon teams of scientists working together.

A workshop at the Academy of Science in February 2002 brought together climate modellers from CSIRO, the Bureau of Meteorology and a number of universities. The workshop was organised under the auspices of the Academy's subcommittee responsible for Australia's contribution to the international Climate Variability and Predictability Programme (CLIVAR). The chair of the subcommittee is Dr Michael Manton, Chief of the Bureau of Meteorology Research Centre.

The workshop assessed the state of climate system modelling in Australia and considered a national strategy with key objectives advanced by a network of scientists. Relative strengths and weaknesses in the overall national effort were identified.

A report of the workshop is being finalised. Email Trish Nicholls at nr@www.science.org.au for details.

Physics in desperate situation

The Chair of the Academy's National Committee for Physics, and Elder Professor of Physics at the University of Adelaide, Professor Tony Thomas, believes that physics teaching and research in Australia are in a 'desperate situation'. He has prepared a paper containing figures and quotes which highlight the decline in Australia and the efforts being made in other countries.

He says that physics is 'a small but essential element of the innovation process'. Discoveries in physics underlie electricity, modern communications, space flight, electronics (the transistor and the laser), solar energy (the material for solar cells), medical imaging (x-rays, PET), genetic research, radio therapy, the World Wide Web, modelling of climate change, and defence.

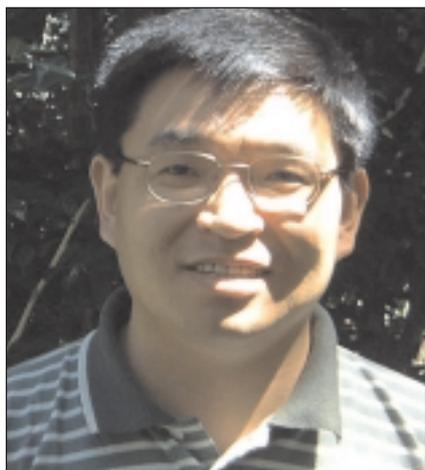
Between 1994 and 2000 academic staff numbers in physics dropped 29 per cent and support staff dropped

26 per cent. The student-staff ratio in Australia is 16:1, whereas Oxford and Cambridge have ratios of 7:1.

A full professorship at an Australian university used to be advertised worldwide. Because of the decline in relative salaries, such advertising is now almost pointless. Professors in Europe can earn A\$200 000, in the USA up to \$400 000. The chances of winning a research grant from the Australian Research Council are low.

Professor Thomas says that the source of the problem is that university staff are employed primarily to service other subjects, such as engineering and medicine, not because of the importance of physics. Few senior school teachers are qualified in physics. School students get no reward for tackling harder subjects.

Copies of the paper are available from Trish Nicholls at the Academy, email nr@science.org.au.



Professor Max Lu

Le Fèvre prize

The 2002 Le Fèvre prize for basic research in chemistry has been awarded to Professor Max Lu. He holds the Chair of Chemical Engineering in Nanotechnology at the University of Queensland and is also Director of the university's Nanomaterials Centre.

Professor Lu's research is in the areas of the physical and surface chemistry of porous materials. He studies the pore structure of materials and how they can be used to catalyse chemical reactions or to separate gases. He has worked on a new catalyst to convert biogas to methanol.

At the age of 38, Professor Lu has published over 200 papers in international refereed journals and conference proceedings, with over 600 citations. His work has resulted in four patents, which are being commercialised by a Queensland company.

The prize, which honours the contributions to physical chemistry of former Fellow, Professor R J W Le Fèvre, will be presented at a Royal Australian Chemical Institute function later in the year.

Kanagawa award

The Kanagawa Museum of Natural History in Japan funds an award which supports research on the Precambrian history of life in Western Australia.

The recipient of the latest award is Dr Paul Hearty from James Cook University in Townsville. His project, *Chronostratigraphic development of the Shark Bay region*, will attempt to improve the understanding of the history of Shark Bay.

Caughley Fellow from NZ

The 2002 Graeme Caughley Travelling Fellowship has been awarded to an ecologist from New Zealand, Mr John Parkes. Mr Parkes is a program leader at Landcare Research New Zealand Ltd in Canterbury.

His main field of research is the impact of feral animals – rabbits, brushtail possums, goats, Himalayan thar and pigs – on agricultural production and the natural environment, and the best ways to manage them. He leads a research program on the epidemiology of rabbit haemorrhagic disease. Other research interests are the costs and benefits of different ways of controlling possums, the eradication of feral goats from islands and the use of commercial harvesting as a pest control strategy.

He is a former President of the

New Zealand Ecological Society and a member of the Australasian Wildlife Management Society.

Mr Parkes' research interests are similar to those of Dr Graeme Caughley, the former CSIRO ecologist and Fellow of the Academy honoured by the Fellowship. The aim of the award is to promote research in ecology and its practice in wildlife management by allowing a scientist to visit scientific centres in other countries.

Mr Parkes will visit Europe to discuss the results of his rabbit haemorrhagic disease research, British Columbia to discuss the adaptive management of possums, and Utah to learn about blood markers used to assess predator diets.

Jacobs award recipients look at forest beetles

Logging in northern hemisphere countries has resulted in the disappearance of insect species and the decline of insect numbers, particularly of beetles that live on large rotting logs. The Tasmanian temperate forest is also at risk of losing beetle diversity.

In the 1950s Dr Maxwell Jacobs was aware of the importance of forest litter in forest management. The Academy's two 2002 Maxwell Ralph Jacobs awards for forest research have been made to young scientists doing research into beetles and forest litter.

Ms Sue Baker, from the University of Tasmania, is undertaking a project to find out how wide forestry reserves should be to conserve litter beetles. The project aims to quantify the distance that disturbances from logging penetrate into streamside reserves and wildlife corridors. The award will fund a survey of existing corridor reserves for sensitive species. This will enable the refinement of prescriptions for reserve width.

Ms Marie Yee, from the Cooperative Research Centre for Sustainable Production Forestry at the University of Tasmania, is investigating associations between beetles and rot types and the implications for forest management in Tasmania. She used the award to travel to Canberra to attend a beetle

identification training course at the Australian National Insect Collection at CSIRO. Following the course she identified her beetle collection with the assistance of CSIRO taxonomists and the insect collection.

Endangered species research fund

The Academy's Fund for the Conservation of Endangered Australian Vertebrate Species supports research to help understand the causes of species' decline with a view to making conditions suitable for their recovery. Awards have recently been made to:

- Dr Danielle Clode, for research on the brush-tailed phascogale
- Mr Shaun Barclay, from the University of New South Wales, for research on the stick-nest rat
- Dr Glen Shimmin, from Adelaide University, for research on the hairy-nosed wombat, and
- Dr Karen Firestone, from the Australian Museum, for research on the northern quoll.



Participants at the Elizabeth and Frederick White Research Conference in Sydney.

White conference on active galactic nuclei

Some galaxies have such violent activity in their cores that the nucleus far outshines the rest of the galaxy. These active galactic nuclei are the most powerful sources of energy known. Radiating from gamma rays to radio waves, they can be seen right across the universe.

Astronomers have found that these active galactic nuclei eject massive jets of ionised material at close to the speed of light. The intensity of the emitted radiation varies on time scales from years to minutes, and implies that their physical size is extremely small, from light-years to light-minutes. This is less than the distance to our nearest star.

Such powerful emissions can only be the result of the gravitational accretion of matter on to a black hole at the centre of the galaxy. These black holes, as massive as a billion suns, were possibly formed when two galaxies collided and merged into one.

Arguments about the cause of active galactic nuclei show that the time scale of their variability is directly related to the physical size of their central regions. However, such sizes are so small when viewed across the universe, that they cannot be resolved through direct imaging at any wavelength. Hence, observations of their variability are often the only way to probe them in detail.

The variability of active galactic nuclei across the electromagnetic spectrum was explored at an Elizabeth and Frederick White Research Conference, held in Sydney from

25 to 29 June 2001. The Academy sponsors these conferences to advance fundamental understanding of one of the physical or mathematical sciences related to the Earth, the atmosphere, space science or astronomy.

The conference brought together about 80 Australian and overseas scientists. They focused on a multi-wavelength approach to observing the massive energy release, as this more fully displays its properties. Their observational strategy also depends on coordination between observatories around the world and in space.

Astrophysicists at Australian universities and observatories have made significant discoveries about active galactic nuclei, which have led to the development of a new paradigm. The conference increased the international visibility of Australian astronomy while adding the expertise of researchers from Europe, Japan, South Africa and the USA.

The conference was organised by Dr David Jauncey and Dr Lucyna Kedziora-Chudczer from CSIRO's Australian Telescope National Facility. They said that the conference had been very effective. The timing had been right, with the state of development of the subject creating considerable interest. 'It is not always easy to get so many overseas scientists all the way to Australia,' they noted.

The proceedings have been published in *Publications of the Astronomical Society of Australia*.

Boden conference on reproductive immunology

A Boden Research Conference on the topic, *Immune deviation and reproductive function*, took place from 19 to 21 February 2001 in Lorne, Victoria. It was attended by over 60 local and overseas reproductive biologists, immunologists, clinicians and students.

Of the international speakers, Andrew Mellor, from Georgia, spoke on the mechanisms of immune deviation at the interface between mother and foetus. Anne Croy, from Guelph, presented recent data regarding the role of natural killer cells in pregnancy. Deborah Anderson and Alison Quayle, from Boston, spoke about the impact of infection, and HIV in particular, on the reproductive tract. Buck Hales, from Chicago, outlined how immune responses affect steroid hormone production and actions in the male.

Rodney Kelly, from Edinburgh, explained the role of inflammatory regulators in endometrial and cervical development. Mats Brannstrom, from Goteborg, spoke about the role of inflammatory cells in ovarian function and ovulation. Larry Chamley, from Auckland, brought participants up to date with recent developments in the contentious field of anti-phospholipid antibodies.

There were many equally interesting presentations from Australian scientists and clinicians.

The conference organisers were Mark Hedger, from Monash University in Melbourne, Mike Holland, from Canberra, and Sarah Robertson, from Adelaide. Dr Hedger said the conference was a great success, scientifically and socially.

The Boden research conferences, in biology, are made possible by a gift to the Academy from the late Dr Alexander Boden.

The proceedings will be published as a special edition of the *Journal of Reproductive Immunology* in mid-2002. This volume will provide an excellent reference work on the current state of research in reproductive immunology with a distinctly Australian flavour.

Video histories at Foundation AGM

The science broadcaster, Ms Alison Leigh, presented an overview of the Academy's *Video Histories of Australian Scientists* project at the annual general meeting of the Australian Foundation for Science on 13 November 2001. Ms Leigh also showed excerpts from three video interviews, funded from different sources, and gave an interesting account of her own involvement in science communication.

Also at the Foundation meeting, Professor David Curtis gave a pictorial report on the refurbishment of the Shine Dome. Guests were then taken on a behind-the-scenes tour of the dome.

The Foundation's Advisors' Committee met on the same day.

Basser bits

Several researchers have visited the library recently. Dr Libby Robin, from the Centre for Environmental Research at the Australian National University, is interested in the history of the National Museum of Australia, which had a very long gestation period following its original proposal by the Academy in 1967 as a Museum of Australian Biology. She was interested in the archived files of the Academy's Committee on Flora and Fauna.

Peter Butt, of Blackwattle Films, is making a film on Maralinga, working in collaboration with Roger Cross, who spent some time in the library several years ago and whose book, *Fallout: Hedley Marston and the British Bomb Tests in Australia*, has recently been published. He consulted the papers of Hedley Marston and Sir Ernest Titterton.

Dr Philip Dorling, from the Department of Foreign Affairs and Trade, is returning to a project he began here about 10 years ago, a biography of D F Martyn, a Foundation Fellow and president of the Academy from 1969 until his untimely death in 1970. As well as consulting Martyn's papers, he has also examined the papers of Jack Piddington.

McCracken delivers Wark lecture

The Academy's Wark medallist for 2001, Dr Ken McCracken, delivered the Wark lecture in Canberra on 7 December 2001. The lecture and medal presentation were held in conjunction with a dinner of Canberra Fellows.

The Wark medal and lecture mark the contribution to Australian science of the late Sir Ian William Wark, a chemist and Chief of the former CSIRO Division of Industrial Chemistry. The award is made for research which contributes to the prosperity of Australia.

In the 1950s Dr McCracken carried out research into the solar system and space. In the 1960s he worked in the US space program. In 1970, he set up what became the new Division of Mineral Physics in CSIRO. There he applied the techniques he learnt from space science to practical problems, particularly in mineral exploration.

For his work on remote sensing, McCracken and his collaborators shared the 1995 Australia Prize. He is still doing research on the edge of the solar system, and still finding techniques that could have value on Earth.

The text of his Wark lecture, 'Reflections on the application of



Dr Ken McCracken after being presented with the Wark medal.

fundamental research to practical problems', is available from the Academy's website at www.science.org.au/awards/wark.htm.

Population and environment fund begins work

The Academy's Population and Environment Research Fund has established a steering committee and appointed a researcher. The researcher is Dr Colin Butler, a medical practitioner who has also submitted his PhD at the National Centre for Epidemiology and Population Health at the Australian National University. His initial task is to survey current work in population and environment research in Australia, and to provide an overview of the debate in this area.

The committee will consider the results of this work before deciding the best way forward.

The members of the fund's committee are Dr Stephen Boyden, formerly of the Australian National University, Dr Doug Cocks, from CSIRO Sustainable Ecosystems, Professor Frank Fenner, from the Australian National University, Professor Tony McMichael, Director of the National Centre for Epidemiology and Population Health at the Australian National University, and Professor Henry Nix, from the Centre for Resource and Environmental Studies at the Australian National University.

Overseas exchanges

The Academy of Science runs international exchange programs with science organisations in northeast Asia, Europe and North America. The Australian scientists selected for travel overseas in 2002–3 are listed below.

The Academy's exchange programs are funded as part of the International Science and Technology Network, a component of the Innovation Access Program – International Science and Technology Access in the Commonwealth Department of Education, Science and Training.

The programs are also funded in part by the Japan Society for the Promotion of Science, the Korea Science and Engineering Foundation, the Chinese Academy of Sciences and the National Science Council of Taiwan.

Asia

Japan short-term

Dr Graeme Allinson from Deakin University will visit the National Institute for Environmental Studies in Tsukuba to study heavy metal contamination in non-wetting soil.

Dr Walter Dunlap from the Australian Institute of Marine Science in Townsville will visit the City University Medical School in Osaka and the University of Tokyo to study biochemical adaptations in marine microbes.

Dr Moshi Geso from the Royal Melbourne Institute of Technology is proposing to visit Nagoya University to mount experiments to measure the photo-absorption cross-sections of protons.

Dr Anatoli Kheifets of the Australian National University will visit the High Energy Accelerator Research Organisation in Tsukuba for experimental and theoretical studies of multiple atomic photoionisation.

Dr Simon Lawson from the Queensland Forestry Research Institute will go to Forestry and Forest Products Research Institute in Ibaraki to assess whether *Pinus caribbea* and its hybrids are susceptible to pine wilt disease.

Dr Patsie Polly from the Children's Medical Research Institute in Westmead will travel to the Institute of Molecular and Cell Biology in Ibaraki to carry out research in the field of transcription and muscle development.

Dr Victor Streltsov of the University

of Western Australia will visit Tokyo Institute of Technology to study the structure and electron density of non-linear optical materials.

Dr Saravanamuthu Vigneswaran from the University of Technology, Sydney, will go to the University of Tokyo to study the nanofiltration bioreactor as a compact wastewater treatment for reuse.

Professor John Webb from Murdoch University will visit Tokyo University of Agriculture and Technology to look at the biosynthesis of bacterial magnetic particles.

Japan long-term

Dr Mark Buntine of the University of Adelaide will visit Toyota Technological Institute in Chiba to study chemical processes on the surfaces of liquids.

Japan postdoc

Mr John Stachurski from the University of Melbourne will visit Kyoto University to look at stochastic growth.

Mr Jim Yoshitaka Onishi from the University of Sydney will visit the Science University of Tokyo to explore oxidation reactions.

Mr Xuekui Fu from the University of Wollongong will visit the Railway Technical Research Institute in Tokyo to study the fabrication of components for power applications.

Mr Anowarul Islam from Orange Agricultural Institute will visit Miyazaki University to evaluate centipede grass, *Eremochloa ophiuroides*, as a forage plant.

Mr Timothy Harrold from the University of New South Wales will visit the University of Tokyo to study changes in precipitation and the incidence of floods and droughts under global warming scenarios.

Mr David Pile of Queensland University of Technology in Brisbane will go to Gunma University in Kiryu to do theoretical and numerical analysis of photonic crystal devices.

Dr De-Ling Ma from the University of Queensland will visit the National Agricultural Research Centre in Tsukuba to look at environmentally friendly control of rice bugs.

Mr Simon Thompson from the Australian National University will go to the National Institute of Advanced Industrial Science and Technology in Tokyo to learn about a service robot for

person-to-person delivery to people in offices.

Dr Rebecca Johnson from James Cook University of North Queensland in Townsville will visit the University of Tokyo to study the genetic architecture of dance behaviour in honey bees.

Mr Nicholas Hastings from the University of Melbourne will visit the High Energy Accelerator Research Organisation in Tsukuba to study B mesons.

Mr Gregory Barbara from the Flinders University of South Australia will visit the University of Tokyo to study metabolic and behavioural interactions between motile marine bacteria and nutrient patches.

Mr Luke Miles from the Walter and Eliza Hall Institute of Medical Research in Melbourne will visit Tokyo Metropolitan University to learn about cell-free expression techniques and isotope labelling of biomolecules.

Mr John Enyang, currently at the University of Illinois at Chicago, will visit the Science University of Tokyo to work on the modular representation theory of particular algebras.

Mr Louis Trichard from the University of Sydney will go to Yokohama City University to look at advanced multi-user detection and decoding for third-generation mobile communications.

China

Dr Alex Cook from the Queensland Museum will visit the Chinese Academy of Sciences in Nanjing to study the links between Chinese and Australian gastropods in the mid-palaeozoic era.

Dr Qi Cui from the University of Western Australia will go to the Fourth Military Medical University in Xi'an and the University of Science and Technology of China in Hefei to study axon regeneration in the central nervous system.

Dr Chao Deng from the University of New England will go to the Chinese Academy of Sciences Laboratory of Visual Information Processing to study interactions between the visual centres in the forebrain of birds.

Dr Mark Diesendorf from Murdoch University Sustainability Centre in Sydney will go to the Chinese Academy of Sciences in Beijing to

study the reduction of air pollution and greenhouse gas emissions from motor transportation in Chinese cities.

Dr Yihong Du from the University of New England will travel to the Chinese Academy of Sciences in Beijing to study critical point theory and nonlinear partial differential equations.

Dr John Long of the Western Australian Museum will visit the Chinese Academy of Sciences in Beijing to resolve problems in evolution by comparing fossils from China and Western Australia.

Taiwan

Dr Chris Glasby of the Museum and Art Gallery of the Northern Territory will go to the Academia Sinica in Taipei to study the geography of the Indo-Pacific polychaete worm, *Perinereis nuntia*.

Dr Dong Jeng of Griffith University will visit four universities in Taiwan to study models showing the effects of waves on the seabed.

Professor Yuri Kivshar of the Australian National University will visit universities in Taiwan to study the nonlinear physics of complex systems.

Dr Helmut Thissen of CSIRO Molecular Science in Melbourne will go to the Industrial Technology Research Institute in Hsinchu to work on the development of biodegradable polymers for tissue engineering.

Dr Sanming Zhou from the University of Melbourne will go to the National Taiwan University to study applied mathematics.

South Korea

Dr Dennys Angove of CSIRO Energy Technology in Sydney will visit the Korea Advanced Institute of Science and Technology in Seoul to investigate secondary aerosol formation in the urban atmosphere.

Dr Mark Barnes of the University of South Australia will go to the Centre for Microstructure Science of Materials at Seoul National University to study thin film formation using the charged cluster model.

Dr Phillip Diamond of the University of Queensland will go to Chungnam National University in Taejeon to analyse dynamical systems, with applications to filtering and control.

Associate Professor Roger Lewis of the University of Wollongong will visit the Research Centre for Oxide Electronics at Seoul National University to do optical studies of bulk



Dr Rajeev Gore (left) and Dr Jennifer Davoren, of the Australian National University, will work in France as part of the Academy's international exchange program.

and thin film oxide electronic materials.

Dr Golshah Naghdy from the University of Wollongong will visit Seoul National University College of Medicine to explore the feasibility of integrating feature detectors into an artificial retina.

Dr Arcot Sowmya from the University of New South Wales will go to Seoul National University to work on computer software.

Dr Wojciech Szymanski of the University of Newcastle will visit Korea Maritime University in Pusan to study the structure of graph algebras.

Europe

Associate Professor Andrej Atrons from the University of Queensland will go to Chalmers University of Technology in Goteborg in Sweden to study the ferrite grain boundaries of pipeline steel and its relationship to service failures by stress corrosion cracking.

Dr Russell Boyce from the Australian Defence Force Academy in Canberra will visit the German Aerospace Centre in Gottingen and Aachen Technical University to explore shock-induced hypersonic flow.

Dr Stephen Catchpoole of the Queensland Forestry Research Institute will visit a French research institute in Montpellier to look at the computer-controlled heat treatment of timber.

Dr Jennifer Davoren and Dr Rajeev Gore of the Australian National University will visit the French laboratory for specification and verification in Cachan to explore the use of temporal logics for model checking.

Dr Jim Denier of the University of Adelaide will visit the University of Manchester to study the control of

boundary-layer separation.

Dr Mark Hovenden from the University of Tasmania will visit the University of Tuscia in Viterbo in Italy to investigate tree ecophysiology and growth using free air carbon dioxide enrichment.

Dr Brian Jeffries of the University of New South Wales will visit the University of Hull to study calculi and partial differential equations.

Dr Andrzej Kilian from the Centre for the Application of Molecular Biology to International Agriculture in Canberra will visit Joseph Fourier University in Grenoble to look at microarrays and the traceability of cattle, sheep and goats.

Dr Wieslaw Krolikowski from the Australian National University will go to Riso National Laboratory in Denmark to study solitons.

Dr Sergey Kun from the Australian National University will go to the French institute for subatomic research to conduct an experiment on quantum chaos and slow decoherence in finite many-body systems.

Dr Victoria Lytle of the Australian Antarctic Division in Hobart will go to the Alfred Wegener institute for polar research in Bremerhaven to analyse sea-ice cores and study their properties.

Associate Professor Andrew McMinn from the University of Tasmania will visit the University of Tromso in Norway to study the effects of thinner ice on the Arctic marine ecosystem.

Dr Myhuong Nguyen of the CSIRO Fluid and Thermal Engineering Group in Victoria will visit the institute of industrial chemistry and physics in Paris to model fluid flow and particle transport in a fractionation channel.

Dr Murray Parkinson from La Trobe

University in Melbourne will visit the University of Leicester to examine auroras.

Dr David Phillips from Monash Institute of Reproduction and Development will travel to France to visit the National Institute for Agronomy Research in Nouzilly to look at the critical regulators of pituitary gland function.

Dr Gerhard Reubel of CSIRO Sustainable Ecosystems in Canberra will visit the French agency for food safety in Malzeville to look at an immunocontraceptive vaccine for foxes.

Professor Curt Wentrup from the University of Queensland will travel to the University of Provence in France to undertake research into matrix isolation of reactive intermediates at cryogenic temperatures.

Professor Ian White of the Centre for Resource and Environmental Studies of the Australian National University will visit the International Cooperative Centre for the Development of Agronomic Research to look at conjunctive use of groundwater in small islands.

Dr Peter Wood of the Mount Stromlo and Siding Spring Observatories will visit the Strasbourg observatory and the astrophysics institute in Paris to find out about highly evolved stars.

Dr Zhihong Xu from the Queensland Forestry Research Institute will go to France, Sweden, Spain and Portugal to work on genetic and environmental control of water and nitrogen-use efficiency in important tree species.

North America

Dr Habib Alehossein from CSIRO Exploration and Mining in Brisbane will visit the Laurentian University in Ontario to do research into methane drainage in coal and hard rock mines.

Dr Hugh Blackburn from CSIRO Building, Construction and Engineering in Melbourne will go to Arizona State University to study instability and nonlinear dynamics.

Dr Xavier Csar from the Cooperative Research Centre for Chronic Inflammatory Diseases in Melbourne will visit the Samuel Lunenfeld Institute in Toronto to study biochemical pathways and proteomics.

Dr Jane Elek of Forestry Tasmania will visit the US Forest Service in South Carolina to improve the environmentally friendly management

Honours to Fellows

The US National Academy of Engineering has elected **Professor Brian Anderson**, from the Australian National University, a Foreign Associate.

Professor Mandyam Srinivasan and colleagues at the Australian National University have won the Australasian Science Prize for their work on the vision and navigation methods of bees. The work has also been the subject of cover stories in *Science* and *Nature*. Professor Srinivasan shared the prize with Dr Shaowu Zhang and Dr Javaan Chahl.

Professor Allan Snyder, of the Australian National University, has shared the 2001 Marconi International prize with Dr Herwig Kogelnik of Bell Laboratories. The Marconi Foundation awarded the prize for the two scientists' contributions to optical telecommunications technology. Professor Snyder also delivered the Royal Society's 2001 Clifford Paterson Lecture.

The Clive and Vera Ramaciotti Foundation for Biomedical Research has awarded its Medal for Biomedical Research to geneticist

Professor Grant Sutherland, of the Women's and Children's Hospital in Adelaide.

The American Geophysical Union has awarded its 2002 Walter H Bucher Medal to **Emeritus Professor Ross Taylor** of the Australian National University. The medal recognises original contributions to the basic knowledge of the Earth's crust.

Australia Day honours

Two Fellows of the Academy were made Officers (AO) in the General Division of the Order of Australia in the Australia Day honours list in January 2002.

Professor Geoffrey Opat – see page 11.

Emeritus Professor John Swan, formerly of Monash University, was honoured for service as an outstanding contributor to the advancement of Australian science, particularly in the fields of chemistry, marine science and meteorology, to education, and to the management, protection and conservation of the natural environment.

of Australian forest insect pests.

Dr Karen Firestone of the Australian Museum in Sydney will visit the Smithsonian Institute in Washington DC to look at the population structure of a declining carnivorous marsupial, *Dasyurus hallucatus*.

Professor Nicholas Fisher of the University of Sydney will visit Stanford University in California to study data mining techniques.

Dr Min Gu of Swinburne University of Technology in Melbourne will go to the Massachusetts Institute of Technology to study multi-photon fluorescence microscopy.

Dr Margaret Harding of the University of Sydney will visit the University of Houston in Texas to explore the design and synthesis of antifreeze proteins.

Dr Bo Jin from the University of Queensland will visit Iowa State University and Massachusetts Institute of Technology to look at a

biotechnological treatment process for food and agro-industrial wastewater.

Professor Tien Kieu from the Swinburne University of Technology in Melbourne will visit Princeton University in New Jersey and Massachusetts Institute of Technology to study quantum computation and measurement.

Dr Michael Kuchiev of the University of New South Wales will visit Princeton University in New Jersey to look at nuclear fusion in a condensed matter environment.

Dr Wayne Leifert from CSIRO Health Sciences and Nutrition in Adelaide will visit the University of Michigan to study recombinant proteins.

Dr Surendran Mahalingam from the Australian National University will travel to the Center for Disease Control and Prevention in Georgia to look at allergic airway disease.

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Deaths



Robert Hanbury Brown in 1967

Robert Hanbury Brown

Robert Hanbury Brown was born in southern India on 31 August 1916. He died in England on 16 January 2002.

Hanbury Brown was sent to school in England, where he learnt Latin and Greek – but received no lectures in science.

He studied engineering at Brighton Technical College, gaining an external BSc, with honours in electrical engineering, from London University in 1935. The technical education was very practical but narrow, with no English or languages. At 19 he published his first scientific paper, on the use of cathode-ray tubes to measure the distribution of light from lamps.

He won a scholarship to the City and Guilds College (part of the Imperial College) of London University and gained a postgraduate diploma in telecommunications in 1936. Though he was working towards a PhD, the Rector of Imperial College and legendary scientific adviser to the British government, Sir Henry Tizard, who Hanbury Brown knew, advised him to take a job.

The job, at the Air Ministry, was secret. Because he knew something about cathode-ray tubes, Hanbury Brown was sent to Bawdsey Manor in Suffolk. He worked in the original team that developed radio direction finding (radar), under Sir Robert Watson-Watt. He was one of three operators at the first large-scale demonstration.

Next he worked under E G Bowen (later also a Fellow of the Academy) on airborne radar for night fighters and

for detecting ships and submarines. Hanbury Brown was in charge of experimental flights and demonstrations at Martlesham Heath, near Bawdsey.

Later he was part of the Fighter Interception Unit, charged with developing night fighter techniques. He worked on radar with others, including Mark Oliphant. He developed a beacon to guide air drops of sabotage material or agents in Europe.

In 1942 he demonstrated the beacon in the USA. He was posted to Washington as assistant head of the Allies' combined research group working on radar recognition of ships and aircraft.

After the war he worked at the Telecommunications Research Establishment in Malvern, in charge of research into navigational aids for aircraft. After the excitement of developing war equipment he found it dull so, in 1947, he became a partner in the firm of consulting engineers, Sir Robert Watson-Watt and Partners.

After Watson-Watt went to Canada, Hanbury Brown visited a wartime colleague, Professor Bernard Lovell, at the University of Manchester. Lovell had a large paraboloid aerial system, built for cosmic ray experiments but not being used. He and Hanbury Brown decided to apply the dish to the new science of radio astronomy.

In 1949 Hanbury Brown joined the university as ICI research fellow. He and Cyril Hazard were the first to detect an extra-galactic radio source, the Andromeda nebula. On the basis of this success, Hanbury Brown and Lovell campaigned for a larger, movable radio telescope, later built at Jodrell Bank.

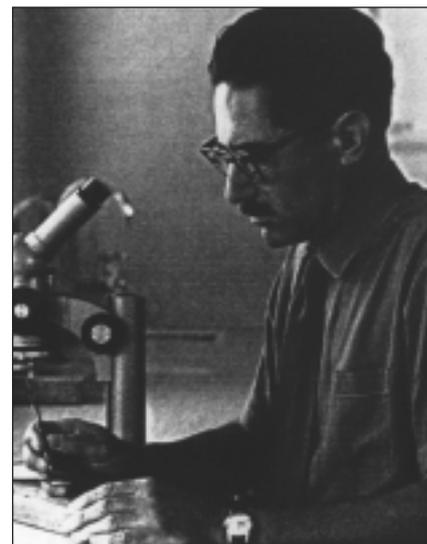
In the late 1950s he built an optical intensity interferometer and measured the angular diameter of Sirius.

In 1960 he gained a DSc from the University of Manchester, a personal chair in radio astronomy, and was elected a Fellow of the Royal Society.

Hanbury Brown learnt that his friend, Richard Twiss, who was working in Sydney, was building a telescope. He visited to help install the full-scale stellar intensity interferometer at Narrabri in north-western New South Wales. He settled in Australia in 1964, taking up the

position of professor of physics (astronomy) at the University of Sydney, a position he held until 1981.

Hanbury Brown was elected a Fellow of the Australian Academy of Science in 1967. He served as Vice-President from 1977 to 1979 and won the Academy's Lyle and Matthew Flinders medals. He became a Companion of the Order of Australia in 1985.



Ken Key

Ken Key

Kenneth Hedley Lewis Key was born on 28 August 1911 in Cape Town. He died on 11 January 2002.

Key's interest was aroused by the diverse and often showy insect fauna of South Africa. By the age of seven he had assembled a collection of pinned specimens.

He went to Rondebosch Boys' High School and then the University of Cape Town, where he gained a bachelor of science with medals in botany and zoology in 1930. He gained a master of science degree the following year, with a thesis on the grasshoppers of the Cape Peninsula.

At the time Australia was seeking entomologists to investigate the biological control of prickly pear. This encouraged Key to plan a career in entomology.

He went to the Imperial College of Science and Technology at the University of London to do a PhD in the Department of Entomology. He studied the behaviour of the locust,

Locusta migratoria, and gained his PhD in 1936.

While Key was doing taxonomic study at the British Museum of Natural History, he just missed out on a job there as an orthopterist. However, he met A L Tonnoir, a Belgian engineer working for the CSIR Division of Economic Entomology, and was encouraged to apply for a job as an assistant research officer investigating the locust problem in Australia. He got the job and arrived in Perth in 1936.

In order to deal with the locust problem, Key had to learn about the ecology, economics, politics and technology of Australian rural production. He dug soil and conducted vegetation surveys to learn about the life cycle of the Australian plague locust, *Chortoicetes terminifera*.

Key tried to find out where and how locust plagues originated. Solving that problem could lead to a more rational strategy for locust control. This work continued through World War II. He and his team established the fundamental causes of locust outbreaks in eastern Australia. He found that particular ecological conditions in outbreak areas led to multiplication and congregation, and physiological changes in swarming locusts.

He was awarded a doctor of science degree by the University of London in 1946.

During the second half of the 1950s Key moved out of the field of ecology, which was becoming controversial, and worked on problems of speciation in grasshoppers, using genetic methods. He also worked with Dr Max Day on the unique, temperature-controlled colour change in the alpine grasshopper.

In 1959 the Division of Entomology decided to organise its haphazard collections of insects into a unified system. Key was appointed Curator of the collections, later Chief Curator. In 1962 the Federal Government declared the division's Australian National Insect Collection 'a great national heritage'.

He wrote papers on the classification of Australian orthopteroid insects (grasshoppers and the like) and played a leading part in revising the International Code of Zoological Nomenclature.

Key retired from CSIRO in 1976 but continued his studies of grasshopper

taxonomy and biology as an honorary research fellow until 1994.

Key was elected a Fellow of the Academy of Science in 1959. He was on the Academy Council from 1975 to 1978.

Oliver Lancaster

Henry Oliver Lancaster was born in Sydney on 1 February 1913. He died on 2 December 2001.

Lancaster grew up in Kempsey, New South Wales, where his father was a doctor. In 1930 he moved to Sydney to train to be an actuary, then switched to arts, then medicine. He really would have liked to be a mathematician but the opportunities seemed too limited. He graduated from the University of Sydney with honours in medicine in 1937.

He was a resident medical officer at Sydney Hospital and later became resident pathologist there.

In 1940 Lancaster joined the army as a medical officer. He went to Egypt, practising pathology outside Alexandria in the hot dusty desert wind, then in Palestine. During two years in New Guinea he wrote papers on hookworm and other worm infestations in troops.

Under the army education scheme, he took up the study of mathematics at the University of Sydney, gaining an arts degree with high distinction in mathematics. Pursuing his interest in demography and medical statistics, he gained an appointment with the School of Public Health and Tropical Medicine in 1946.

At the school he worked in the fields of medical and vital statistics, increasingly applying mathematical methods to health information. He did extensive research into the theory and application of the chi-squared test, devising new tests of goodness of fit between theoretical and observed statistics. In 1953 he gained a PhD for his work on chi-squared.

In 1959 he became the inaugural professor of mathematical statistics at the University of Sydney. He continued his research in medical statistics, gaining a doctorate of medicine in 1966 for his work on mortality in Australia, and a doctorate of science in 1971 for more research on chi-squared.

Lancaster also investigated the epidemiology of deaf-mutism and



Oliver Lancaster in 1981

produced evidence that melanoma is caused by sunlight. He studied the statistics of laboratory methods, blood counting and amoebic surveys. Another of his research interests was the bibliography of statistics.

He was founding editor of the *Australian Journal of Statistics*, which began in 1959.

Lancaster was elected a Fellow of the Academy of Science in 1961, in which year he won the Academy's Lyle medal. He retired from the university in 1978. He was made an Officer of the Order of Australia in 1992.

Geoff Opat

Geoffrey Ivan Opat, a Professorial Fellow in the School of Physics at the University of Melbourne, and chair of the Victorian regional group of Fellows, died on 7 March 2002.

In the 2002 Australia Day Honours he was made an Officer of the Order of Australia for service to scientific research, particularly in the fields of theoretical and experimental physics, to tertiary education in Australia and overseas, as an advocate for the need to stimulate the interest of young people in the sciences, and to the community, particularly the Victorian College of the Arts and the Museum of Victoria.

There will be more on Geoff Opat in the next issue of *AAS Newsletter*.

Apology

In the last issue of *AAS Newsletter* (number 51), a photo of Max Day at an early age accompanied the obituary of Lou Davies by mistake. We sincerely regret this error and offer our apologies to all concerned.

Bede Morris Fellowship Scheme promotes links with France

Two Australian scientists will travel to France in 2002 under the Bede Morris Fellowship Scheme.

The Bede Morris Fellowship Scheme honours Bede Morris (1927–88), an immunologist who unravelled some of the mysteries of the lymphatic system, particularly the role played by lymphocytes in the development of immunity. In 1969 he was the head of the first department of immunology in Australia, at the John Curtin School of Medical Research at the Australian National University. He also contributed to strong scientific and cultural links between France and Australia, for which France awarded him its highest honour, the Legion of Honour, in 1988.

The Bede Morris Fellowship Scheme comes under the accord for scientific cooperation between the Australian and French academies of science. It is supported by donations from colleagues and friends of Bede Morris, by the French Embassy in Australia and by the Australia–France Foundation.

The **Bede Morris Fellow** for 2002 is Dr Bryant McAvaney, a climate modeller from the Bureau of Meteorology Research Centre in Melbourne.

One of the greatest areas of uncertainty in climate models is the interaction between clouds and radiation. Despite a decade of intense research, the size of the effect of clouds on climate is not known. In its third assessment report the

Intergovernmental Panel on Climate Change noted the wide variation between climate models on the amount of feedback they expect from clouds. This uncertainty limits the ability of the models to predict climate in the future.

Dr McAvaney and his colleague, Dr Hervé Le Treut from the French Laboratory of Meteorology and Climate, have designed an experiment that will systematically compare cloud feedbacks in climate models. They will also attempt to find the reasons for the variation between models. While in France, Dr McAvaney will learn details of some of the best climate models in the world, and so be able to incorporate that knowledge into Australian models.

The French Embassy will also be providing funding for Dr McAvaney to continue his research with Dr Le Treut for an additional six weeks.

The **Australia–France Foundation Fellow** for 2002 is Professor Richard Hartley, from the Department of Systems Engineering at the Australian National University. Professor Hartley has done a great deal of research on computer vision and image analysis, with commercial, industrial and defence applications. His innovations include the analysis of multiple images and video sequences.

One of the goals of machine learning is for machines (robots) to be able to work out where an image was taken. If the image can be placed in a previously learned environment, then the robot can recognise its position. This is the

first step in effective navigation. Also, if fixed or moving sensors can recognise which room a person is in, then they can turn on or off communications, computers or security.

In France, Professor Hartley will work with scientists from the French National Institute for Research in Computer Science and Control in Montbonnot on the ability of machines to recognise landmarks.

French Embassy active in science exchanges

The French Embassy in Canberra has become quite active in science and technology exchanges. The Embassy has recently asked the Academy to manage their Australia–France exchange program. The Academy helps select Australians to go to France.

As well as the two scientists travelling under the Bede Morris Fellowship Scheme in 2002, three scientists selected to travel to France under the Academy's Europe exchange program will receive further funds from the Embassy to extend their stay in France and continue their research work. Seven other researchers are also being sponsored by the Embassy.

Overseas exchanges

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Dr Diane McDougald from the University of New South Wales will visit the University of North Carolina at Charlotte to test inhibitors of bacterial virulence.

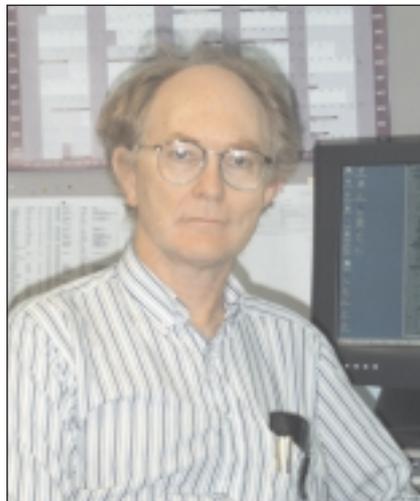
Dr Simon McKirdy from the Department of Agriculture in Western Australia will go to Pennsylvania State University to work on a biosecurity strategy to manage the potential incursion of serious exotic plant diseases, based on the US plan for plum pox virus.

Dr Giacinta Parish from the University of Western Australia will visit the University of California in Santa Barbara.

Dr Xiaoming Wang from CSIRO Infrastructure Systems Engineering in Melbourne will visit the University of Colorado to study the reliability and management of bridge infrastructures.



Dr Bryant McAvaney



Professor Richard Hartley