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Linking Australian Science, Technology and Business

INSIDE

The Future of Agriculture

A revolution in the way we use science and technology in agriculture is needed to avoid environmental collapse and social breakdown, says a major global food report released in April by the **International Assessment in Agricultural Science and Technology for Development** (IAASTD; see also 'Opinion' p5).

The IAASTD was set up in 2004 by the **World Bank** and the **Food and Agriculture Organization** (FAO) to answer the question how can agricultural knowledge, science and technology (AKST) be better used to reduce hunger and poverty, improve rural livelihoods, and facilitate equitable environmentally, socially and economically sustainable development?

The report was the outcome of two years of synthesis by an international team of more than 400 scientists and other stakeholders.

Eight cross–cutting themes were considered: bioenergy, biotechnology, climate change, human health, natural resource management, trade and markets, traditional and local knowledge and community–based innovation, and women in agriculture.

According to the report's Australian co–ordinating author, ***Roger Leakey***, the ideal for agriculture is to achieve better food production in ways that protect and even restore natural resources (soil, water, vegetation cover, biodiversity and climate), while meeting all the social and economic needs of rural communities. But modern agriculture has not scored highly against this ideal, he says (see 'Opinion' at www.ScienceAlert.com).

The main failing of agricultural R&D was seen as an excessive focus on boosting production through the development of new technologies. While enormous yield gains and lower costs for large–scale farming have been achieved, the success has come at a high environmental cost and has not solved the social and economic problems of poorer developing nations.

Dr John Williams, a commissioner to the **Australian Centre for International Agricultural Research**, says: "In the past, too much of our research, in my judgment, has been focussing on technical fixes to the production arm without giving adequate attention to the natural resource impacts and impacts within the whole agricultural ecosystem."

Much intensive farming has been managed unsustainably due to land clearance, soil erosion, pollution of waterways, inefficient use of water, and a dependence on fossil fuels for the manufacture and use of agrochemicals and machinery.

Photo: (Texas A&M photo/Shannon Pinson)

Science and food: Developing a variety of rice with higher nutrient levels could help billions of people worldwide who rely on rice as a main food source.

A major point made in the report is that global investment in agricultural science, education and training and extension to farmers has decreased at a time when it is most needed. Despite significant progress, there is a gap between the production of agricultural knowledge and its delivery to farmers, with poor developing country farmers being the biggest losers.

The assessment was considered by 64 governments at an intergovernmental plenary meeting in Johannesburg in mid April and was approved by all countries except Australia, Canada and the US who noted the report with reservations. Australia's response was mixed. A statement from the Australian Centre for International Agricultural Research reads: "Although Australia is very supportive of the IAASTD initiative and has agreed the final plenary statement, we cannot 'fully support' all the assertions and observations in the reports."

One concern about the assessment is that it focussed too heavily on the potential pitfalls of biotechnology (such as patents that can limit the equitable use of resources, and the movement of transgenic crop strains between organic and non-organic producers) and not enough on the potential benefits.

"With the urgency of food production problems we can't afford to be so picky [about the use of biotechnology]," says ***Dr Eric Craswell***,

'Nature' cover story: Platypus genome revealed: Story on page 2 and Opinion on page 9 by Jennifer Graves & Sue Forrest

visiting fellow at the **ANU Fenner School of Environment and Society** and former senior academic advisor to the **United Nations Institute for Environment and Human Security**. ***Professor David Kemp***, professor of Farming Systems at **Charles Sturt University** and the **University of Sydney** agrees: "There is the dilemma in the report's conclusions that organic farming is the way to go and there is little evidence that this will feed the increasing human population. A more ecological approach is justified, but that won't work in every case. Some areas will arguably need to be farmed intensively if people are to be adequately fed.

But the report was also seen as an excellent opportunity for Australia. "Australia has arguably the best suite of expertise in terms of tropical agricultural research of any developed country. So there's an opportunity for Australia to latch on to this report and put Australia's efforts to help developing countries squarely behind it," says Dr Craswell.

▶ **More information: www.agassessment.org**

Platypus genome

Australian researchers are part of an international team that has sequenced the entire genome of the duck–billed platypus (Ornithorhynchus anatinus), the first Australian animal to have been sequenced so far (see also 'Opinion' p9).

The platypus is remarkable in many ways – an amalgam of reptilian, mammalian and unique characteristics, it has almost no living relatives and provides clues to the function and evolution of all mammalian genomes.

Sequencing its genome has helped uncover some of the secrets of the platypus including its venom proteins. which were co–opted independently from the same gene families that provided reptile venom.

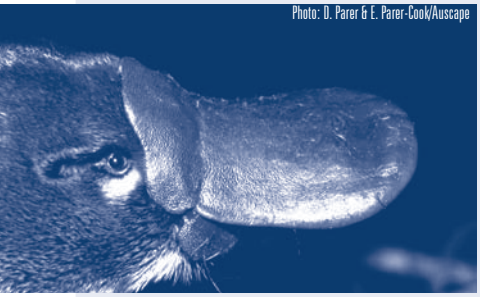
Photo: D. Parer & E. Parer-Cook/Auscape

By comparing the human and platypus genomes, scientists hope to work out which genes have been conserved best through evolution. As well as providing an invaluable resource for comparative genomics, the sequence will be important for monotreme conservation.

▶ **More information: www.nature.com/nature**

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Climate change partnership

Australia and the United Kingdom have embarked on an enhanced partnership to tackle the causes and impact of climate change, aimed at building a global low carbon economy and bolstering effective adaptation measures to combat increasing greenhouse gas emissions. Features of the new climate change partnership include:

- Australia joining the UK as a member of the **International Carbon Action Partnership** – an association of governments working together on emissions trading;
- the governments of Australia and the UK working collaboratively on technological solutions to climate change, in particular energy efficiency and carbon capture and storage;
- heightened cooperation between UK and Australian climate scientists; and
- building a global low carbon economy to provide new jobs, new industries and new growth for the future.

This will require an ambitious long term global target, supported by carbon markets that help drive investment in clean technologies. For Australia, finding a technological solution to carbon emissions from coal-fired power stations is critical.

In the lead–up to the next **United Nations** climate change conference in Copenhagen in 2009, the UK and Australia will become active partners in working towards a global consensus on climate change.

▶ **More information: www.pm.gov.au/media/Release/2008/media_release_0173.cfm**

Federation fellowships

Australian Research Council Federation Fellowships worth more than $23 million over five years have been awarded to 14 researchers. Science winners are:

- ***Professor Michael Bird*** — environmental change, carbon cycling and human impact in tropical Australia, at **James Cook University**;
- ***Dr Christopher Carilli*** — exploring the last frontier: cosmic reionisation and the first galaxies, at the **CSIRO Australia Telescope National Facility**;
- ***Professor Michael Eastwood*** — conformal differential geometry, at **The Australian National University**;
- ***Associate Professor Trevor Lithgow*** — molecular machines that could drive microbial pathogens, at **Monash University**;
- ***Professor Gaoqing (Max) Lu*** — band–gap engineered visible light photocatalysts: enabling technologies for sustainable energy and the environment, at **The University of Queensland**;
- ***Professor Tanya Monro*** — light–matter interactions using optical fibres, at **The University of Adelaide**;
- ***Professor Brett Neilan*** — the toxins of water–borne cyanobacteria regulation and exploitation of their biosynthesis, at **The University of New South Wales**;
- ***Professor Peter Robinson*** — dynamics of multiscale complex systems, at **The University of Sydney**;
- ***Professor Michelle Simmons*** — atomic electronics: precompetitive research for the global semiconductor industry, at **The University of New South Wales**;
- ***Professor Dr Peter Teunissen*** — theoretical and model strengthening

of future Global Navigation Satellite System to yield improved geospatial information for tomorrow's society, at **Curtin University of Technology**;

- ***Dr James Whisstock*** — membrane attack complex/perforin–like proteins in defence, attack and developmental biology; at **Monash University**; and
- ***Professor Aibing Yu*** — multiscale modelling and analysis of complex particulate and multiphage flow, at **The University of New South Wales**.

▶ **More information: Fiona Skivington, 0412 623 057; www.arc.gov.au**

Review help

Four international innovation experts have agreed to act as advisors to the review of **Australia's National Innovation System**. They are:

- ***Professor Alan Hughes*** of the **University of Cambridge** (UK), who is working on the measurement of innovation in small and medium enterprises, measurement and evaluation of industrial and business support policy;
- ***Professor Richard Lester*** of the **Massachusetts Institute of Technology** (USA), who is working on industrial innovation and the management of technology, national and regional productivity, competitiveness and innovation performance;
- ***Professor Stan Metcalfe*** of the **University of Manchester** (UK), who is working on the development of science and innovation policy in the UK. He specialises in evolutionary economics in relation to innovation, competition and economic growth, and the development of science and technology policy and management strategies; and
- ***Professor Keith Smith*** from the **Australian Innovation Research Centre**, who has worked in Europe for many years on innovation policy. His research work includes the nature and dynamics of innovation processes and innovation systems, innovation in low-technology industries and innovation statistics, and the development of science, technology and innovation policy.

Additional participants in the review include **Nick Donofrio**, **IBM**'s global vice–president and head of Innovation and Technology, and ***Professor Mark Dodgson***, director of the **University of Queensland**'s Technology and Innovation Management Centre.

▶ **More information: Catriona Jackson, 0417 142 238, www.innovation.gov.au/innovationreview/**

Green light

The chief executive officer of the **Australian Radiation Protection and Nuclear Safety Agency** (ARPANSA), ***Dr John Loy***, has approved a submission from the **Australian Nuclear Science and Technology Organisation** (ANSTO) for a modified design of reactor fuel for the **Open Pool Australian Light–water** (OPAL) reactor. ANSTO can now undertake the first part of its Return to Service Program and load the modified fuel into the OPAL reactor. The reactor was shut down last July following the partial displacement of some fuel plates. The investigations into the cause of the displacements indicated a combination of factors including inadequate design and fuel manufacture techniques.

The approval came after ANSTO had provided further information to ARPANSA on ANSTO's application to modify the OPAL reactor fuel design. Prior to the decision ARPANSA had undertaken a detailed review of the submission, including the engagement of external experts on reactor fuel design and vibration. The review also involved extensive questions and answers on the submission, including additional tests by ANSTO.

The new OPAL reactor building

PHOTO: ANSTO

According to Dr Loy, the modified design for the reactor fuel was appropriate and could be undertaken without undue risk to the health and safety of people and the environment. He proposes, however, to impose additional licence conditions on the facility licence for the OPAL reactor which will require ANSTO to continue a regime of testing for the fuel and to re–examine the design of the fuel in its entirety within two years.

▶ **More information: Sharon Kelly, 0400 394 085; www.arpansa.gov.au/news/MediaReleases/mr1_010508.cfm**

Open SHRIMP

The Minister for Resources, Energy and Tourism, ***Martin Ferguson***, recently opened the new **Sensitive High Resolution Ion Microprobe Laboratory** (SHRIMP) at **Geoscience Australia**. SHRIMP will significantly increase the amount of high quality data about the age of Australian rocks for resource exploration companies, government geoscience agencies and researchers.

SHRIMP is six metres long, weighs 12 tonnes and has the ability to analyse trace elements inside individual minerals smaller than a grain of sand. This will provide an important stream of geological data for the Australian mining community – data that will encourage exploration investment and support the Australian economy.

PHOTO: BRAD FERGUSON

A product of 20 years design and research at the **Australian National University** (ANU), the complex SHRIMP instruments are built by **Australian Scientific Instruments** (ASI) and are operating at the ANU and **Curtin University**, and have been exported to laboratories in Canada, Japan, the United States and China.

The Geoscience Australia instrument also marks a 15–year agreement between government and private enterprise, under which ASI will have the opportunity to test new hardware and software, and conduct customer demonstrations while Geoscience Australia broadens its scientific applications and scope with the SHRIMP.

▶ **More information: Tracey Winters, 0439 991 730**

Diverse research

Australia's **Learned Academies** have been awarded $561,272 over two years for research into issues as diverse as decisions about nuclear energy, nanotechnology safety, multiculturalism, workforce needs, and new approaches to illness and wellness, under the **Australian Research Council** (ARC) Linkage Learned Academies Special Projects scheme.

In 2008, six proposals from five Academies will be funded, representing a 75% success rate and average funding of $93,545 a project,

up by almost $10,000 on 2007.

The new science and technology research projects will:

- shape new approaches to illness/wellness through applications of converging technologies, e.g. smart packaging, air and water treatments with neuronal chips and robotics (**Australian Academy of Technological Sciences and Engineering**);
- analyse the research of historians, political analysts, physicists, environmentalists, legal analysts, economists, cultural critics, anthropologists and others to clarify the political, scientific, environmental and social contexts in which decisions on nuclear energy are made (**National Academies Forum**); and
- examine nanotechnology research trends and priorities in Australia and develop appropriate criteria for assessing the health, safety and environmental risks on a case–by–case basis for different applications (**Australian Academy of Science**).

▶ **More information: Fiona Skivington 0412 623 057**

Capture alliance

In an historic alliance, industry, union and environment organisations have called on the **Australian Government** to establish a **National Carbon Capture and Storage Taskforce** to combat climate change.

The new taskforce, proposed by the **Australian Coal Association** (ACA), the **Construction, Forestry, Mining, Energy Union** (CFMEU), the **Climate Institute** and the **World Wide Fund For Nature** (WWF), would develop and implement a nationally coordinated plan to oversee rapid demonstration and commercialisation of 10,000 GWh of carbon capture and storage (CCS) electricity per year by 2020.

The **Cooperative Research Centre for Greenhouse Gas Technologies** (CO2CRC), which is undertaking Australia's first carbon storage project, welcomes the proposal. Chief executive ***Dr Peter Cook*** says that he would look forward to the acceleration of research, demonstration and commercialisation of carbon capture and storage projects in Australia. "I see the taskforce as an important step in the broad adoption of the technology. The allied support for CCS from the mining union, the CFMEU, the Australian Coal Association and the Climate Institute and the World Wide Fund for Nature shows that the technology is now well accepted as an important greenhouse gas mitigation technology," Dr Cook says.

▶ **More information: Peter Logue, ACA, 0402 067 614; Gemma Swart, CFMEU, 0414 873 291; Ben Oquist, TCI, 0419 704 095; Charlie Stevens, WWF, 0424 649 689; Dr Peter Cook, 0419 490 044.**

Dry review

The **Australian Government** will conduct a comprehensive national review of drought policy through three separate investigations, to help prepare farmers and local communities for climate change. Federal Minister for Agriculture, Fisheries and Forestry ***Tony Burke*** says the review will include:

- an economic assessment of drought support measures by the **Productivity Commission**;
- an expert panel, led by an eminent Australian, to assess the social impacts of drought; and
- the **Bureau of Meteorology** and **CSIRO** to undertake a detailed scientific examination of likely future climate patterns and the current Exceptional Circumstances standard of a one-in-20-to-25-year-event.

"The idea of reviewing drought policy was backed by many submissions and discussions as part of the Australia 2020 summit in Canberra. In the face of climate change and increasing global pressures on food supply, now is the time to make sure we continue to build a resilient and adaptable farming sector," Mr Burke says. A priority theme from the Australia 2020 rural stream was: 'The challenges posed by climate change, with particular emphasis on its impacts on the food, fibre and forestry value chains'.

Progress will be discussed at the next **Primary Industries Ministerial Council** meeting in November, with the aim of having an improved drought policy in place by July 2009.

▶ **More information: www.maff.gov.au**

Non-intrusive venture

CSIRO and Chinese security inspection system specialist **Nuctech Company Ltd** have launched a new venture to commercialise the next generation in air cargo scanning technology.

In a move that will advance front–line border security worldwide, the joint venture will see the two partners working together to develop a new scanner incorporating CSIRO's world–first neutron technology and Nuctech's proven x–ray systems.

CSIRO's scanning technology is designed to accurately and rapidly detect a wide range of threat items concealed inside air freight containers. Conventional x-ray scanners are good at detecting objects based on their density and shape but are quite insensitive to composition.

By combining neutron and x-ray imaging, the new technology creates material–specific images of the contents of air cargo containers. This helps to detect any anomalies that should be inspected more closely. The technology is easily integrated with existing airport systems and is designed to be non–intrusive. Scanning an air freight container should take less than one minute.

The new venture will see Nuctech and CSIRO working together to manufacture the first commercial unit of the new air cargo scanner in Beijing. A detailed program of trials will then be undertaken to demonstrate the technology.

▶ **More information: Dr Nick Cutmore, 02 9710 6704, nick.cutmore@csiro.au**

Indian ties

The **Australian Government** will provide $7 million for new collaborative science initiatives under the **Australia–India Strategic Research Fund**.

The fund aims to facilitate and support science and technology research cooperation between the two countries and is Australia's largest bilateral research fund, providing $20 million over five years from 2006-07 for collaborative research projects.

Projects to be supported include research into the bioremediation of oil–contaminated marine and freshwater environments and work designed to strengthen Australia's research base in radio astronomy. Other projects include areas such as transgenic crops, nanotechnology, plant nutraceuticals and stem cell therapies.

In addition to projects under the competitive element of the fund, the Australian Government has also allocated $3 million under the Targeted Allocation component for large–scale collaborations between Australian and Indian partners. The **Queensland University of Technology** will receive funds for an information technology security project and the **University of New South Wales** will be funded for a nanocomposites project.

▶ **More information: Catriona Jackson, 0417 142 238**

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IAASTD food report: a golden opportunity

We sometimes forget that, despite lowered birth rates in many countries, the world's population will continue to grow for at least the next few decades, and is projected to peak at 9 billion in 2050. There are currently 850 million undernourished people in the world and we have to somehow find ways to feed them better. At the same time the demand for food is projected to increase due to the growing world population and rapidly rising living standards in South and East Asia.

An expansion in agricultural production is required and must be achieved against the uncertainties of a changing climate, and without exacerbating the damage already done to the atmosphere and the natural resource base. The global food system is already showing signs of pressure. Food prices are increasing and some farming inputs such as fertilisers have gone up 200% in the past year due to the rising cost of fossil fuel. These issues were highlighted in the recent global report from the International Assessment of Agricultural Science and Technology for Development (IAASTD). The report is timely because aid agencies such as the World Bank, in their recent *World Development Report*, emphasise that enduring solutions to the global food crisis require long term measures to reverse the decline in investment in agricultural R&D in many developing countries.

Striking a balance between the twin needs to increase productivity and to manage land, water and biological resources sustainably, the IAASTD report provides a unique up-to-date analysis of agricultural research consistent with the emerging concept of the multi-functionality of agricultural land.

It emphasises the need for research that focuses on social as well as economic and environmental dimensions of the problems. These features probably result from the strong contribution to the report from civil society organisations, which have led the way in developing participatory approaches to research; however their input is also reflected in the report's overly cautious treatment of the potential contributions from research on genetically modified organisms, and in its overemphasis on organic approaches to nutrient management. On the latter point, it is hard to see how the impacts of soil nutrient mining, now widespread in Africa, can be redressed without chemical fertilizer inputs as part of an integrated soil fertility management strategy; as it is said, 'nothing begets nothing'.

The biofuels' issue can be seen as a crossroad between agriculture and the environment, and the recent rapid expansion in crop biofuel production, is a hot topic in the media. Some commentators blame biofuels for the current global food price crisis, but looking into the topic at more depth reveals a high level of complexity in terms of impacts not only on the production and prices of food and feed commodities and international trade, but also on energy, greenhouse gases, land use and biodiversity; each commodity/biofuel has its own suite of impacts and ramifications. It is worth noting that biofuel production has little direct effect on the production or trade of rice.

One way to assess the international ramifications of the crop biofuel issue is in the context of the distortions current in world agricultural trade; for decades developing countries have been discouraged from growing their own food by the dumping of subsidized cheap grains from rich countries (mainly the Europe Union and the USA). The disincentives for developing country farmers were addressed by OxFam and the International Food Policy Research Institute in a piece written six years ago, before the biofuel issue fully emerged. Ironically their study showed that the $40 billion annual benefit that developing country producers would gain from rich countries lifting the $300 billion of subsidies to their own farmers was almost equivalent to the $50 billion that rich countries gave annually in development assistance. In the best of all possible worlds, the diversion of US and European excess crop production to domestic biofuels would go a long way to matching the effect of removing the farm subsidies. In reality the biofuel 'revolution' has spawned new tariffs and trade distortions designed to protect farmers in rich countries. Producers in developing countries may stand to gain from current increases in commodity prices, and from opportunities offered by their country's domestic biofuel policies. However, consumers, especially the vast and increasing numbers of urban poor, are the major losers as prices rise.

In reality the biofuel 'revolution' has spawned new tariffs and trade distortions designed to protect farmers in rich countries.

The IAASTD report draws attention to the need for a systematic re-direction of agricultural science towards agro-ecological strategies that address production and environmental issues. Only an integrated systems approach can draw together the complex web of diverse issues and distil the key insights into forms that policy–makers can understand and translate into action. A wide gulf exists between researchers in the agricultural and environmental fields, although at the global level joint projects on food, water, health and carbon as part of the Earth System Science Partnership (ESSP) are exploring new interdisciplinary approaches, as are several new Australian institutes.

Australian science has much to offer because the agricultural production and land and water issues that we face have much in common with many developing countries. The IAASTD presents a golden opportunity for the Federal Government to divert development assistance investments to support research and training that targets agricultural and environmental problems faced by both Australia and developing countries. After all, we all share the same planet.

**The author was former senior academic advisor to the United Nations Institute for Environment and Human Security*

Calculated potential

The development of new drugs has been given a high–tech speed boost by chemists at the **Australian National University** (ANU) using a supercomputer to accurately predict the redox potential of drug molecules. The redox potential of drug molecules, which defines the ability to donate or accept electrons, is a significant indicator of their therapeutic potential, and improving the calculations of redox potentials will allow more efficient predictions for drug development.

"We have shown that the supercomputer results are as accurate as those obtained from the laboratory", says ***Dr Mansoor Namazian*** of the ANU and member of the **ARC Centre of Excellence for Free Radical Chemistry and Biotechnology**. "This method saves lots of time and resources," he adds, "as we can take many potential drugs and feed their chemical structures into a computer and calculate which of those has the desired redox potential without having to do all the time consuming experiments on all of them."

The group used vitamin P, also known as Rutin, to successfully demonstrate their method. It is a large compound with many known bioactivities.

"The ability to get such excellent agreement between theoretical and experimental results using vitamin P demonstrates the power of this new method and also the potential for making drug discovery more targeted", says research leader ***Dr Michelle Coote***.

The results for Rutin as well as for anti–cancer agents such as Chlorogenic acid, Quercetin, and Coumestan have recently been published in international journals such as *Biophysical Chemistry*.

▶ More information: www.freeradical.org.au/images/stories/Media/News%20Release_7April08.pdf

Sniffing out radiation

Australian scientists have developed a prototype remote–controlled robotic vehicle to detect radiation, the Minister for Defence Science and Personnel, ***Warren Snowdon***, has announced.

"This is a significant leap forward for Australia's defence and national security agencies," says Mr Snowdon. "It will greatly enhance our ability to respond to radioactive incidents."

The concept vehicle, known as RASP, for Remote Advanced Sensor Platform, was developed jointly by the **Defence Science and Technology Organisation** (DSTO) and the **Australian Nuclear Science and Technology Organisation** (ANSTO). It is small and light and can be operated from distances of up to 350 metres with full control of the robot.


PHOTO: DSTO

The Remote Advanced Sensor Platform, RASP

"It could be deployed in almost any area or location, from aircraft to cargo containers," says Mr Snowdon. "For the first time, we will also be able to provide our national security agencies with the ability to remotely identify the nature of the radioactive sources."

According to Mr Snowdon, emergency officers who detect the presence of radiation with their handheld instruments will be able to send in RASP and quickly determine its half–life.

Mid–year scenario trials will be conducted at ANSTO, which will closely emulate a real event involving radioactive material.

▶ More information: www.dsto.defence.gov.au/news/5366/

Hands on preferred

Around 80% of male and almost 70% of female final year engineering university students intend to pursue their engineering careers in Australia according to a new survey.

The Minister for Education, ***Julia Gillard,*** released the report, which surveyed 1540 final year engineering university students across the country. The findings highlight that 70% of overseas students studying engineering also intend to look for engineering jobs here, a positive outcome because of the continuing high demand for engineers in Australia.

The survey suggests women and men are attracted to engineering courses for the same reasons, such as problem solving, designing and creating in a hands–on way. Students said they were interested in new and emerging technologies and are attracted by the strong employment opportunities engineering presents.

Work experience is a critical element of the engineering education experience. Survey results indicate that the most common means of obtaining employment was after doing work experience at the same site.

▶ More information: www.deewr.gov.au/engineeringstudentssurvey

Moving data

CSIRO's **Australia Telescope National Facility** (ATNF) has been awarded a 'private data highway', a 10 gigabit per second link across the US by a major internet consortium and a US communications company. The link will allow the ATNF and collaborating institutions to show that large data sets can be moved, in real time, to and from Australia and around the globe.

"This will be important for demonstrating techniques that will be used for the international Square Kilometre Array radio telescope," says ***Professor Brian Boyle***, director of CSIRO's ATNF.

The award is the first IDEA (Internet2 Driving Exemplary

Applications) Wave of the Future Award from the **Internet2 consortium**, which represents more than 300 US universities, companies and government research institutions.

The award is sponsored by **Level 3 Communications**, an international communications company headquartered in Colorado. It was presented at the Internet2 Spring Members' Meeting held in Arlington, Virginia.

In the first instance, CSIRO's astronomers will use the link to work with colleagues at the Haystack Observatory run by MIT (**Massachusetts Institute of Technology**). Astronomers at both institutions are pioneering the use of data networks to link widely separated radio telescopes in real time. The technique the astronomers are working on is called e-VLBI (electronic very long baseline interferometry). In this, telescopes hundreds or thousands of kilometres apart observe the same region of sky simultaneously. Data from each telescope is sampled and sent to a super–computer via high-speed networks. The super–computer decodes and correlates the data and generates very high–resolution images of the cosmic objects being observed.

A typical VLBI experiment in Australia involves five or six telescopes, while an international experiment could use up to 20.

E-VLBI has eliminated the weeks or even months it used to take to record and ship this data around on disks. It also allows astronomers to get instant feedback during observations, which will open up the study of quickly evolving, transient phenomena in the universe.

The Internet2-sponsored link across the USA will be made available for a year. The data link from Sydney to Los Angeles will be provided by the **Australian Academic and Research Network**, AARNet.

▶ More information: www.csiro.au/news/MediaCentre/whatsnew.html

New perspective

The way in which researchers can present their data in online publications has been revolutionised, thanks to a new software technique developed by staff at **Swinburne University**.

Dr David Barnes and ***Dr Christopher Fluke*** from Swinburne's **Centre for Astrophysics and Supercomputing** have developed a new technique that allows interactive three dimensional visualisations to be embedded into Adobe Portable Document Format (PDF) files.

This new technique allows researchers who publish in online digital publications to present their papers so that readers can interact with 3D data. Readers can easily rotate and explore 3D models, and can even highlight particular elements from a data set, which is useful for example to view astronomy data sets, such as representing the dark matter halos that surround galaxies. These complex structures can only be fully appreciated via interactive 3D visualisations.

While this software was originally developed for astrophysicists, it is a technique that can be applied to data sets across all disciplines.

Presenting findings in this way also gives readers the opportunity to scrutinise research data themselves, rather than having to rely on the conclusions of the paper's author.

▶ More information: www.swin.edu.au/corporate/marketing/mediacentre/core/releases_latest.php

Cosmic digestion

According to researchers from the **Australian National University**, a stream of debris across the sky is the result of intergalactic cannibalism, and it is the not the first time our galaxy has had one of its neighbours for breakfast.

Astronomers from the Research School of Astronomy and Astrophysics at **ANU** have identified a huge swathe of debris that has been wrenched from a neighbouring galaxy to our Milky Way.

"The stars we have found have been stripped from the Sagittarius dwarf galaxy," says lead author ***Dr Stefan Keller***. "The Sagittarius dwarf is a cosmic lightweight weighing 10,000 times less than our Milky Way. It has ventured too close to our galaxy and is now getting stretched out and torn apart."

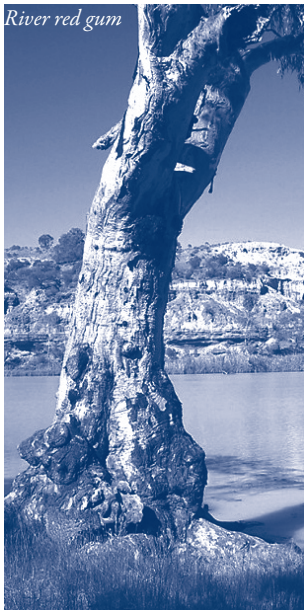
The pieces of debris from the Sagittarius dwarf sweep across the entire sky but are buried among the countless foreground Milky Way stars. Dr Keller and his colleagues were able to trace the stream by analysing a very rare type of pulsating star called an RR Lyrae variable.

These stars change their brightness as they get bigger and smaller, and all have the same intrinsic brightness. This allowed the researchers to derive an accurate distance to each RR Lyrae star they found.

It's currently thought that the Milky Way has had a steady diet of smaller galaxies during its lifetime. "Early in the life of the Milky Way galaxy mergers such as this occurred on a much more frequent basis, contributing substantially to the mass of the Milky Way," Dr Keller says. "The devouring of the Sagittarius dwarf is like the after dinner mint on top of what has been an extensive banquet for the Milky Way."

▶ More information: info.anu.edu.au/ovc/media/Media_Releases/index.asp

Gum rescue


River red gum

Dying river red gums along the River Murray in South Australia could be saved with clever irrigation technology, according to **University of Adelaide** researcher ***Anne Jensen***.

Recent research suggests that a watering regime of just 5mm per week or 10mm per fortnight could be sufficient to keep germinating red gum seedlings alive through summer.

Mrs Jensen, a PhD candidate in the School of Earth and Environmental Sciences, and Facilitator of the University's Water Research Cluster, says that the chances of river red gums getting flood flows had diminished. Already more than 75% of the majestic red gums were stressed or dying. "In the absence of floods to water the seedlings, precision irrigation techniques could be used to deliver water to priority areas, as an interim measure," says Mrs Jensen, commenting on results presented in a paper *Smart Environmental Watering* at the international conference Water Down Under 2008 in Adelaide.

"These relatively low watering rates would be sufficient to keep seedlings alive through their first summer after germination."

▶ More information: www.adelaide.edu.au/news/?mode=search2002/

Grass ban

The decision by the **Queensland Government** to officially declare African gamba grass a weed is a correct and courageous decision, taken in the face of sectoral interests lobbying for continued use of this plant, says chief executive officer of the **Weeds CRC**, ***Dr Rachel McFadyen***.

In supporting the decision she points out that pastoral interests

imported the grass from Africa in the days before modern weed risk assessment protocols were available.

"Armed with the assessment process we now have, it is highly unlikely that permission would ever have been granted to allow this dangerous grass species into Australia," says Dr McFadyen. "It's a major threat to biodiversity, and it's a high fire risk for wildlife, humans and infrastructure."

The African grass was recently assessed by officials in both WA and Queensland using a standard, national 'weed risk assessment' process developed by Australian scientists. It failed the test in both states and was then banned in WA.

Class 2 Declaration in Queensland means that local governments and other land owners such as Main Roads will have to control the plant on their land, and isolated and small infestations can now be eradicated. Where landholders have plantations established for cattle feed, they will be able to maintain these but will have to prevent any seeding and spread and take responsibility for the control of unmanaged infestations on their land.

▶ **More information: www.weeds.crc.org.au/publications/media.html**

New kilo

Small Business Minister ***Dr Craig Emerson*** has handed over two unique spheres that may redefine the 'kilogram' to the world.

Dr Emerson, the Minister responsible for **Australia's National Measurement Institute** (NMI), handed over the silicon spheres to the international measurement community during a special ceremony at Lindfield, Sydney.

The kilogram, the unit of mass in the International System of Units (SI), is presently defined as the mass of a platinum–iridium cylinder sitting in a vault in France. There is evidence that the mass of the 119–year–old cylinder may have slowly changed over time in a small but measurable way.

"This presented a unique opportunity for staff from the **CSIRO**'s **Australian Centre for Precision Optics** and the NMI to take part in the Avogadro Project," says Dr Emerson. "The project is a global collaboration that aims to link the weight of the kilogram directly to the mass of atoms."

Dr Emerson says the definition of the kilogram is the peak measurement standard of mass to which all others worldwide are traced.

"I understand that not only are measurements of mass affected, the definition of the kilogram links directly to measurements for energy, electrical and chemical quantities," he says. Dr Emerson adds that improving the kilogram will improve measurement capabilities in these and other areas, and will be important for industries that rely on accurate measurement such as aerospace.

▶ **More information: minister.industry.gov.au/Pages/default.aspx**

Radical choke

Free radical pollution in the air could be a cause of asthma, suggests ***Duanne Sigmund***, from the **ARC Centre of Excellence for Free Radical Chemistry and Biotechnology**.

In new research Sigmund and ***Dr Uta Wille***, both chemists at the **University of Melbourne**, have discovered that the atmospheric nitrate radical irreversibly damages amino acids. This, they suggest, could be a cause of some respiratory diseases. The nitrate radical is formed by two common atmospheric pollutants - nitrogen dioxide, which is emitted from car exhausts, and ozone, an important greenhouse gas. During the day the sun's UV radiation breaks down the nitrate radicals, but the concentrations rise as soon as the sun goes down.

The duo has found that the nitrate radical reacts with amino acids to form compounds such as beta–nitrate esters, beta–carbonyl, and aromatic nitro–compounds. Some of these compounds have been associated with increased immune response in some respiratory diseases, creating worse symptoms. "Our results suggest that the nitrate radical could be a real culprit for respiratory diseases, yet until this study the nitrate radical has been previously entirely overlooked in regard to causes for diseases such as asthma", says Sigmund.

"We are now focusing our research on the cell membrane, to see if these radicals can migrate inside and cause damage to cells," adds Dr Wille. "If this is found to be significant, then health researchers might have to factor in the role of the nitrate radical when examining other respiratory diseases."

The duo's work will be published in the upcoming issue of the *U.K. Royal Society of Chemistry's Chemical Communications*.

▶ **More information: Duanne Sigmund: 0439 762 998; Uta Wille, 03 8344 2425**

Steroid helper

Evolutionary studies into what keeps us breathing led to a breakthrough for **University of South Australia** researchers who discovered that cholesterol is an essential ingredient in healthy lung function.

This important discovery could lead to lifesaving solutions for premature babies with breathing difficulties and even for transplant surgery.

The research team, led by ***Associate Professor Sandra Orgeig*** from UniSA's **Sansom Institute**, is one of very few globally undertaking evolutionary research on the pulmonary surfactant system of the lungs of some unusual mammals and reptiles.

The pulmonary surfactant system, a complex mixture of lipids (fats) and proteins, lines the insides of the lung alveoli and prevents the lung from becoming stiff. In premature babies, the surfactant system and the lungs are not yet fully developed resulting in breathing difficulties. Without surfactant their lungs are incredibly stiff and the babies aren't capable of expanding their lungs, which may lead to collapse. In severe cases, artificial surfactant is administered by being vaporised and inhaled into their lungs. The group's discovery that cholesterol is an important component in the surfactant system has sparked world–wide interest among surfactant researchers whether it should be incorporated in artificial surfactants.

In evolutionary studies the group found that the surfactant system is present in every lung, no matter how complex, but the composition of surfactant varies. In reptiles and heterothermic mammals, which can change their body temperature, the cholesterol component is essential to cope with wide ranging temperatures. The state of a fat at a certain temperature depends on its composition. "Cholesterol is a fluidising lipid that makes solid lipids more fluid, so when added to surfactant, cholesterol enables the surfactant mixture to be more fluid at a lower temperature," says Professor Orgeig. "We know how important cholesterol is for body temperature changes in mammals. Now we are investigating this further to see if there is value in including cholesterol in artificial surfactants for premature babies or adults with severe respiratory distress."

Knowing how animals cope with body temperature changes could also lead to potential applications for transplant surgery, where the body temperature is also lowered, although to a lesser extent than in hibernating mammals. Ultimately the group aims to formulate better artificial surfactants for people with severe respiratory conditions.

▶ **More information: www.unisa.edu.au/news/2008/110408.asp**

Professor Jennifer Graves
Australian National University
&
Dr Sue Forrest
Australian Genome Research Facility

Oz genomics - getting back on the bus

The platypus genome is causing ripples of excitement around the world. Published as a cover story in *Nature* this week, it is easily the most keenly awaited genome since the chimp. What can we learn from it? What practical use is this knowledge? Does it herald a new era in Australian genomics?

The excitement is because platypus is so different from the run–of–the mill placental mammals, having diverged about 210 million years ago. It is an amazing amalgam of reptile–like and mammal–like characters; a creature with fur that lays eggs but feeds its young with milk, and makes venom like a snake. It is often called the missing link between mammals and reptiles.

The genome truly reflects this biological mixture. There are genes that make egg–yolk proteins (though fewer than in a bird), and genes that make milk proteins (as many as a cow), and independently evolved genes that make toxins like snake venom. There are lots of surprises: for instance, sex is more like a bird than a mammal.

In genomics, difference is power. Power to find new genes (including human genes) and small signals that turn them on and off, by aligning sequence against placentals. Power to find out how complex regulatory systems like sex and epigenetic gene silencing evolved and how they work in humans. This knowledge is intensely sought to understand the biochemistry of life, and what happens when things go wrong, as in cancer cells.

Jennifer Marshall Graves is a geneticist who works on Australian animals – kangaroos, platypus and sex are specialities. She heads the Comparative Genomics Research group in the Research School of Biological Sciences at ANU, and is director of the ARC Centre of Excellence for Kangaroo Genomics.

Sue Forrest is director/CEO of the Australian Genome Research Facility Ltd, the Genomics Platform Convenor of BioPlatforms Australia and a member of the Biotechnology Strategic Development Plan Infrastructure Working Group for the State Government of Victoria.

If difference is power in genomics, Australia should be very powerful. Being cut off from the evolutionary mainstream for 80 million years, Australia specializes in really different plants and animals. Our access to kangaroos and devils, dragons, kookaburras and (old) gumtrees presents opportunities to make unique contributions to international genomics.

So is the platypus sequence, the first for an Australian animal, a triumph for Australia? Alas, no. Sequencing was at Washington University, funded by the National Institutes of Health (NIH) of the US, and analysed by a huge international consortium. The project was not ours, although most platypus research is Australian, we generated the proposal, supplied the DNA, and helped interpret the sequence (25 of 100 authors are Australians).

In fact, Australia can claim only the humblest profile in international genomics. Of the 20 sequenced mammals published, we have contributed only a miniscule amount to the cow genome. The gum tree was sequenced in Japan. Australia had the chance to lead the project to sequence the first marsupial; we wrote the proposal to do the kangaroo. What happened? Despite intense urging, the Australian government refused to contribute even a tiny fraction of the funding. Result? The Brazilian opossum graced the cover of *Nature* last year.

Australia's support for genome science falls far behind many comparable countries. The Canadian Federal government invested a total of CA$840 million in Genome Canada over 10 years, funding half the research projects and technology platforms. Neighbours such as Singapore, Korea, China are investing heavily in genomics to generate significant scientific outcomes.

Does it matter that Australia contributes nothing to these milestone projects? The data all go up on the web anyway, so can't we sit on our backsides, then get it for free? No. We need to have an early seat at the international genomics table to enable us to be seriously involved in the next stages, the rush to utilise the avalanche of data to invent new diagnostic tools, new drugs, new approaches to agriculture.

So why did Australia miss the bus so ignominiously? Maybe Government and their advisors thought that we can get it all for free, and some senior scientists hoped this 'DNA stuff' would go away so we can all go back to old fashioned biochemistry. What a blunder! Genomics is fundamental to biochemistry, medicine, pharmaceuticals, agribusiness, forensics, ecology and wildlife management.

The one bright spot in Australian genomics is the kangaroo genome, now being sequenced by the Australian Genome Research Facility (AGRF). Funding came, not from the Australian Government or any of its grant schemes, but the State Government of Victoria, matched by the NIH, with funding also from AGRF. By far the largest genome sequencing project in Australia, this project salvages some national respectability and gives the Victorian Government a high profile in international biotechnology.

The next stages of genome science will see comparative sequencing accelerate to complete our picture of the fundamental plan of the genome and understand how it functions in different organisms. This is hugely important to biotechnology, and Australian scientists are poised to make big contributions. The National Collaborative Research Infrastructure Strategy recently granted initial support for some infrastructure and operating costs for genomics over the next four years.

This potential was evident at the recent 10th Anniversary Symposium held by the AGRF in Melbourne, in April, as scientists talked about the genome of yeasts vital to producing quality wine, about genes that are mutated in children with epilepsy, genes that tell plants when to flower, and genes that can make plants into better biofuels.

Can we still get back on the bus? We must if we are serious about being major, or even minor players in biotechnology. There are great opportunities with the new generation of sequencing technology to use it inventively, capitalising on our unique resources.

Safe surf

New international guidelines for safer use of social networking services, such as Facebook, MySpace and Bebo, have been launched in the UK Parliament's **House of Lords** in London. The **Australian Communications and Media Authority** (ACMA) has been an important contributor to the development of the guidelines.

ACMA chairman ***Chris Chapman*** says the *Good Practice Guidance for Providers of Social Networking and Other User Interactive Services* is an important step in providing a global safety net.

"The Internet doesn't recognise geographic borders. Connecting Australian cyber safety work – such as the **Internet Industry Association** (IIA) development of a new online services code of practice – to parallel activities in other countries, we can start to generate globally effective solutions to online safety issues," says Mr Chapman.

The Guidance recommends making social networking profiles for users under 18 private by default, and increasing reporting mechanisms for bullying or other anti–social behaviour on social networking sites. It provides recommendations for implementation by service providers to minimise the risks to users and information that can be incorporated into Australian safety campaigns targeted to parents, carers and users of services.

▶ **More information: www.acma.gov.au/WEB/STANDARD/pc=LATEST**

Defence attraction

Join a humanitarian aide mission, operate a temporary airfield and earn a virtual veterans' service medal in **Air Force**'s new online game, 'Operation Overwatch'. The online games of the **Australian Defence Force** (ADF) are designed to entertain and inform potential recruits about the variety of jobs available in the Forces, and the latest brings to life caring for civilian populations in a war–torn country.

The Minister for Defence Science and Personnel, ***Mr Warren Snowdon***, says with 12 games now available online real work is being done to engage young Australians with Defence.

"While more has to happen to attract and retain young people in the Forces, it is critical to the future of the ADF that Generation Y and beyond can access and interact with recruiting information via the technology they are comfortable with," says Mr Snowdon. "Operation Overwatch follows on from the outstanding success of Air Force's two other online games, Supreme Air Combat and Operation Thunderbolt, which have already seen over 300,000 game plays."

Mr Snowdon adds that this latest game expands the idea of the Air Force as simply fast jets, to include the compelling challenge of supplying food, water and medical supplies to a country in need.

▶ **More information: www.minister.defence.gov.au/Snowdontpl.cfm?CurrentId=7582**

Free to air popular

Just over two out of five Australian households – 42%– are watching digital television over the airwaves, according to research by the **Australian Communications and Media Authority**.

"Take-up of digital free-to-air TV has risen steadily since its introduction in 2001, but significant numbers of the community have yet to make the switch from analog," says ***Chris Chapman***, ACMA chairman.

"This research gives us an insight into the reasons for the adoption and non–adoption of digital television, which will help guide the **Australian Government**, ACMA and broadcasters to effectively manage the transition from analog to digital."

ACMA's research suggests that even when viewers of digital subscription television services are combined with those watching over the airwaves, only just over half of households – 54% – are receiving digital free-to-air television services.

The research also indicates that digital capable TV sets now account for a quarter (25.7%) of overall stock of televisions.

The findings are among the key results of the *Digital Television in Australian Homes 2007* report, the third in a series of ACMA studies into household adoption of digital TV.

▶ **More information: www.acma.gov.au/WEB/STANDARD/pc=LATEST**

Online overnment

A quarter of all Australians now conduct most or their entire dealings with government online, according to a report released today by the Minister for Finance and Deregulation, ***Lindsay Tanner***.

The report *Australians' Use of and Satisfaction with e-Government Services – 2007* measures the uptake of government services provided through the internet and other channels in Australia.

"This report provides insight into Australian citizens' views and use of online government services. It shows how indispensable the Internet has become for the delivery of those services to the Australian public," says Mr Tanner. "Use of the Internet to access government services has changed significantly since these reports began in 2005. By measuring how citizens use government services in different ways, we can identify trends and analyse the experiences, preferences and evolving expectations of those citizens."

The report indicates that 25% of people now conduct all or most of their dealings with government over the Internet, up from 14% in 2004-05. Three in five people (59%) use the Internet to access government services in 2007, a 20% increase compared with 2004-05 usage rates.

The report is based on a study of Australians over the age of 18 who had some form of contact with government in the previous 12 months.

▶ **More information: www.financeminister.gov.au/media/2008/mr_132008.html**

Darwinians connected

Northern Territorians living in Darwin are the 'best connected' in regional Australia, according to a new economic and social analysis of country areas. The *2008 Country Matters: Social Atlas of Rural and Regional Australia* was launched by the Minister for Agriculture, Fisheries and Forestry, ***Tony Burke***.

The Atlas is an online tool that describes the social and economic trends affecting the lives of the 7.5 million Australians living outside Australia's capital cities.

"The highest level of household internet connections in regional centres – at 63.4% – was found in the Northern Territory," Mr Burke says. "This is not far behind the proportion of households in major urban centres which are connected (66.1%).

▶ **More information: www.maff.gov.au/media/; to use the Atlas online visit www.brs.gov.au/socialatlas**

Professor Malcolm Walter,
DIRECTOR OF THE AUSTRALIAN CENTRE FOR ASTROBIOLOGY, UNIVERSITY OF NEW SOUTH WALES

New momentum in space

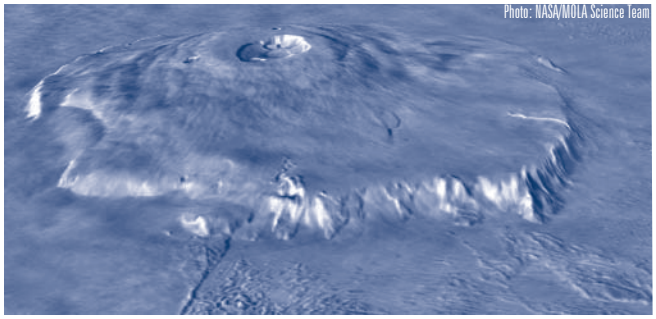
The "Space Race" of 1960's and 1970's fizzled out with the end of NASA's Apollo program in 1973. Exploration missions continued but with an ever decreasing role for the former Soviet Union. In the US the bulk of the funding went to the International Space Station, widely viewed as a dubious venture. Meanwhile, most other developed nations discovered space and set up national programs of one sort or another. There are now about 40 nations involved. Australia stands out as an exception, but the current Senate enquiry into space science and industry may be a harbinger of change.

The international spread of activities has become striking over the last decade. The technical achievements of the European Space Agency rival those of NASA, Japan is making steady progress, Canada is highly visible, and India and China are major players. There is new interest in returning to the Moon and it is not obvious who will get there first.

Some missions are so difficult and expensive that they are driving international collaboration. Foremost amongst these, beyond the space station, is a mission to return samples from Mars. While NASA and ESA are providing most of the momentum, many nations are involved. If it happens this will be the first two–way mission to another planet. All of the numerous exploration missions, except those to the Moon, have been one–way, leading to fanciful proposals for one-way trips by astronauts to Mars. Japan may break this record by returning a sample from a comet; that mission is underway.

Mars is a glittering target. It might once have, and might still, harbour life, fossil or extant. There are many scientific and technical reasons for exploring Mars but none so profoundly significant as discovering evidence of life.

To understand this we only need to recognise that everything we know about life is based on a sample of one. A second sample would lead to a revolution in biology, and perhaps in philosophy and theology as well. But there is a catch: there is a traffic of meteorites between Mars and Earth, so one planet could have seeded the other with life. This has been shown to be feasible and, some would say, inevitable. Of course this relates to microbes, but is no less significant for that as all life on Earth began that way.



Home to giant volcanoes, Mars would be an even more dramatic place if lava still flowed on the surface today. Olympus Mons, the largest volcano in the solar system, would cover the state of Arizona. The image shows two views of Olympus Mons, shown as topography draped over a Viking image mosaic.

Because of the orbital dynamics of Mars and Earth launch opportunities occur every 26 months. A sample–return mission is in the early stages of planning. The earliest launch opportunity occurs in 2018. The long lead–time results from the complexity of the mission, not to mention the difficulty of convincing funding agencies. The 'mission architecture' will probably involve two launches by heavy–lift rockets (like the Saturn 5 of Apollo days), an orbiter/sample-return vehicle, a lander perhaps with multiple rovers as well as the capacity to launch the sample container, and a high data–rate communication system.

Any such mission raises the issue of forward and backward contamination. First, we do not want to send what we will be searching for, microbes or even organic compounds. An extraordinarily high level of cleanliness will be required. Second, because microbes might be present in returned samples, Earth must be protected. The landing procedure on Earth and then the sample containment process must be fail–safe. There is already substantial experience with the necessary procedures, but the standards will have to be even more stringent.

The search for life elsewhere is guided by our knowledge of life on Earth. We can imagine other forms of life but all scientific searches are based on two assumptions: all life is carbon–based and requires liquid water. There is an exception to this approach: that is the search for technologically–advanced life. There the assumption is that such life would leak or send electromagnetic signals. But back to microbes. In recent decades enormous advances have occurred in microbiology. In probing the environmental limits of life we have found microbes living in what, from our perspective, are extreme environments. For example at 121°C, at a pH near zero, in the high radiation conditions of the cooling water of nuclear reactors, and so on. Hence the term 'extremophiles'. In fact, we do not yet know the environmental limits of life.

So the search for life elsewhere starts with life here. As well as studying extant life, research on the fossil record of microbes is important. That is because the evidence suggests that Mars once had a much more clement environment than at present.

The planet is now a frigid desert, but three billion years ago it was warm and wet. At that time on Earth microbes flourished. The oldest convincing evidence of life on Earth is found in the Pilbara region of NW Australia, in rocks 3.4–3.5 billion years old. If there was life here then, why not on Mars?

The search for life elsewhere in the solar system encompasses other planets and their satellites, such as Europa, but Mars is the most accessible target. In addition, many other planetary systems have been found in recent years. Searching for life on these is challenging but possible. The approach at present is to search for evidence in planetary atmospheres – oxygen or methane, for example. Free oxygen in our atmosphere comes from photosynthesis by microbes and plants, and much of the methane comes from biological processes.

Being an optimist I consider it likely that by the end of this century we will know whether we are alone in the Universe. The question may be answered by robotic missions, but I suspect that 'crewed' exploration will be required, and that within the lifetimes of our children there will be people on Mars.

Pluripotential

The Queensland node of the **Australian Stem Cell Centre** (ASCC) has now opened in the Queensland Bioscience Precinct at the **University of Queensland**. The ASCC's Queensland laboratories include the first human embryonic stem cell production facility in the state. The ASCC's human embryonic stem cell lines are now available to Brisbane–based stem cell scientists who are using the cells to investigate their potential for the treatment of blood related diseases and kidney disease. The Queensland cell lines are expanded from existing human embryonic stem cell lines, known as MEL1 and MEL2, created in Melbourne.

The Centre's Queensland node is headed by the ASCC's chief scientific officer ***Professor Melissa Little,*** and will support the ASCC's research programs in haematology and tissue regeneration.

▶ More information: 0423 056 952, www.stemcellcentre.edu.au/.

Calculated effort

The **University of Newcastle** is repositioning itself on the international maths scene following major investment in the discipline and the recruitment of leading experts. The University has secured the internationally recognised expertise of ***Visiting Professor Jon Borwein*** and ***Professor Natashia Boland*** to develop a world–class centre for computer assisted research mathematics and its applications.

Visiting from **Dalhousie University** in Canada, Professor Borwein is internationally recognised for his contribution to mathematics and computing education. He is at the forefront of developing highly innovative computer programs to illustrate complex mathematical ideas.

Recognised for her continuing work with industry, Professor Boland works in the specialised field of operations research, which involves the application of mathematical techniques to human and business activities. Her research has been applied to numerous industry problems including airline planning, military logistics deployment, and the planning of international shipping movements.

Together Professors Borwein and Boland will conduct an international search for five outstanding teaching and research staff to join the University of Newcastle.

▶ More information: Prof John O'Connor, 02 4921 5439, 0402 839 978

Small scale benefit

Australia's national facilities for nanoscale fabrication and characterisation are to work closely together for the benefit of all Australian researchers.

A Memorandum of Understanding between the **Australian Microscopy and Microanalysis Research Facility** (AMMRF), which has its national headquarters at the **University of Sydney**, and **Australian National Fabrication Facility Ltd** (ANFF) has been signed recently. Collaboration between the facilities will principally be in the areas of facility management and operation and business development, with a view to achieving best practice in all areas of AMMRF and ANFF operations.

The AMMRF and ANFF were established in 2007 under the **Commonwealth Government's National Collaborative Research Infrastructure Strategy** (NCRIS). The facilities are funded by the **Australian Government** through NCRIS and the **State Governments of New South Wales**, **Queensland**, **Victoria**, **South Australia** and **Western Australia**.

▶ More information: Jake O'Shaughnessy, 02 9351 4312, 0421 617 861

Terrorism research

The **Australian Government** is providing funding for two research projects in the **University of South Australia**'s (UniSA) **Defence and Systems Institute** (DASI) to enhance Australia's counter–terrorism capabilities.

A general security and forensic model for Process Control and Supervisory Control and Data Acquisition (SCADA) systems will improve the security of Australia's electricity, gas, water and oil supplies against terrorism. The project will initially investigate and map security weaknesses associated with the computer systems and networks that control critical infrastructure. Associate professor (Homeland Security) and director of UniSA's Forensic Computing Lab, ***Dr Jill Slay,*** leads the project and says this data will be used to develop a generic security architecture for Process Control and SCADA systems.

The second project, a data analysis tool for counter–terrorism collaboration, cooperation and visualisation, will use data mining techniques to help counter–terrorism agencies connect terrorism–related dots in massive amounts of data. Project leader ***Associate Professor Shraga Shoval*** says the new tool will identify hidden patterns and relationships in counter–terrorism databases and present it to the relevant law enforcement agencies in a timely, clear and user–friendly fashion.

▶ More information: Jill Slay, 08 8302 3840, jill.slay@unisa.edu.au

Marketing helper

Flinders University has joined forces with a US–based company, **Innovista Systems**, to promote its innovative ASK software for commercialising research to universities and research institutions on international markets.

Flinders Partners managing director ***Anthony Francis*** says the relationship with Innovista is one of the first international collaborations for the newly formed company Flinders Partners, which was established to bring good ideas and advanced research together with the marketplace to develop viable products. According to Mr Francis, the ASK software provides a platform for analysing research projects, assessing market readiness and advising on the steps still required before the product can be offered for sale.

▶ More information: Charles Gent, (08) 8201 2965

Healthy partners

University of New South Wales (UNSW) researchers have been awarded $6.6 million for a strategic partnership to improve the quality and effectiveness of health sector aid in the Asia–Pacific region. The university will be one of four Health Knowledge Hubs identified to help the **Australian government**'s overseas aid organisation **AusAID** build capacity and improve health outcomes in the region.

The team of researchers selected to establish the knowledge hub in Human Resources for Health over a period of four years include: ***Associate Professor Rohan Jayasuriya***, ***Professor Anthony Zwi***, ***Associate Professor Anna Whelan***, ***Mr Alan Hodgkinson***, ***Professor Daniel Tarantola*** and ***Ms Lois Meyer***.

The group has already commenced work to develop partnerships with experts in Australia and overseas to give priority to the needs identified in countries of the Asia Pacific region, namely Papua New Guinea, Indonesia, Timor Leste, Laos, Cambodia and Vietnam.

▶ More information: www.unsw.edu.au/news/pad/articles/2008/apr/Aid.html

Cell death trigger

Targeting ovarian cancer

Pre–clinical studies reviewed during an oral presentation at the annual meeting of the **American Association for Cancer Research** demonstrate that the **Novogen** drug candidate NV-128 engages a novel mode of cell death, which targets the akt-mTOR pathway in multi-drug resistant ovarian cancer cells.

"We consider that the capacity of NV-128 to trigger mTOR dephosphorylation leading to caspase–independent cell death, in otherwise chemoresistant ovarian cancer cells, opens new possibilities for the use of NV–128 as a potential addition to conventional chemotherapy targeting ovarian cancer cells," says ***Associate Professor Gil Mor***, Department of Obstetrics and Gynecology, **Yale University School of Medicine**.

In regard of late stage ovarian cancer, Dr Mor says that the demonstration of a functional caspase–independent cell death pathway in apoptotic–resistant ovarian cancer cells is a key step to the development of alternative targeted therapy for refractory patients.

Structurally, NV–128 is an analogue of triphendiol (NV–196) and phenoxodiol, both of which are investigational drugs that have been licensed by Novogen to **Marshall Edwards Inc**. Phenoxodiol is currently in a multinational, multi-centre Phase III clinical trial for patients with late stage ovarian cancer. Triphendiol has recently been granted orphan drug status by the **FDA** for pancreatic and bile duct cancers, and late stage melanoma.

▶ **More information: www.novogen.com/**

Targeting biliary cancers

Pre–clinical studies demonstrate that the investigational drug candidate triphendiol (NV-196) from **Marshall Edwards Inc**, a **Novogen Limited** subsidiary, induces apoptosis in pancreatic and bile duct cancer cell lines, and also retards tumour proliferation in animal models of both indications. Of significance, triphendiol also potently sensitises pancreatic and bile duct cancer cell lines and xenograft tumours to the standard of care drug, gemcitabine.

"In laboratory studies, triphendiol is more potent at apoptosis induction in pancreatic and bile duct cancer cells compared to gemcitabine at up to ten-fold lower concentrations," says ***Assistant Professor Ewan Tytler***, Division of General Surgery, **University of Alabama**.

Fewer than 20% of pancreatic cancer patients are candidates for surgery and current treatments are limited to chemotherapy with gemcitabine, to which most patients are resistant or acquire resistance. This study assessed the potential of triphendiol as a treatment for pancreatic adenocarcinoma using three representative cell lines. Triphendiol induced apoptosis (cell death) in all cell lines and pre–treatment with triphendiol increased gemcitabine–dependent apoptosis. Animal model studies showed that triphendiol in combination with gemcitabine inhibits tumour growth more effectively than each drug alone. Both triphendiol and gemcitabine induce apoptosis via a mitochondrial pathway.

▶ **More information: www.novogen.com/**

Opening airways

A Phase II clinical trial by **Pharmaxis Ltd** in children with cystic fibrosis demonstrated excellent lung function improvement following three months treatment with Bronchitol, which matched that achieved by the current marketed product rhDnase1. The improvement in lung function after three months on Bronchitol reflects that seen in a previous study following two weeks of treatment.

The study was an independent investigator initiated study conducted in the United Kingdom in 20 children with a mean age of 13 years. Those children enrolled in the trial completed three months treatment with each of three different therapies – Bronchitol alone, both Bronchitol and rhDNase together and rhDNase alone. The trial measured changes in lung function, airway inflammation, infections, and quality of life.

At the end of the treatment period, lung function as determined by measuring FEV1 (the amount of air that can be forcibly exhaled in 1 second) improved by 7% while the subjects were on Bronchitol, 7% while subjects were on rhDNase and 2% while subjects were on both agents together. The study had insufficient numbers to reach a definitive statistical conclusion.

Pharmaxis chief executive officer ***Alan Robertson*** says: "While not on the regulatory approval path, this is the first time we have had an opportunity to measure the performance of Bronchitol following 3 months continuous treatment and it bodes well for the pivotal 6 month Phase 3 trial that is currently in progress. Although the two agents worked less well when taken together, the patient numbers are low and a previous study has shown a benefit to using both therapies together."

▶ **More information: www.pharmaxis.com.au**

Lasting protection

Biota Holdings Ltd has announced that its long acting neuraminidase inhibitor (LANI), CS8958, an anti–influenza treatment, has initiated dosing in a UK–based Phase I trial in volunteers aged 65 years and over. This follows completion of dosing in a UK–based Phase I single ascending dose trial in healthy adult volunteers aged 18 to 55 years.

The current Phase I trial in elderly volunteers will extend the safety, tolerability and pharmacokinetic data on CS8958 in a broader population. This is particularly important as the burden of disease above 65 years of age is very high. The trial will be a double–blind, placebo–controlled study, involving up to 24 healthy volunteers. Each volunteer will be administered either placebo, or a single dose of CS8958 at one of three dose levels. The study is designed to lay the basis for further clinical development and, if successful, will pave the way for further efficacy studies in the broader population.

The major markets for neuraminidase inhibitors include the US and Japan. Biota's partner for LANI, **Daiichi-Sankyo**, is currently evaluating CS8958 in Phase II trials in Japan and Asia, while Biota is conducting a number of Phase I trials in Western populations as part of a grant (up to US$5.6 million) provided by the **US National Institutes of Health**. This global clinical development approach will generate data across the appropriate ethnic populations to assist in global marketing of CS8958 when remaining clinical development and regulatory approvals are in place. Earlier Phase I data indicates that CS8958 is safe and well tolerated in healthy adult volunteers and have supported progression to Phase II studies in this age group.

▶ **www.biota.com.au/uploaded/154/1021349_50lani-phaseicommencesine.pdf**

Heartening news

Doctors at **Houston's Texas Heart Institute** have provided an update on the ongoing multicenter Phase 2 clinical trial of the proprietary mesenchymal precursor cell (MPC) technology in patients with heart

attacks. This is the first trial in the world to evaluate an allogeneic or 'off-the-shelf', stem cell therapy injected directly into damaged heart muscle by cardiac catheter. The trial's 25 patients are currently being enrolled at multiple sites in the United States by **Mesoblast**'s sister company **Angioblast Systems Inc**. Patients receive either placebo or one of three progressively increasing doses of the proprietary adult stem cells.

Texas Heart Institute's first patient, a 65–year–old man with a weakened heart muscle function, was injected with the company's allogenic stem cells 10 days after suffering a massive heart attack. The procedure went smoothly and the patient was discharged from hospital within 48 hours.

In the US, of the one million people who survive a heart attack each year about 30% go on to develop heart failure. The aim of the stem cell treatment is to prevent the onset of heart failure after a heart attack.

Dr James Willerson, co–leader of the trial and president-elect of the Texas Heart Institute says: "Our expectation is that the stem cells will develop into blood vessel and heart muscle cells and heal the damage caused by the heart attack."

▶ **More information: www.mesoblast.com**

Joint success

Mesoblast Limited has announced successful long–term results in its osteoarthritis preclinical trials. A single injection of its proprietary allogeneic adult stem cells into arthritic knees provided sustained protection against cartilage destruction and degeneration for up to nine months.

On the basis of these results, Mesoblast will proceed to commence its Phase 2 clinical trial program for cartilage protection in patients with osteoarthritis of the knee.

Mesoblast's allogeneic cells were safe and effective over a wide range of doses tested at three, six and 12 months in 60 sheep with knee osteoarthritis. The dose which showed maximal effectiveness and superiority over hyaluronic acid alone in protecting cartilage at three months continued to show superiority for between six and 12 months. In addition, a 10-fold lower dose of cells showed significant and superior effectiveness against cartilage loss for at least nine months, when administered into the damaged knee in the absence of joint inflammation.

Professor Peter Ghosh, Mesoblast's vice president for Cartilage Regenerative Programs and a world renowned cartilage expert, says that these results indicate that Mesoblast's cells may provide long–term sustained protection against knee cartilage damage in osteoarthritis, in contrast to alternative therapies which are currently on the market and approved by the **US Food and Drug Administration** (FDA).

Current therapies attempt to alleviate painful symptoms but are unable to preserve the cartilage lining the joint. Moreover, many of the currently used pharmaceutical therapies are associated with severe side effects and can even cause death. Joint replacement is often the only option for restoring function.

▶ **More information: www.mesoblast.com**

Spinal fusion update

Mesoblast Limited will accelerate its clinical trial timetable towards commencement of a Phase 3 trial in spinal fusion by mid 2009 following encouraging preliminary safety data from its ongoing Phase 2 clinical trial.

In the current single–centre Phase 2 trial for spinal fusion using its allogeneic proprietary adult mesenchymal precursor cells (MPCs), no cell related adverse events have been reported in up to five months of follow–up. In this trial, safety outcomes are compared between patients randomised to receive either implantation into the spine of autograft alone (patient's own bone transplanted from the pelvis) or Mesoblast's allogeneic MPCs.

Mesoblast will now expand its Phase 2 Spinal Fusion clinical trial activities to include up to 10 new major clinical trial sites in the United States. This will serve to accelerate the company's **US Food and Drug Administration** (FDA) submission process for an invertebral spinal fusion product.

To lead this multi–centre clinical effort, Mesoblast has appointed ***Dr James Ryaby*** as vice president of Research and Clinical Affairs. Dr Ryaby, who is based in the US, has extensive expertise in clinical development of orthopaedic and bone regenerative technologies, including successful execution of large, multi–centre Phase 3 clinical trials for publicly listed US companies.

▶ **More information: www.mesoblast.com**

Neuropathic pain relief

NeuroDiscovery Ltd, a specialty neuroscience services provider and drug development company, has announced the success of its Phase I clinical trial of NSL–043, a treatment for neuropathic pain. This trial is the first of two Phase I trials, designed to test the safety and tolerability of an oral formulation of NSL–043. The second trial is ongoing, and both are being undertaken in collaboration with the company's 50/50 partner, **Sosei Group Corporation**.

In this trial, healthy male volunteers were given a single dose of NSL–043 in capsule form. There were seven treatment groups, each with eight participants, who received from 10–2000mg of NSL–043. At random, one subject in four from each group was assigned a placebo (dummy pill). Adverse effects of the drug were not meaningfully different from placebo. The highest dose, of 2000mg, is five times higher than has previously been studied in humans, but NSL–043 was nonetheless well tolerated at all doses.

As well as monitoring for adverse events, this study has enabled NeuroDiscovery to assess the metabolism and pharmacokinetics of NSL–043 in humans. Additional data are expected by July 2008 from an on–going repeat–dosing (multiple ascending dose) Phase I trial of NSL–043. The data from these Phase I trials will enable the Company to begin a Phase II study, scheduled to commence in the fourth quarter this year.

▶ **More information: www.neurodiscoveryltd.com/**

Expressive yeast

Select Vaccines Ltd has announced the successful achievement of a key manufacturing goal, having produced virus–like particles (VLPs) from a large–scale, yeast–based expression system.

Production of Select Vaccines' candidate avian influenza VLP vaccine was achieved by the company's European subcontractor, **ARTES Biotechnology** GmbH (ARTES). ARTES' proprietary technologies (the yeast systems Hansenula polymorpha and Arxula adeninivorans) are widely used in biotechnology applications. Their systems are fully scalable and can be used to economically produce vaccine material for future clinical studies.

The latest results from ARTES demonstrate stable expression of influenza VLPs in yeast cells. These cells can be stored as required, and then used to produce the company's avian 'flu VLP vaccine material using

standard, large–scale yeast fermentation systems.

"Stable expression is critical to development, clinical testing and commercial production of vaccines," says ***Martin Soust***, chief executive officer of Select Vaccines. "Toxicology testing and human trials require substantial quantities of high grade vaccine material and this system developed by ARTES represents an effective way of producing large batches of our VLPs for those purposes.

He adds: "These results were achieved with our lead influenza VLP vaccine candidate but this system can also be used for the production of future influenza VLP vaccines and our malaria vaccine."

▶ **More information: www.selectvaccines.com.au/**

Gearing up

Sydney–based manufacturer **CGC Kymon** is demonstrating how Australian capability in advanced manufacturing is helping create new export opportunities in renewable energy, after securing a significant export win to Germany.

CGC Kymon will deliver over 1100 tonnes of precision engineered forgings this year to **Winergy AG** of Germany, a part of the Siemens group of companies. The company's high integrity engineered gear components are used in drive mechanisms for wind turbines. CGC Kymon also supports Australian industry and recycling by using 100% Australian made steel in its exports, comprised of greater than 95% recycled materials.

The Minister for Trade ***Simon Crean*** says CGC Kymon's success shows that an increasing commitment to green energy by governments in Europe could deliver real export opportunities for Australian business.

Mr Crean says that climate change presents not just an environmental and economic challenge but also an opportunity to expand trade and create jobs. He says that the **German Government** has set an ambitious target to cut carbon dioxide emissions by 40% compared with 1990 levels, well beyond what is required by the Kyoto agreement. This includes phasing out nuclear power and increasing renewable energy sources.

"Germany already has over 16,000 wind turbines and produces 40% of the world's total wind power. By 2010, wind will meet 12.5% of Germany's energy needs."

CGC Kymon has invested over $1 million in a new plant to become an accredited supplier of precision engineered forgings to Siemens' German manufacturing facilities and to meet the growing demand for gear parts from Winergy AG.

▶ **More information: www.trademinister.gov.au/releases/2008/sc_023.html**

Retrofitted storage

Agreement has been reached between Australian and Japanese partners for the construction of Australia's first demonstration power station using clean coal technology to produce low emission electricity.

Construction of the $206 million **Callide Oxyfuel** project at Biloela in Central Queensland will begin early next year with the 30 megawatt power station scheduled to start producing electricity by the end of 2010.

The project is a collaborative effort funded by the **Australian Government**, the **Queensland Government**–owned **CS Energy**, the **Australian Coal Association**'s **COAL21 Fund**, **Xstrata Coal**, **Schlumberger**, the **Japanese Government** and Japanese participants, **JPower**, **Mitsui & Co** and **IHI Corporation**.

It will see the retrofitting of a coal–fired boiler at Callide A power station with oxy–firing technology which will burn coal in a mixture of oxygen and re–circulated flue gases. This will create a highly concentrated stream of carbon dioxide (CO_2) suitable for capture and storage deep underground, in geological formations west of the power station using a process known as carbon capture and storage or geosequestration.

The oxyfuel combustion process, first conceived in Japan in 1974, has been tested in small–scale projects in Japan, the USA the UK and Europe. The Callide project will take the technology to a larger scale in order to demonstrate that it can be applied to existing and new coal–fired power stations to achieve very significant reductions (up to 90% of CO_2) in emissions.

▶ **More information: www.csenergy.com.au/media_centre/default.aspx**

Clean disposal

ANSTO's Synroc technology is to be demonstrated as a way to clean up radioactive waste at the United States **Idaho National Laboratory**.

According to ***Dr George Collins***, ANSTO's chief of research, a US$1.4 million deal was signed between **ANSTO Inc** (ANSTO's US arm) and **Battelle Energy Alliance** – the management and operating contractor for the Idaho National Laboratory – to demonstrate the benefits of Synroc technology in treating waste stored at the site. "ANSTO will provide a demonstration of how to immobilise a range of legacy wastes using hot isostatic pressing (HIP), a technology which ANSTO applies to the cleanup of radioactive waste," says Dr Collins.

The Idaho National Laboratory has around 4,400 cubic meters of radioactive calcine material arising from the reprocessing of spent naval fuel, which is in a powder form not unlike laundry detergent. The demonstration will use two alternative methods – one simply HIPing the calcine, the other HIPing a calcine–synroc mix. "HIP places high heat and pressure evenly around an object to solidify the contents and reduce its size by up to a half, ready for storage," explains Dr Collins. "In this case, the object will be steel cans filled with radioactive waste, either the calcines as currently stored at the Idaho Lab or calcines mixed into a special powder using ANSTO's synroc technology. "

He further explores that the synroc process is designed to produce a product which will last for hundreds of thousands of years without breaking down, which is important for the storage of highly radioactive material. Once the cans and its contents are compacted and reduced in size, they would be placed in specially shielded containers and safely stored in a specially designed nuclear waste storage facility.

In an agreement with the State of Idaho, the **United States Department of Energy** must have the radioactive calcine material 'road ready' by the end of 2035 so it can be disposed of at another site – possibly the planned **Yucca Mountain geological repository** in Nevada.

▶ **More information: www.ansto.gov.au/information_for/for_media.html**

Joint investment

Tata Power (a member of the Indian Tata Group of Companies) and leading engineering services company **Sedgman** have joined founding shareholder **Thiess** as cornerstone investors in both **Exergen Pty Ltd** and its technology. Exergen is an Australian company which has developed a process for removing moisture and contaminants from brown coal.

"The **Federal Government** is acutely aware of the emissions profile of brown coal–fired power generation," says the Federal Minister for Resources and Energy, ***Martin Ferguson***. "Latrobe Valley brown coal power is a significant contributor to Australia's energy market. We see it as a priority to achieve large emission reductions quickly. The Exergen pilot is a significant step towards cleaner brown coal power."

The Exergen technology has been demonstrated to remove up to 80 per cent of the moisture from brown coal, while also removing other contaminants which contribute to emissions. Teamed with modern power generation plants, Exergen promises emission reductions of approximately 40 per cent and importantly, the moisture removed from the coal could supply up to 40 per cent of the power station cooling water. According to Mr Ferguson, this technology has significant potential for Victoria in particular and could deliver emission reductions by increasing the thermal efficiency of brown coal which has been out of reach until now.

▶ **More information: Michael Bradley, 0420 371 744**

Spray on drugs

Acrux's first product utilising its unique skin spray drug delivery technology, Evamist™, has been launched by US licensee **KV Pharmaceutical Company** into one of the largest therapeutic categories in women's healthcare.

Evamist™ is the first and only estradiol transdermal spray, indicated for the treatment of moderate–to–severe vasomotor symptoms due to menopause. It is a unique transdermal estrogen therapy delivering a low dose of estradiol in a once–daily spray. **Evamist**™ targets an annual US$1.3 billion estrogen therapy market where physicians and patients are seeking an effective low–dose estrogen product. Acrux will receive royalties on sales of **Evamist**™, with an peak annual sales potential estimated by KV to be US$125 million.

▶ **More information: www.acrux.com.au**

Time out

Solbec Pharmaceuticals has decided to allow the CommercialReady Grant awarded to the Coramsine® Cancer Project to 'Timeout'. The timeout process allows the project budget relating to the grant funding to simply run out of time and any monies not already utilised are then refunded to **AusIndustry**.

Solbec management and board felt that this was the most appropriate course of action given the protracted nature of the delays associated with the Coramsine® project. A timeout of the grant allows Solbec the freedom to re–apply for further grant funding at any time in the future.

▶ **More information: www.solbec.com.au/**

Underwritten rights

Materials science company **BioLayer** is pleased to announce the underwritten rights issue has successfully concluded. The underwriter, **Transocean Securities Pty Ltd**, has maintained its support of the issue by subscribing for the shortfall under the offer. Transocean has stated its intention to sell down the shortfall of over $3 million to an institution and a number of sophisticated investors.

In light of the volatility in global financial markets the company is grateful for the commitment of the underwriter who has honoured their agreement despite market out clauses being triggered by the volatility.

Transocean Securities Pty Ltd managing director ***James Henderson*** states: "We are happy to absorb the shortfall given the level of interest from a number of large potential investors. Having worked with the company over the last few months we are confident Biolayer has an exciting future."

▶ **More information: www.bio-layer.com/**

Ready to move

pSivida Limited proposes to reincorporate in the United States. The reincorporation, which is subject to **Australian Federal Court** and shareholder approval, will occur in mid–2008. This reincorporation is designed to make the company a more attractive investment for shareholders by increasing the potential scope and depth of the company's shareholder base and liquidity while maintaining strong ties with the Australian investor base.

After the reincorporation, the company will maintain listings on the **ASX**, **NASDAQ** and the **Frankfurt Stock Exchange**. The company's current business, operations, directors and management will not change as a result of the reincorporation.

"With our increased focus on the US, **Pfizer** has become our largest stockholder and a collaborative partner to develop ophthalmic products. Our phase III product, MedidurTM FA for DME, is fully funded by another US partner, **Alimera Sciences**," says managing director ***Dr Paul Ashton***. "Most of our operations are now in the US, and with our operational and strategic successes, we are ready to reincorporate in the US, the next step in our previously announced strategy of building a global drug delivery company."

The reincorporation is subject to various conditions, including obtaining regulatory approvals, a primary listing for the new US company on NASDAQ and a full foreign listing on ASX.

▶ **More information: www.psivida.com/news/ASXAnnouncements.asp**

Complete enrolment

Biota Holdings Limited's long acting neuraminidase inhibitor (LANI), CS8958, an antiviral influenza treatment, has completed enrolment for its Phase II clinical study at its second Asian site. The Phase II trial commencement was advised in an ASX Release on 22 November 2007 and indicated the trial would occur in two countries, one in Japan and the other elsewhere in Asia.

Full results of the Phase II study are expected approximately mid year.

▶ **More information: www.biota.com.au/uploaded/154/1021351_43laniphaseiipatientenrol.pdf**

European patent

The **European Patent Office** (EPO) has granted its patent for **Giaconda Limited**'s lead product, Myoconda®, a combination therapy for patients with Crohn's Disease who are infected with MAP (Mycobacterium avium paratuberculosis).

The formal decision to grant affords protection until April 2018 in all European member states and extension states, with patent number EP 98912149.6. The application was filed as part of a broader, international application under the Patent Cooperation Treaty (1970).

"The European Union is a key territory for Myoconda®," says ***Patrick McLean***, Giaconda's chief executive officer. "The protection of Myoconda®'s intellectual property until 2018 in Europe provides an excellent window of opportunity for earnings. From the company's perspective, this milestone is another step in expanding our patent coverage and adding value to the IP portfolio."

▶ **More information: www.giacondalimited.com/**

Little helpers

The **New South Wales Government** has announced a series of grants to help innovative life science companies develop promising new medical technologies. The Proof of Concept program aims to help emerging companies take their research discoveries from the laboratory to market. A total of 10 grants have been awarded to biotechnology or medical device companies, with further funding rounds to follow. Grants include:

- $100,000 to North Ryde company **EnGeneIC Pty Ltd** to help it develop nanocell technology to fight cancer;
- $69,865 to Bondi Junction company **Seagull Technology** to further test a non–invasive method to treat macular degeneration;
- $100,000 to **Acu Rate Pty Ltd**, a Mosman company that has invented a simple, physics–based model for controlling flow on intravenous drips;
- $100,000 to **Ablantenn Pty Ltd**, a Westmead company that has invented a new surgical tool to treat irregular heart rhythm;
- $96,949 to Rosebery company **TeleMedCare Pty Ltd** to develop a monitoring device that warns frail users when they are in danger of a fall and allows them to talk instantly to a carer at the touch of a button; and
- $71,038 to Brookvale company **Special Phage Holdings Pty Ltd** to develop cocktails of bacteria–eating viruses (bacteriophages) that preliminary tests suggest are effective against antibiotic–resistant bacteria.

▶ More information: www.business.nsw.gov.au/newsroom/news_20080422_proofofgrant.htm4

Agreed exchange

Queensland Premier ***Anna Bligh*** has signed a Memorandum of Understanding (MOU) with the Minister of Science and Technology for the Republic of China, ***Mr Wan Gang***, to provide greater collaboration and co–operation in the battle against climate change. According to Ms Bligh, the MOU focuses on climate change sciences as well as other research and development priorities including energy, sustainability of the natural and built environment, human health and medical research.

The first initiative under the MOU will be a Queensland–China Climate Change Fellowship Program which will enable Queensland and Chinese researchers as well as other professionals to participate in short–term reciprocal exchange programs. The fellowships are expected to support a minimum of three applicants from Queensland and three from China for a period of up to four weeks.

Applications for the Queensland–China Climate Change Fellowship Program will be available through the **Queensland Centre for Climate Change Excellence** website or by contacting the centre directly on (07) 3896 9612. The closing date for the 2008 application round has been extended to 30 June 2008.

▶ More information: 07 3224 4500;

Secure advice

Western Australia's Agriculture and Food Minister, ***Kim Chance***, is to establish a new 15–person council to replace the **Agriculture Protection Board** (APB). The **Biosecurity Council of Western Australia** will replace the APB as the principal advisory body on biosecurity issues to the Minister and the Department of Agriculture and Food Director General. The council will be responsible for advising on strategic biosecurity policy and effective biosecurity management in WA.

The new council's role will be broader than the APB as result of the introduction of the new Biosecurity and Agriculture Management (BAM) Act 2007. "The BAM Act not only covers the protection of agriculture and related resources, but also the prevention and management of biosecurity threats to commercial activities related to agriculture, forestry, fishing, the environment and public amenity," says Mr Chance. "In its first year, the Biosecurity Council will provide advice on the implementation of the BAM Act, agricultural industry funding schemes that may be established under the Act, and on the recognition of biosecurity groups which are established in particular areas of the State."

The Minister says all council members have a general or specific interest in biosecurity management, and the council includes representatives of community and industry organisations. The council will be chaired by current APB chairman ***Chris Richardson,*** and four current APB board members, ***Michelle Allen***, ***Ron Creagh***, ***Robert Gillam*** and ***Maxinne Schlanders***, have also been appointed to ensure a smooth transition over the next 12 months. Other new council members are ***David Anderson***, ***Lisa Christy***, ***John Edwards***, ***Maggie Lilith***, ***Daniel Machin***, ***Lesley Mayer***, ***Johann van der Merwe***, ***Philip O'Brien*** and ***Bob Pearce***. One remaining position on the council will be filled later this year.

▶ More information: 08 9213 6700

Flexing mussels

A new strategy aims to grow Victoria's aquaculture industry from $22 million to $60 million by 2015. According to Victoria's Minister responsible for Fisheries Joe Helper, it will set out a framework for an ecologically sustainable and prosperous aquaculture industry.

The Victorian Aquaculture Strategy was developed by the **Aquaculture Advisory Group** and incorporates advice from experts in industry, science, environment, finance and the community. Mr Helper says that the strategy includes six main objectives and 24 actions to be implemented by the **Department of Primary Industries** (DPI), in consultation with an industry reference group.

One of the key tasks in the strategy is to undertake collaborative shellfish research to improve mussel farming productivity and competitiveness. "This will involve a research and development agreement between the Government and the aquaculture industry to reliably produce more and better mussels in the future," Mr Helper says.


Photo: Unknown

He outlines that under the agreement mussel breeders have formed a consortium – the **Victorian Shellfish Hatchery**, which will collaborate with researchers from DPI and use the hatchery facilities at Queenscliff to grow mussel spat. As part of the agreement, the DPI and industry

will jointly contribute $800,000 over five years toward research and infrastructure to establish and operate the hatchery. It will also see the research findings and spat production shared with the rest of the industry.

▶ **More information: www.dpi.vic.gov.au/aquaculture**

Challenging navigation

Queensland is the first location outside of Europe to host an international competition aimed at finding and promoting commercially viable ideas that use satellite navigation technology – the European Satellite Navigation Competition (ESNC) 2008. According to Natural Resources and Water Minister ***Craig Wallace***, technology using global navigation has been widely accepted by Australians. "This challenge is to find new uses for Global Navigation Satellite Systems (GNSS) technology through the government's hosting of the ESNC Australian Challenge," he says.

The **Department of Natural Resources and Water** is the lead agency for GNSS in Queensland, and this role is coordinated by the Natural Resources and Waters's **Geospatial Technology Applications Centre** (GTAC), which has developed close ties with similar European facilities and has world–class knowledge and experience in the collection and use of spatial information.

The European Satellite Navigation Competition 2008: Australian Challenge opened in Brisbane on 1 May 2008.

▶ **More information: Clare Gillic, 07 3896 3688.**

Earth watching

Western Australia will be part of an initiative to gather information about the earth's surface. Land Information Minister ***Michelle Roberts*** announced a network of 26 continuously operating reference stations (CORS) to be built throughout WA, including Broome. "The CORS are used in conjunction with global positioning system (GPS) technology to monitor seismic and tectonic motion," Mrs Roberts says.

The **State Government** will, through the statutory authority responsible for WA's land and property information, **Landgate**, contribute more than $2 million over five years to fund the CORS project. In addition, the **Australian Government** will contribute a further $1 million.

Mrs Roberts says the CORS data could also be used by the revolutionary telescope project Square Kilometre Array (SKA). "Should WA be successful in its bid for the SKA telescope, CORS data would be used to monitor storm activity in the upper atmosphere," she says. "Information will also be used by Landgate and the wider community for surveying, mapping, navigation and for engineering and agricultural machine guidance."

▶ **More information: 08 9213 6600**

Banning indefinetely

The **South Australian State Government** has moved to extend the ban on GM crops in SA following Cabinet approval to extend existing regulations under the Genetically Modified Crops Management Act 2004. Agriculture, Food and Fisheries Minister ***Rory McEwen*** says the regulations will extend the ban indefinitely beyond the current expiry date on April 29 this year. "The six week of public consultation showed there's a divergence of opinion about the impact of GM crop cultivation on markets and trade for our produce. However, 81% of the submissions and 97% of the letters supported retaining the moratorium," says the Minister adding that at present there's no compelling reason to lift the ban for growing GM crops for human consumption in SA."

The effectiveness of the current arrangements will be monitored as the cultivation of GM canola in Victoria and NSW proceeds to help assess the level of regulation required to protect markets and trade for SA products.

▶ **More information: www.ministers.sa.gov.au/news.php?id=3018**

Land and biodiversity

Private sector investment in the environment and opportunities for business and farmers is a key focus of the Land and Biodiversity Green Paper launched by Victoria's Environment Minister, ***Gavin Jennings***.

"The Green Paper outlines a strategic vision of how we can revitalise our land and water catchments, contribute to agricultural and economic growth and building on Victoria's world–leading market–based approach to environmental management," says Mr Jennings.

The launch marked the second stage of the extensive consultation process that will involve a series of workshops throughout Victoria over the next few months. Submissions are invited on the Green Paper until 30 June 2008 with the White Paper due for release in early 2009.

▶ **More information: www.dse.vic.gov.au**

Marine management

CSIRO's Wealth from Oceans National Research Flagship and the **Western Australian Government** have developed practical tools to help planners manage potentially competing uses of Australia's marine ecosystems. The North West Shelf Joint Environmental Management Study (NWSJEMS) will use a model that allows users to envisage different development scenarios and management options, and comprehensively evaluate their potential impacts on marine ecosystems.

NWSJEMS project leader, CSIRO's ***Dr Scott Condie***, says this research is vital because coasts and oceans worldwide are being exposed to growing pressure from increasing population and industrialisation.

The $7.7 million study was initiated by the Western Australian Government and jointly funded by the Wealth from Oceans National Research Flagship. Many organisations contributed to the NWSJEMS project, including federal and WA agencies, industry and regional communities.

▶ **More information: Dr Scott Condie, 03 6232 5025, Scott.Condie@csiro.au**

Money provided

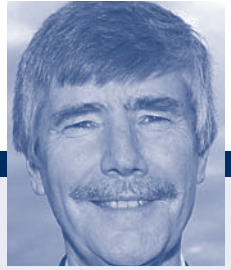
A carbon dioxide storage project at Nirranda in Victoria's south-west marks the beginning of carbon dioxide injections into the vast subterranean reservoirs. The **Victorian Government** is providing $6 million for this project, conducted by the **Cooperative Research Centre for Greenhouse Gas Technologies** (CO2CRC), which will involve the injection of 100,000 tonnes of carbon dioxide deep underground.

The project will help Victoria address climate change and meet the target set by the Brumby Government to reduce greenhouse gas emissions by 60% by 2050, compared to 2000 levels.

▶ **More information: www.co2crc.com.au. Energetic alliance**


Katharina Gaus


Keith Millington


Graham Davies

Nosy researcher

University of New South Wales research fellow **Dr Katharina Gaus** has been awarded a US grant to investigate the cells that govern our sense of smell. Dr Gaus, a cell biologist based at the Centre for Vascular Research, and her US–based collaborator have won US$750,000 over three years from the Human Frontier Science Program Organisation. The collaborators hope to build a new microscope, to allow them to see how these cells convert the chemicals of smell into electrical signals in the brain. The research could also lead to new understandings of other cell types.

Wooly medallist

CSIRO Textile and Fibre Technology scientist, **Dr Keith Millington**, has been awarded a Centenary Medal from the Society of Dyers and Colourists in the UK. The Centenary Medal is awarded in recognition of authors of papers of an educational, management or review nature, published by the Society in their journal 'Coloration Technology'. Dr Millington receives the award for a recent review of the scientific literature on the photo–yellowing of wool.

Major player

Professor Graham Davies has taken up his new role as the Dean of Engineering at the University of New South Wales (UNSW). Previously the Chance Professor and Executive Dean of the School of Engineering at the University of Birmingham, Professor Davies wants to see UNSW as a major player on the world scene.

Renal medallist

University of Queensland researcher **Professor Wendy Hoy** has been awarded the United States National Kidney Foundation (NKF) International Distinguished Medal for 2008. The Medal recognises Professor Hoy's research, which has helped expand the focus of the renal specialty community from end–stage kidney disease to community–based rates, patterns of disease and risk factors, as well as development of services for early diagnosis and better management. This latest international recognition of Professor Hoy's work comes after she was awarded one of only two prestigious National Health and Medical Research Council Australia Fellowships conferred in 2008.

Digital curer

One of the major contributors to the development and implementation of Canada's electronic health records system, **Richard C Alvarez**, has been appointed an Honorary Fellow of the Australian e–Health Research Centre in Brisbane. A joint venture between CSIRO and the Queensland Government, the Australian e–Health Research Centre is a leading national research facility for health care innovations in ICT.

Invited weeder

Queensland's weed eradication expert **Dr Dane Panetta** from the Department of Primary Industries and Fisheries **has presented Australia's** weed eradication research at a series of seminars in California in April, following an invitation by the California Department of Food and Agriculture. Dr Panetta is a noted authority on weed eradication with the department and leader of the Incursion Response subprogram in the Weeds Cooperative Research Centre.

Farrer Medallist

Professor Philip Cocks has been awarded the 2008 Farrer Memorial Medal. Formerly the chief executive officer with the Centre for Cooperative Research for Plant–based Management of Dryland Salinity, Professor Cocks is well regarded for his contribution to a range of agricultural research initiatives. He is the current Thinker–in–Residence at the University of Western Australia Albany Foundation and was previously professor of Agriculture in the Plant Sciences Group at The University of Western Australia.

Citation awards

The Thomson Scientific Citation Awards recognise researchers contributing significantly to international scientific literature. The 2008 awards go to:

- **Dr Stuart Batten** (Chemistry), Monash University;
- **Professor Paul Chandler** (Education), University of Wollongong;
- **Professor Suzanne Cory** (Biochemistry and Molecular Biology), Walter and Eliza Hall Institute of Medical Research;
- **Professor Don Harding** (Economics), LaTrobe University;
- **Professor Terry Hughes**(Marine and Freshwater Biology) – James Cook University;
- **Professor Anthony Jorm** (Psychiatry), Orygen Research Centre and University of Melbourne;
- **Dr Jim Peacock** (Plant Sciences), CSIRO;
- **Professor Brian Schmidt** (Astronomy and Astrophysics), Australian National University;
- **Dr Ian Wright** (Ecology), Macquarie University;
- **Professor Zheng-Xiang Li** (Geosciences), Curtin University of Technology.

Staring group

An Australian and UK astronomy team is the first to receive a Group Achievement Award from the UK's Royal Astronomical Society. The thirty-three-member team spent ten years mapping the distribution in space of 220,000 galaxies using the 3.9-m Anglo-Australian Telescope (AAT) in New South Wales — a project called the 2-degree Field Galaxy Redshift Survey (2dFGRS). The survey measured patterns in the distribution of galaxies, on scales from 100 million to 1 billion light-years. Seven members of the 2dFGRS team are currently based at Australian institutions:

- **Professor Matthew Colless**, Anglo-Australian Observatory;
- **Dr Joss Bland-Hawthor**, University of Sydney;
- **Dr Russell Cannon** Anglo-Australian Observatory;
- **Professor Warrick Couch**, Swinburne University;
- **Professor Karl Glazebrook**, Swinburne University;
- **Dr Carole Jackson,** CSIRO Australia Telescope National Facility; and
- **Dr Bruce Peterson**, The Australian National University.

Innovation post

The University of Canberra has appointed **Dr John Howard** as director of Innovation and Engagement. In recent years Dr Howard has completed a number of significant research projects in the innovation policy domain focussing on knowledge transfer and strengthening engagement between business, higher education, government and the community. His responsibilities at the University of Canberra will include promoting collaboration between the university and all levels of government, assisting with the preparation for major bids for funding and turning our research and consulting expertise to best commercial advantage.

Okamoto award

Dr Fadi Charchar, a senior lecturer in the new biomedical science course at the University of Ballarat, has been awarded the Okamoto Award for Young Investigators. Dr Charchar received the award for his work establishing the presence of gene copy number variation in high blood pressure. This award was established by the Japan Vascular Disease Research Foundation in 2004 and is biannually presented for excellent research in basic research on vascular diseases such as hypertension, arteriosclerosis, diabetes.

Embryo mapper

Professor Patrick Tam from the Children's Medical Research Institute, (CMRI) has been elected as a Fellow of the Australian Academy of Science in recognition of his research in Embryology. Professor Tam and his team have recently completed a 'fate map' of early embryo development. His 28-year exploration mapped the movement of cells and tissues in the developing mouse embryo between the 5th and 10th days after conception, the human equivalent of one week to one month after conception.


Wendy Hoy


Richard Alvarez


John Howard


Fadi Charchar


Patrick Tam

Energy R&D limited

Research and Development in the energy industries is limited by structural issues which must be addressed if Australia is to move to low emissions energy generation. These issues bedevil both the supply and use of electricity, as well as perceptions of the quality of electricity supplied, according to the **Australian Academy of Technological Sciences and Engineering** (ATSE).

In its response to the Garnaut Climate Change Review Issues Paper 4 (Research and Development: Low Emissions Energy Technologies) ATSE says electricity (and gas) markets do not operate efficiently and provide little or no incentives for investment in low–emission technologies.

ATSE says that, prior to privatisation, government generators commissioned significant research from organisations such as universities, through to substantial demonstration projects. These projects were then taken up by manufacturers and supplied to the industry together with internationally sourced technology.

Since privatisation, some technology development has continued, but R&D has fallen sharply and, in ATSE's view, the electricity and gas sectors in Australia are unlikely to lead investment in the development of low–emissions technologies, and certainly not on a scale and in a timeframe that will meet our needs.

The vast bulk of Australia's electricity is an undifferentiated product so there is not the same incentive as exists in manufacturing, agriculture or financial services, for instance, to spend money on research to improve quality, or to obtain a price premium in the market.

ATSE notes that most energy research is very capital intensive and slow – with some steps in the innovation process taking many years – and that some energy R&D results in products which are difficult to patent.

▶ More information: www.atse.org.au/index.php?sectionid=1151

Clean projects

The **Australian Government** will invest $20 million in an Australia–China Joint Coordination Group on Clean Coal Technology as part of the Government's $500 million **Clean Coal Fund**.

The Prime Minister, ***Kevin Rudd***, and Minister for Climate Change and Water, ***Penny Wong***, have announced funding for three new climate change and water projects in China:

- a feasibility study into the development of the largest solar city in the world at Weihai in the northeast of China;
- a pilot project applying Australia's National Carbon Accounting System at a provincial level in China; and
- a trial of the Australian river health monitoring systems in the Yellow river, The Pearl River Basin and the Da Ling River.

These efforts also include a new Ministerial level dialogue that will provide high level oversight to future collaboration and drive enhanced cooperation in clean energy technologies; climate change science, adaptation; and building the capacity of China to respond to climate change.

▶ More information: www.pm.gov.au

Water investment

Minister for Climate Change and Water ***Senator Penny Wong*** has outlined details of the *Water for the Future* plan to secure long term Australia's water supply.

The 2008/09 Budget will provide new money for three key election commitments:

- $1 billion for the National Urban Water and Desalination Plan;
- $250 million for the National Water Security Plan for Cities and Towns; and
- $250 million for the National Rainwater and Greywater Initiative.

Further $400 million will be brought forward between 2007/08 and 2009/10 to accelerate investment in the Murray Darling Basin.

Senator Wong says that this money will be used to purchase water and invest in key infrastructure projects across the Murray Darling Basin to address the problem of overallocation and to improve river health.

According to Senator Wong, $3.1 billion will be allocated to purchase water to put back into the Murray Darling Basin waterways, as part of the **Federal Government**'s key focus on supporting healthy rivers. A further $5.8 billion will be available under the Sustainable Rural Water Use and Infrastructure program for key rural water projects that help secure a long term sustainable future for irrigation regions and return water to the rivers.

▶ More information: www.environment.gov.au/minister/wong/2008/pubs/mr20080429.pdf

Sweet survey

Photo: CSIRO

The **Australian Bureau of Agricultural and Resource Economics** (ABARE) has commenced a survey of Australian beekeepers as part of a project to provide more information about the state of the industry and set future directions in industry strategy, and research and development.

The survey, undertaken on behalf of the **Rural Industries Research and Development Corporation**'s (RIRDC) Honeybee program, will explore the characteristics of honeybee businesses, production efficiency and profitability, and demographic and socioeconomic circumstances of people in the industry.

According to ***Dr O'Brien***, managing director of RIRDC, the survey "will assist in the development of strategies and research and development programs to improve the long term productivity of the honeybee industry."

As well as producing quality honey and honey–related goods for Australian and world markets, the industry plays an important role in agricultural production, with around 65 per cent of Australian crops dependent to some extent on honeybees for pollination.

The results of the survey are expected to be released in July.

▶ More information: Milly Lubulwa, 02 6272 2069, milly.lubulwa@abare.gov.au

Easy reporting

The **Federal Government** has announced an ammendment to regulations governing the Energy Efficiency Opportunities (EEO) program from 1 July 2008 to enable participating companies to streamline energy use reporting with requirements under the new **National Greenhouse and Energy Reporting System**.

The EEO program is a key component of the Government's push to improve energy use by Australia's largest energy–using businesses. It requires companies using more than 0.5 petajoules of energy a year to undertake energy efficiency opportunity assessments and report publicly on the results of those assessments and measures planned to reduce energy use. The National Greenhouse and Energy Reporting System will collect energy use data which will form the basis for a future emissions trading

scheme. Streamlining the EEO with this system is designed to address concerns expressed by some businesses that energy use reporting would be duplicated under the two systems.

Minister for Resources, Energy and Tourism ***Martin Ferguson*** says: "Aligning energy use reporting requirements under the EEO program with the Greenhouse and Energy Reporting System will enable companies to collect one set of energy use data, and report the data once, in order to meet government reporting requirements."

Transitional provisions will allow companies already operating under the existing rules to avoid having to re–do any assessment or reporting work they have committed to.

▶ **More information: Tracey Winters, 0439 991 730; EEO program: www.energyefficiencyopportunities.gov.au**

Extended rights

Australia's submission for jurisdiction over an additional 2.5 million square kilometres of seabed – approximately the same size as Western Australia – has been confirmed by the **United Nations Commission on the Limits of the Continental Shelf**. The decision confirms the location of the outer limit of Australia's continental shelf in nine distinct marine regions and Australia's entitlement to large areas of shelf beyond 200 nautical miles. In these areas, Australia has exclusive rights to what exists on the seabed, including oil, gas and biological resources.

"This is a major boost to Australia's offshore resource potential and also to our ability to preserve the marine environment on the seabed," says Minister for Resources and Energy ***Martin Ferguson***.

Australia is also entitled to the submerged prolongation of its landmass extending beyond 200 nautical miles (the so–called extended continental shelf), to limits defined in the 1982 **United Nations Convention on the Law of the Sea**.

The confirmation is in response to a submission made through a close partnership between **Geoscience Australia**, the **Attorney General's Department** and the **Department of Foreign Affairs and Trade**.

▶ **More information: Tracey Winters, 0439 991 730; www.ga.gov.au/news/#clcs**

Marine management

CSIRO's Wealth from Oceans National Research Flagship and the **Western Australian Government** have developed practical tools to help planners manage potentially competing uses of Australia's marine ecosystems.

CSIRO's ***Dr Scott Condie***, project leader of the $7.7 million North West Shelf Joint Environmental Management Study (NWSJEMS), says the research was vital because coasts and oceans worldwide are being exposed to growing pressure from increasing population and industrialisation. "Our team developed a sophisticated model that allows users to envisage different development scenarios and management options, and comprehensively evaluate their potential impacts on marine ecosystems."

According to the study, the North West Shelf environment is in good condition but needs to be carefully managed to cope with the current industrial expansion. NWSJEMS provides the scientific tools to enable this and can be adapted for any marine ecosystem facing pressures from potentially competing uses.

Industries that rely on the ocean include; oil and gas, mining, shipping, fisheries, aquaculture and tourism. But Australians also treasure the environmental and recreational aspects of marine ecosystems.

Pink Coral

Dr Condie says the impacts of all these uses were interconnected and often wide–ranging and that is why his team "took an holistic approach linking all the key elements of the natural and human system and integrating the impacts of different marine uses."

▶ **More information: Scott Condie, 03 6232 5025, Scott.Condie@csiro.au**

Measured transition

The **Minerals Council of Australia** (MCA) has called for measured transitional arrangements to ensure the proposed emissions trading scheme will achieve its environmental objectives without compromising economic growth, community living standards and the competitiveness of Australian industry. "An effective, high quality Emissions Trading Scheme will be the most substantial economic reform of the Australian economy for a generation – but it cannot be digested overnight," says MCA chief executive officer ***Mitchell Hooke***. "We cannot underestimate the scale of the challenge for Australia in making substantial reductions in emissions in the short term. This is particularly the case until low emissions technologies are developed into commercial reality."

Mr Hooke proposes transitional arrangements, specifically:

- a cautious approach to interim targets – implied interim cuts of around 30% on 1990 levels by 2020 will require cuts of around 44% on current projections (that accounts for the contribution of the renewable energy target);
- a gradual ramp–up in the carbon price signal – it is the expectation of a higher carbon price coupled with research and development that will stimulate the deployment of low emissions technologies;
- establishing a price cap in the initial stages of the scheme – this is a critical safeguard against high prices and volatility beyond industries' and the economy's capacity to adjust;
- the phased introduction of full auctioning of permits – initial administrative allocations to disproportionately affected industries phasing to full auctioning;
- ensuring that it does not compromise the competitiveness of trade exposed emissions intensive industries with unintended economic and environmental consequences;
- gradual linking to the development of emissions trading schemes in other countries and ultimately a global scheme – critical to ensuring that Australia does not import high carbon prices beyond our ability to adjust.

The MCA further contests the Garnaut Review's embrace of uniform per capita emissions targets as a basis for a future global framework. This presumes, says Mr Hooke, that all economies are the same in terms of geography, resource endowment, composition of exports and the rates of economic and population growth. "But no two economies are the same," says Mr Hooke.

▶ **More information: Louise Dodson, 02 6233 0600; media@minerals.org.au; www.minerals.org.au**

By Dr Gerd Winter
Editor Australian R&D Review

EMBL and Australia: a new partnership

In March, Australia became the first ever associate member of the European Molecular Biology Laboratory (EMBL), one of the largest and most influential life sciences laboratories in Europe.

It was an event that, by and large, bypassed public attention and yet promises to give Australia a boost towards greater innovation, especially in molecular biosciences.

Australia's ambition to embrace innovation will rely on the infrastructure and strategic alliances in place to allow its creative and innovative potential to unfold. The associate membership with EMBL, which was initiated by an invitation from EMBL in 2005 and then championed by the Go8 Universities, may be one such key partnership.

According to Silke Schumacher, EMBL Coordinator of International Relations and Communication, the association will provide Australia with access to EMBL's research infrastructures especially in bioinformatics, structural biology and mouse biology. These infrastructures, says Schumacher, have been built over a period of 30 years and represent an accumulated investment of more than €100 million in equipment. Australian scientists will receive training at EMBL facilities and they will get access to experts to assist in infrastructure implementation and problem solving in Australia. Australia will also be represented on the EMBL governing body, the EMBL Council, as a non-voting observer and Australians are eligible for participation on the EMBL Scientific Advisory Committee.

Professor McEachern, Deputy Vice-Chancellor for Research and Innovation at the University of Western Australia, says that "this is a very significant and exciting step that involves many opportunities for Australian researchers but also the odd challenge."

He says that the agreement provides a high degree of equality between EMBL's full members and the associated member Australia. "It is not a second class membership," he says adding that the differences merely reflect that Australia is not in Europe. "The benefits we derive from our ability to use EMBL resources are very high, the possibilities are there and our challenge is to actually use them"

According to McEachern, EMBL is significant in its research output but also in the unique organisational processes that support its research activities. "That is where some of the challenges may lie," he says. "We can learn of some things EMBL has been doing but it is not a straight forward learning process. We have to think step by step about what the implications are if we want to emulate some of these organisational principles."

McEachern believes that to be internationally competitive, Australian research needs to be integrated into some major international initiatives, because of the high demand on resources in some high-end research areas. The alliance with EMBL will, however, provide additional value. "What makes the membership attractive is that it gives access to the unique way EMBL does things as well as the resources that EMBL provides."

EMBL group leaders are in general younger then their peers in equivalent positions in Australia but have to leave after 9 years to find employment elsewhere. "They don't have trouble with that. They are employable anywhere because they are so good. And Australia will benefit as it gains access to staff as they come out of their EMBL contracts," says McEachern. It is a fantastic advantage, he says, simply as researchers will get to know about Australia and its resources. This is not a one way street, he emphasises. Selected Australian group leaders will spend the first 5 of their 9 funded years at the EMBL, and then return for 4 years to Australia. Some Australian research talent, however, will leave Australia for good. "I expect the flow to go both ways," he says. However, Australia has to ensure its facilities are attractive enough by international standards.

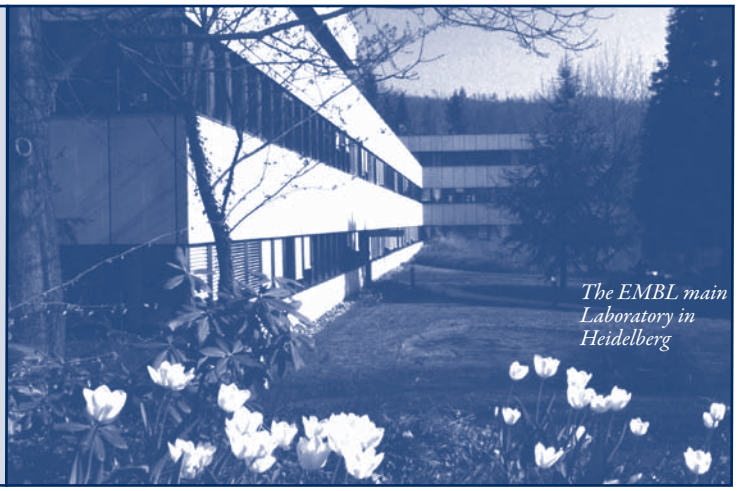
THE EMBL:

The EMBL has around 80 independent research groups covering the spectrum of molecular biology. The main research areas are: structural biology, computational biology and bioinformatics, developmental biology, cell biology, gene expression and the generation of mouse models of human diseases.

EMBL has 5 laboratories: Heidelberg (main laboratory), and outsations in Hinxton, Grenoble, Hamburg and Monterotondo (near Rome). Financial contributions from 20 member states and now one associate member, Australia, secure the existence of each research group and the progress of ongoing projects. Group leaders are encouraged to seek funding from external sources.

The 1400 staff from over 60 nations employed at EMBL laboratories work under fixed-term contracts and can stay of a maximum of nine years, which ensures a continuous turnover and influx of new ideas. As a result of the high turnover EMBL has an increasing number of alumni - over 3,000 living in 40 countries - with many holding high level positions in research institutes, universities and companies. More than 80% of alumni return to their member states after their stay at EMBL.

Silke Schumacher, EMBL



The EMBL main Laboratory in Heidelberg

Having visited the laboratories recently, McEachern was impressed by the way EMBL runs facilities. "There is no competition inside of EMBL and strategies are in place to encourage collaboration between EMBL research groups. This allows them to compete very effectively for grant schemes in the European region."

It is not about simply transferring the EMBL model to Australia, he says. Which part of Australia's research system could be modelled on EMBL will have to be looked at on a case–by–case basis. Australia will have to build partner laboratories with EMBL that are based on similar principles and require similar resources to be competitive within the EMBL system. This will cause organisational challenges but, he says, "we will see the difference in the performance of these labs and the surrounding labs and benefits will flow from that."

There is also the question of funding. The initial costs for becoming a member (~$8 million) have been covered jointly by 4 of the Go8 universities – Monash University, The University of Western Australia, Queensland University and University of Sydney – the CSIRO and the Commonwealth through the National Collaborative Research Infrastructure Strategy (NCRIS). Moving ahead, however, McEachern says that there will have to be fairly substantial discussion about how to finance this initiative. There remain questions about the funding of

the two group leader positions as well as the question of partner labs in Australia and these are issues that will take time to resolve, he says. The NHMRC is currently funding one group leader position and several pre- and postdoctoral fellows. McEachern would like to see the second agreed group leader position secured. "I believe you can make a very strong business case as to why this investment is going to have benefits for Australia," he says adding that benefits will also accrue for EMBL.

This view is shared by EMBL's director-general Iain Mattaj, who says that "it is important now that activities linked to the associate membership are appropriately funded in order to achieve sufficient critical mass especially in the Australian partnership laboratories." He adds that EMBL would appreciate if more funding became available to train young scientists in Europe, to encourage collaborations and to exchange know how. Mattaj sees also mutual benefit as a corner stone of the relationship, and cites various reasons for the initial invitation to join: "Australia's research strengths are complementary to the research performed at EMBL. Similarly, EMBL and Australian research cultures are both highly collaborative, and synergies created from the alliance could be significant. This will complement the already strong relationship between Australia and the European Union in key domains of biomedical research and provide new opportunities for joint funding applications in Australia and Europe."

McEachern agrees: "Australia has got certainly expertise in areas that aren't represented in EMBL at the moment." He mentions plant molecular sciences, stem cell research and various aspects of translational research and certain biomedical areas where he expects EMBL to gain from this association.

The benefits for both partners may extend beyond basic research.

Mattaj says that because of its reputation and track record, EMBL often is provided with instrumentation long before they are available on the commercial market. "The interaction with the Australian research community will accelerate deployment of new technology to Australia and, on the other hand, EMBL will be able to benefit from technology developments that are made in Australia in areas that are complementary like stem cell research and plant biotechnology," he says.

> "I believe you can make a very strong business case as to why this investment is going to have benefits for Australia," says Professor McEachern.

Mattaj also points out that Australia is poised to benefit from greater access to European funding sources: "The affiliation with EMBL will facilitate Australian researchers to connect to research networks and institutions in Europe to apply jointly for funding such as the EU framework programme."

According to Mattaj, EMBL has no concrete plans to establish other associate memberships. However, EMBL expects to expand its collaborations in the future.

McEachern shares a similar vision for Australia, saying that, while the association with EMBL is unique, future alliances of Australia will not just be concentrated on the US or Europe, but will intensify with research institutions in India, China and the North Asia area. A major challenge for Australia in the next few years would be, however, to make international collaborations fully effective. "We already do a lot of collaborations, but we could raise the benefits of these to higher levels and do more with collaborations than we presently do."

JOBS IN R&D

JOBS	INSTITUTION	CLOSING DATE
GSK Don Chisholm Diabetes Research Fellowship	Garvan Institute - Diabetes Research Program | NSW	30 May
Research Assistant - Diabetes Research	Garvan Institute – Diabetes Research Program	16 May
Postdoctoral Fellow/Research Associate: Efficient and Tailored Supercontinuum Generation	University of Sydney - School of Physics | NSW	27 May
Postdoctoral Fellows in Proteomics	University of Sydney - School of Molecular and Microbial Biosciences | NSW	18 May
AusGas Research Director	CSIRO Petroleum Resources | WA	16 May
Postdoctoral Fellowship - Evolving Large Scale Concept Structures	University of Sydney - Centre for the Mind | NSW	18 May
Research Fellow - Cardiovascular Risk Assessment	University of New South Wales - Faculty of Medicine | NSW	21 May
Lecturer In Viral Hepatitis	University of New South Wales - Faculty of Medicine | NSW	21 May
Research Associate In Cell Biology And Biomaterials Research	Flinders University - School Of Chemistry, Physics & Earth Sciences | SA	26 May
Research Fellow in Geology/Geochemistry (Level A/B)	University of Tasmania - Faculty of Science, Engineering & Technology | TAS	6 June
Research Fellow - Agent Systems	Australian National University - ANU College of Engineering & Computer Science | ACT	6 June
Postdoctoral Fellow - Visual Processing	Australian National University - College of Science | ACT	30 May
Postdoctoral Fellow - Epidemiology and Population Health	Australian National University - ANU College of Medicine and Health Sciences | ACT	21 May
Postdoctoral Fellow/Research Fellow - Solar Concentrator	Australian National University - ANU College of Engineering &Computer Science | ACT	6 June
Senior Research Officer - Psychostimulants	University of New South Wales - Faculty of Medicine | NSW	21 May
Postdoctoral Research Fellow - Pain Management	University of Sydney - Pain Management Research Institute | NSW	13 May
NMR Facility Manager	University of Sydney - School of Molecular and Microbial Biosciences | NSW	1 June
Science Leader-Principal Research Scientist - Biomedical Imaging	CSIRO ICT Centre | QLD	31 May
Livestock Production and Landscape Systems Scientist	CSIRO Livestock Industries | WA	18 May
Structural Geology / Tectonics Lecturer	University of Melbourne - Earth Sciences | VIC	14 May
Senior Geophysicist	CSIRO Petroleum Resources | WA	31 May
OCE Postdoctoral Fellowship - Climate change impacts on phytoplankton	CSIRO Flagship Programs | VIC	21 May
Lecturer/Senior Lecturer - Mining Engineering	Curtin University of Technology | WA	30 May
OCE Postdoctoral Fellowship - Effect of Endocrine Disrupting Compounds on Aus Wild Fish Populations	CSIRO Land and Water | SA	13 June
OCE Postdoctoral Fellowship - Land Surface Hydrological Modeller	CSIRO Flagship Programs | ACT	13 June
Research Fellow - Biomechanics	University of Melbourne - The Royal Children's Hospital | VIC	31 May
Bioinformatician / Chemometrics Scientist	University of Melbourne - Bio21 Institute | VIC	21 May
IP and Commercialisation Manager	CSIRO - CSIRO ICT Centre | NSW	26 May
Experimental Research Engineer - Hydraulic Fracturing and Drilling Mechanics	CSIRO Petroleum Resources | VIC	30 May
Clinical Research Interviewer	La Trobe University | VIC	16 May

More information on these positions: **www.sciencealert.com.au/jobs**

CALENDAR

For details or to list an event go to **www.sciencealert.com.au/events**

2008

16th Australian Weeds Conference
18 to 22 May 2008, Cairns, QLD

Redesigning Healthcare for the Ageing Population 2008
20 to 21 May 2008, Brisbane, QLD

Irrigation Australia
20 to 22 May 2008, Melbourne, VIC

Cooperative Research Centres Association Annual Conference 2008
21 to 23 May 2008, Sydney, NSW

Generic Medicines Australia 2008
20 to 22 May 2008, Sydney, NSW

2nd Australian International Green Build & Renewable
1 to 3 June 2008, Sydney, NSW

Rail Infrastructure 2008
3 to 5 June 2008, Sydney, NSW

Going Green Expo
5 to 8 June 2008, Melbourne, VIC

14th Australian Vertebrate Pests Conference
10 to 13 June 2008, Darwin, NT

17th World Hydrogen Energy Conference
15 to 19 June 2008, Brisbane, QLD

14th Annual Meeting of the Organization for Human Brain Mapping (HBM2008)
15 to 19 June 2008, Melbourne, VIC

Clean Energy Australia 2008
17 to 19 June 2008, Sydney, NSW

5th International Conference on Information Technology and Applications (ICITA 2008)
23 to 26 June 2008, Cairns, QLD

Asia Pacific Symposium on Nanobionics
22 to 26 June 2008, Wollongong, NSW

5th International Conference on Information Technology and Applications (ICITA 2008)
23 to 26 June 2008, Cairns, QLD

Western Australia Infrastructure: Building a Sustainable Infrastructure Future
24 to 28 June 2008, Perth, WA

8th Annual Hospital in the Home 2008
25 to 27 Jun 2008, Melbourne, VIC

NSW & ACT Australian Institute of Medical Scientist (AIMS) - Australian Association of Clinical Biochemists (AACB) Combined Meeting
3 to 5 July 2008, Hunter Valley, NSW

Population Health Congress
6 to 9 July 2008, Brisbane, QLD

Australian Society for Microbiology 2008
6 to 10 Jul 2008, Melbourne, VIC

21st Congress of the International Commission for Optics
7 to 10 July 2008, Sydney, NSW

OECC/ACOFT 2008 (Opto-Electronics, Optical Fibre Technology and Communications)
8 Jul 2008 - 10 Jul 2008, Sydney, NSW

Vision, Memory, Spectacle
9 to 12 July 2008, Perth, WA

Australian Association for Environmental Education Conference 2008
9 to 12 July 2008, Darwin, NT

The mathematics of water supply and pricing
14 to 16 July 2008, Surfers' Paradise, QLD

2nd ASIAMiner Investing in Mining Conference
15 to 16 July 2008, Brisbane, QLD

Australian Earth Sciences Convention 2008
20 to 24 July 2008, Perth, WA

41st Annual Australian Institute of Food Science & Technology (AIFST) Convention 2008
21 to 24 July 2008, Sydney, NSW

Australian Space Development Conference
21 to 23 July 2008, Adelaide, SA

9th World Meeting of International Society for Bayesian Analysis
21 to 25 July 2008, Hamilton Island, QLD

International Conference on Photochemical Conversion and Storage of Solar Energy
27 July to 1 Aug 2008, Sydney, NSW

2008 Western Pacific Geophysics Meeting
29 July to 1 Aug 2008, Cairns, QLD

2008 - From Babies to Blokes - The Making of Men
3 to 6 August 2008, Perth, WA

5th World Congress of Society of Environmental Toxicology and Chemistry
3 to 7 August 2008, Sydney, NSW

3rd Australian International Green Build, Design & Technology Show
15 to 17 August 2008, Sydney, NSW

Coast to Coast 2008
18 to 22 August 2008, Darwin, NT

12th Sustainable Economic Growth for Regional Australia (SEGRA) Conference
18 to 20 August 2008, Albury, NSW

2nd Australian Lung Cancer Conference 2008
21 to 24 August 2008, Gold Coast, QLD

6th International Symposium on In Vitro Culture and Horticultural Breeding
24 to 28 Aug 2008, Brisbane, QLD

Zinc Processing 08
25 to 26 Aug 2008, Brisbane, QLD

Endocrine Society of Australia & Society for Reproductive Biology Annual Scientific Meeting
25 to 28 August 2008, Melbourne, VIC

Automated Minerology '08
27 to 28 August 2008, Brisbane, QLD

12th World Congress of the World Federation for Ultrasound in Medicine and Biology
30 to 3 Sep 2008, Sydney, NSW

5th World Conference on Promotion of Mental Health and the Prevention of Mental and Behavioral Disorders
10 to 12 September 2008, Melbourne, VIC

12th International Lupin Conference
14 to18 September 2008, Perth, WA

2008 World Congress of WATOC (theoretical and computational chemists)
14 to 19 September 2008, Sydney, NSW

Australasian Sexual Health Conference 2008
15 to 17 September 2008, Perth, WA

11th International Conference on Principles of Knowledge Representation and Reasoning (KR 2008)
16 to19 September 2008, Sydney, NSW

Leura VI International Breast Cancer Conference 2008
18 to 21 September 2008, Sydney, NSW

World Sustainable Building Conference
21 to 25 September 2008, Melbourne, VIC

Open Access and Research Conference 2008
24 to 25 September 2008, Brisbane, QLD

3rd Annual Conference of the Aus and NZ Chapter of the Society for Risk Analysis
30 September to 1 October 2008, Canberra, ACT

RANZCR 59th Annual Scientific Meeting (radiology and radiation oncology)
16 to 19 October 2008, Adelaide, SA,

6th Australasian Viral Hepatitis Conference
20 to 22 October 2008, Brisbane, QLD

Nurse Practitioners: A Solution for the Future
26 to 28 October 2008, Melbourne, VIC

Australian Association for Infant Mental Health Conference
5 to 8 November 2008, Adelaide, SA

2009

10th International Congress of Ecology
16 to 21 Aug 2009, Brisbane, QLD

12th International Dental Congress on Modern Pain Control
14 to 17 Oct 2009, Gold Coast, QLD

2009 Asia Pacific Conference on Child Abuse and Neglect
15 to 18 November 2009, Perth, WA

Face THE Facts

AUSTRALIAN R&D REVIEW