

# ROAD

REVIEW

## AUSTRALIAN

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*Linking Australian Science,  
Technology and Business*

# Australia's future: energy

The Government has released a set of three reports which will provide the basis of a comprehensive strategy to meet Australia's long-term energy needs. An Energy White Paper is due at the end of 2009.

The [National Energy Security Assessment](#) (NESA), the [Liquid Fuels Vulnerability Assessment](#) (LFVA) and the [Energy White Paper \(EWP\)](#) [Strategic Directions Paper](#) together provide insights into Australia's energy position, challenges and future outlook. Complementing the documents is a recent report by the **Australian Bureau of Agricultural and Resource Economics** (ABARE), [Energy in Australia 2009](#).

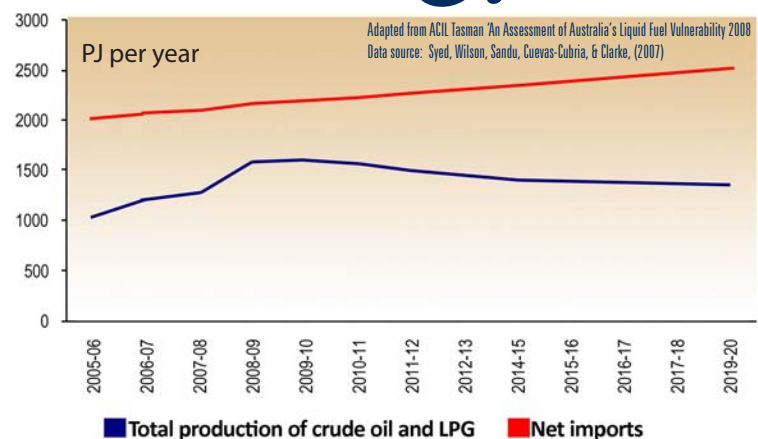
According to the Direction Paper, the **International Energy Agency** predicts that demand for global energy could increase by 45% between 2006 and 2030 and that energy-related CO<sub>2</sub> emissions will continue to rise in absolute terms.\* Oil, coal and natural gas are likely to remain the main fuel sources used globally to 2030, with global oil production not expected to peak before 2030 and coal expected to increase its share of global energy demand.

Australia is the world's eighth largest producer and a net exporter of energy, exporting 66% of domestic energy production – mainly coal, LNG and uranium. However, increasingly it is a net importer of liquid fuels despite exporting crude oil and condensate. The value of energy exports grew annually by an average of 5% over the past 20 years to \$38 billion in 2006-07, while over the same period imports grew annually by 8.8% to \$22 billion. The ABARE report states that coal is Australia's largest energy export earner valued at approximately \$24 billion in 2007/08, which accounts for 18% of world trade. Australia is also the world's second largest exporter of uranium.

In 2006/07, energy accounted for nearly 10% of total R&D expenditure, increasing to \$2 billion from \$828 million in 2002-03. Of this, 90% was spent by businesses (80% in 2002/03) accounting for almost all increases in energy R&D expenditure.

While Australia has extensive reserves of coal, natural gas, uranium and renewable energy sources, there is still limited knowledge of their full energy potential, with, for example, some 70% of Australia's sedimentary basins unexplored for petroleum.

There are also significant challenges. Australia's electricity generation



*Australia is predicted to increasingly import liquid fuels, while its production of crude oil and LPG is expected to decline*

is at present largely dependent on thermal coal, to almost 81% in 2006/07. While this has provided for relatively cheap electricity it also poses challenges in the face of climate change. The Direction Paper also points to Australia's remoteness from international export markets and, in a national context, the remoteness of major energy sources from large population centres posing challenges for energy infrastructure.

The Direction Paper outlines a series of policy challenges dealing with aspects of energy security and enhancing Australia's energy position to which the Government seeks public comments by the end of May.

The document builds on the findings of the NESA and the LFVA. The NESA identifies a range of mounting challenges for ensuring Australia's energy security over the next 15 years and notes that liquid fuels, natural gas and electricity energy security has decreased overall.

To at least maintain its energy security position Australia will have to address: 1) market reforms to maximise investment and improve flexibility and resilience of energy markets; 2) the impact of tightening supply/demand balances and infrastructure reliability on supply chain resilience; 3) a general increase in energy costs; 4) sharply increasing costs of investment capital, global demand for energy infrastructure components and skilled labour; and 5) threats to international energy markets arising

from reduced availability of capital from the current global financial crisis and growing resources nationalism.

Focusing on individual sectors, NESAs assesses liquid fuel security as high until 2018, but it is then projected to decline, influenced by four main factors:

- crude oil supply – increasingly from imports from unstable regions as demand outstrips domestic production;
- refined product supply – increasingly from imports, as global fuel refining capacity increases while being rationalised in Australia;
- infrastructure resilience – reduced reliability in meeting demand could be mitigated by proactive supply chain management;
- carbon pricing – affecting the competitiveness of Australian refineries, depending on the level of assistance.

NESA predicts that increased diversity of supply source for both crude and refined product will have positive impacts. However, over the next 15 years alternatives such as biofuels, and carbon-to-liquid and gas-to-liquid technologies are likely to remain niche products due to challenges such as large up-front capital costs, the availability and cost of credit, the state of technological development and the policy environment.

Assessing Australia's vulnerability in Liquid Fuels in more detail, the LFVA report by **ACIL Tasman** says reduced reliability of the system is influenced by 1) the adoption of tighter fuel standards; 2) reductions in domestic refining capacity; and 3) capacity constraints in petroleum distribution infrastructure such as pipelines and terminals, particularly in Sydney. However, declining self-sufficiency in petroleum products does not necessarily equate to increased vulnerability, says the report.

Australia's consumption of petroleum fuels (excluding LPG) has grown by 3% per year between 2002 and 2007 and is projected to increase by 24% between 2005 and 2020. The demand for LPG will grow by 51.5% over the same period. At the same time, any major addition to Australia's current refining capacity, currently provided by seven major oil refineries, is extremely unlikely and Australia's reliance on imported refined petroleum products will gradually increase.

Australia's crude oil and condensate production is projected to decline over the period to 2020. In addition, many of Australia's newer fields, located offshore in North West Australia, produce crudes not suitable for Australian refineries and are exported.

For the natural gas sector, NESAs concludes that despite the

economic downturn there is likely to be a growing domestic and international demand leading to a tightness of the natural gas supply/demand balance. A Carbon Pollution Reduction Scheme (CPRS) will reinforce this trend. On the supply side, Western Australia has vast reserves of natural gas but NESAs notes that the immaturity of market arrangements, geographic distances, high capital costs of gas supply infrastructure, and a relatively small domestic market combine to pose challenges to natural gas security. The development of significant coal seam gas deposits in recent years could, however, dramatically increase Australia's gas reserves and improve the diversity of gas supply in the east over the assessment period. Natural gas security will depend on the ability of investment to keep pace with demand growth, and on market reforms such as the establishment of the Australian Energy Market Operator.

In regard to the electricity sector, NESAs identifies six key influences: carbon pricing, the revised renewed energy target (RET), implementation of market reforms, gas supply issues, infrastructure resilience and reduced water availability. While uncertainty about the CPRS has delayed investment in the electricity sector the expanded RET scheme is also likely to negatively affect security components such as affordability, adequacy and reliability.

► **More information:** [www.ret.gov.au](http://www.ret.gov.au); **ABARE**, [www.abareconomics.com](http://www.abareconomics.com); **\*International Energy Agency's World Energy Outlook 2008**;

## Broad bandits

In its effort to establish a **National Broadband Network** (NBN), the **Australian Government** has terminated its controversial public/private tender process. According to **Prime Minister Kevin Rudd**, the decision follows advice by an independent panel of experts that none of the national proposals "offered value for money".

The Government will now set up a new company which is to invest up to \$43 billion over 8 years into building the NBN. Initially, the Government will contribute \$4.7 billion towards the process.

Following an initial investment in the company, the Government will sell down its interest within 5 years after completion of the network, which aims to provide access to connection speeds of up to 100 megabits/second (Mbps) for 90% of households. The Government will remain, however, the majority stakeholder in the company, in joint ownership with the private sector.

As the nation's first state, Tasmania will begin rolling out its fibre-to-the-premise (FTTP) network and next generation wireless services as early as July, prior to a national rollout in early 2010. This follows advice by its expert panel to accept a respective proposal by the **Tasmanian Government**. Tasmania has currently the lowest proportion of households (39%) connected with broadband of any Australian state. In conjunction with **Aurora Energy**, the Tasmanian Government will construct a FTTP network providing speeds of up to 100 Mbps, which will connect over 200,000 Tasmanian households and businesses, extending to all hospitals and almost 90% of schools. A wireless network and the Australian Government's National Broadband Network satellite solution will service the remainder of the state with speeds of 12 Mbps or more.

A nation-wide rollout is expected to follow in early 2010 to:

- provide 100 Mbps optical fibre (fibre to the premise or 'FTTP')

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broadband services to urban and regional towns of around 1,000 or more people;

- provide 12 Mbps connections through next generation wireless and satellite technologies to more remote parts of rural Australia;
- provide fibre optic transmission links connecting cities, major regional centres and rural towns;

The NBN will be based on a wholesale-only, open access model and it is planned that it will be simultaneously established in metropolitan, regional, and rural areas.

An implementation study will determine the operating arrangements, detailed network design, and ways to attract private sector investment. The Government will also progress legislative changes that will govern the national broadband network company and facilitate the rollout of fibre networks, including requiring greenfields developments to use FTTP technology from 1 July 2010.

The Government has also released a Regulatory Reform discussion paper after stakeholders, including telecommunications carriers and consumer groups, have expressed concerns about the effectiveness of the current telecommunications regulations regime.

Options for reform include:

- allowing the **Australian Competition & Consumer Commission** to set up-front access terms for companies seeking access to **Telstra** and other networks, and allowing it to impose binding rule of conduct when issuing competition notices;
- promoting competition across industry including through measures addressing Telstra's vertical and horizontal integration;
- improving universal access arrangements for telephony and payphones; and
- introducing more effective rules, requiring telephone companies to make connections and repairs within set time-frames.

The Government seeks submissions by the 3 June 2009.

► [More information: www.pm.gov.au](http://www.pm.gov.au)

## Under one roof

The new **Lifhouse at RPA** cancer care, research and education facility at the Sydney **Royal Prince Alfred Hospital** will be a not-for-profit treatment centre bringing together experts in cancer treatment and research with a particular focus on using new research discoveries in patient care.

After surgeon and cancer patient **Professor Chris O'Brien** had long advocated to bring together different cancer services to provide best conditions for comprehensive treatment breakthroughs, the Government has now committed a total of \$150 million over three years for the centre, which is expected to officially open in early 2012.

► [More information: www.pm.gov.au](http://www.pm.gov.au)

## From plasmonics to broadband

The new **Institute of Photonics and Optical Sciences (IPOS)** has been launched at the **University of Sydney** to provide leading photonics research and education. Formerly established in 2008 under the leadership of **Professor Ben Eggleton**, it is home to more than 30 academic and research staff and 40 postgraduate students, linking the university's faculties of Science and Engineering.

It also houses the ARC's \$19 million **Centre of Excellence for Ultrahigh Bandwidth Devices for Optical Systems**. The institute will particularly focus on planar and fibre-based lightwave devices and

circuits, plasmonics and photonics in nature, and on innovative optical and fibre-based techniques for astronomy.

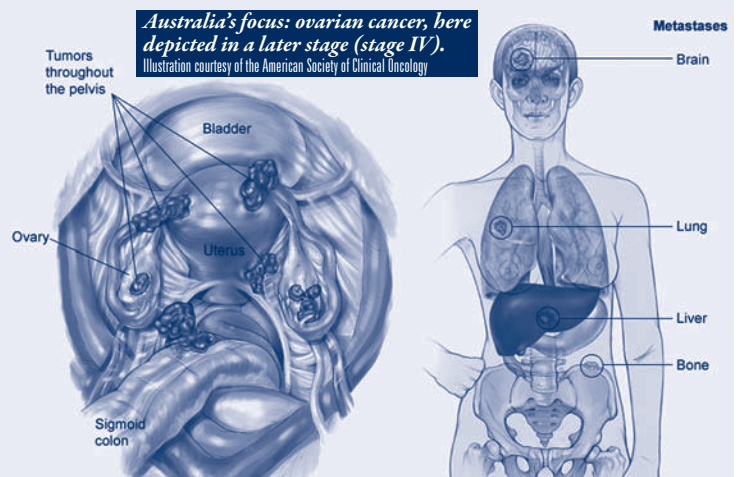
According to Minister for Innovation, Industry, Science and Research **Senator Kim Carr**, IPOS research will also provide essential technology for the delivery of a future broadband infrastructure.

► [More information: www.usyd.edu.au/ipos/](http://www.usyd.edu.au/ipos/)

## Borderless cancer research

Australia will join the **International Cancer Genomics Consortium (ICGC)** with research into pancreatic and ovarian cancer. The 5 year research effort is supported by over \$40 million in funding, of which \$27.5 million will be provided through **NHMRC** funding (Opinion p11). The ICGC is the biggest ever international research effort into the genetics of cancer with 24 countries participating in the consortium.

Its primary goal is to establish a catalogue of mutations in 50 different cancer types which are of clinical and societal importance across the globe. The consortium will also coordinate current and future



large-scale projects into cancer. The Australian contribution will involve:

- the **University of Queensland's Institute of Molecular Bioscience**, the **Garvan Institute** and the Canadian **Ontario Institute for Cancer Research** collaborating on pancreatic cancer;
- the **Peter MacCallum Cancer Centre** collaborating with the Institute of Molecular Bioscience on ovarian cancer research.

Other partners in this research include the **NSW Cancer Council**, **Silicon Graphics**, and **Applied Biosystems**, a division of **Life Technologies Corporation**.

Countries in the ICGC will share information, allowing the comparison of different cancers. Australia will provide tissue samples and data to other countries participating in the ICGC.

► [More information: Marilyn Chalkley, 0434 369 981](http://www.usyd.edu.au/ipos/)

## Clean launch

A new building block of the \$271 **Enterprise Connect** initiative, the national **Clean Energy Innovation Centre**, has opened to support small and medium sized businesses in the clean energy sector.

**Newcastle Innovation**, the commercial arm of the **University of Newcastle**, is hosting the \$20 million centre working in partnership with the **Australian Institute for Commercialisation**, and the **Western Australian Sustainable Energy Association**.

According to Minister for Energy, Tourism and Resources **Martin Ferguson**, the centre will adopt a broad definition of the clean energy

sector including energy produced from solar, wind, wave, tidal, low-emission coal, biofuels and geothermal as well as cogeneration. **Philip Pledge**, who is currently the chair of the **SA Water Board**, will chair the **Clean Energy Centre Interim Advisory Board**. Mr Pledge was previously a partner with **Ernst and Young** and has experience in financial management, business planning and corporate restructuring.

► **More information:** [www.enterpriseconnect.gov.au](http://www.enterpriseconnect.gov.au); **Enterprise Connect hotline, 131 791.**

## Innovative ally

Under round 3 of the **Australia-India Strategic Research Fund (AISRF)**, 15 collaborative projects will share in \$4 million provided by the two main elements of the fund, the Indo-Australian Science & Technology Fund and the Indo-Australian Biotechnology Fund. The AISRF was set up in 2006 as a component of the Australian Scholarships. It is Australia's largest bilateral research fund, providing \$20 million over five years from 2006/07.

Funded projects cover a diverse set of topics such as establishing Australian-Indian collaboration on gravitational wave astronomy and the development of a malaria vaccine. Other areas address agricultural research,

nanotechnology, medical diagnostics, nutraceuticals, and micro-electronic devices and materials.

► **More information:** <https://grants.innovation.gov.au>;

## Get ready

Under the second round of its \$75 million **Climate Ready** program, the Government has provided 19 companies addressing climate change with matching grants totalling \$16.4 million.

The projects, which include schemes to improve waste recovery and manage climate change related diseases, will receive between \$50,000 and \$5 million. The Climate Ready program is part of the **Clean Business Australia** initiative – a \$240 million, four-year partnership between Government and industry.

► **More information:** [www.ausindustry.gov.au](http://www.ausindustry.gov.au); [hotline@ausindustry.gov.au](mailto:hotline@ausindustry.gov.au); **hotline, 132846**

## All want CCS

The **Global Carbon Capture and Storage Institute (GCCSI)** has been launched to globally accelerate the deployment of carbon capture and storage (CCS) technology and the sharing of information.

To date, the Australian initiative is supported by 85 bodies, including 16 national governments and more than 40 major companies, either as foundation members or collaborating participants. More members are expected to join when the institute will become a separate legal entity in July 2009.

The institute is Australian Government initiative to help drive global cooperation on CCS projects and technologies. It is expected to play a

key role – along with the **International Energy Agency** and the **Carbon Sequestration Leadership Forum** – in achieving the G8 group's goal of the broad deployment of CCS technology by 2020.

The Government will provide annual funding of up to \$100 million to the institute which will be headed by **Nick Otter** as interim chief executive officer. **James D. Wolfensohn** was recently appointed to chair the International Advisory Panel of the GCCSI.

► **More information:** [www.pm.gov.au](http://www.pm.gov.au)

## Help me to the market

The latest round of **Commercialising Emerging Technologies (COMET)** program grants will support 33 projects with each receiving \$64,000 to bring their products and services to market.

In announcing the grants totalling \$2.1 million, **Senator Kim Carr**, Minister for Innovation, Industry, Science and Research, highlighted the funding of an almost 100% accurate eye scanner which is highly resistant to fraud and was developed by **Wavefront Biometric Technologies**.

Other funded projects include:

- a simple DNA swab test developed by **Excelgene Pty Ltd**, that determines genetic profiling for health and fitness levels.
- a media channel for PCs and mobile phones developed by **DPIP Holdings Pty Ltd**, which manages a user's content from emails, internet, iPod, and mobile phone; and
- a competitive online quotation service by **WhoCanDo Pty Ltd**, that helps consumers to find tradespersons or service providers.

► **More information:** [www.ausindustry.gov.au](http://www.ausindustry.gov.au)

## Synched progress

The **Australian Synchrotron** in Melbourne will receive \$14.7 million in funding from the **NHMRC** (\$13.2 million) and the **Victorian Government** (\$1.5 million) to develop a new imaging and therapy beamline.



*The Australian Synchrotron*

photo: David Cohen

With the new **Australian Synchrotron-Imaging Therapy Beamline (AS-ITBL)** extremely high-resolution medical imaging and therapy will be possible which will allow researchers and clinicians to see – at sub-micron level – the structural detail of internal organs such as lung air sacs and the microcirculation of tumours. Such detail was previously not visible in real time. Essentially a research tool, it may in future also find application to treat cancers: the high energy x-rays could selectively target tumours with extremely high doses of radiation, sparing surrounding healthy tissue.

**Monash University's Professor Rob Lewis**, who chairs the medical beamline science advisory panel, says this will allow the full range of medical applications requested by the research community to be realised.

► **More information:** (NHMRC) [www.nhmrc.gov.au](http://www.nhmrc.gov.au); (Monash) **Tim Mitchell 0437 457 780**

## (Green) IP steaming ahead

According to **IP Australia**, there is strong growth in green intellectual property applications, indicated by a 250% increase in green trade marks in the energy sector over the past five years. In addition, as Minister for Innovation, Industry, Science and Research **Senator Kim Carr** points out, patent registrations for solar and clean coal technology applications from Australian and overseas innovators have risen by 15% and 50% respectively over the past five years.

This global trend was highlighted at a recent **World Intellectual Property Day** on 26 April which had focussed on green innovations.

IP Australia is the **Australian Government's** agency responsible for administering patents, trade marks, designs and plant breeders' rights. Recently, it has opened a new **Melbourne Patent Examination Centre**, which will be responsible for examining patent applications in the fields of chemical engineering, mechanical engineering, chemistry and electronics. It is IP Australia's first substantial presence outside of Canberra since many decades.

► **More information:** [www.ipaustralia.gov.au](http://www.ipaustralia.gov.au); Peter Willimott, 0410 698 391

## The eyes have it

The **Australian Research Council (ARC)**, will establish a grants program providing \$50.7 million over four years for research in bionic vision science and technology aimed at developing a retinal prosthesis – commonly known as the bionic eye (the ARDR will include an 'In Focus' article on this development in the June edition).



The Prime Minister's **2020 Summit** had identified the bionic eye as a significant opportunity to improve the quality of life for the vision-impaired. Additional benefits are expected to flow from research into medical devices and the mechanical and software systems used to control them. The ARC has announced it will involve national and international experts in the selection of grants to develop, in the long term, a functional bionic eye in Australia.

► **More information:** [www.arc.gov.au](http://www.arc.gov.au); Sheena Ireland, 0412 623 056

## Good Gates

The **Bill & Melinda Gates Foundation** will provide \$18 million to the **UNSW National Centre in HIV Epidemiology and Clinical Research (NCHECR)** for its support of the **ENCORE\*** project, in which UNSW **Professors Sean Emery** and **David Cooper** will participate in a 96-week, 700-patient, randomised controlled clinical trial (RCT) to determine the effectiveness of optimised doses of HIV antiretroviral therapy (ART).

Conducted through an existing, centrally-co-ordinated international research network, the project could, if successful, ease the pressure on meeting the growing global demand for ART, while providing more people with access to therapy for any given level of funding.

The current rollout of HIV drug therapy is expected to not only positively affect the life quality of the HIV infected but also benefit HIV/AIDS prevention as it reduces the likelihood of that person infecting others. However, as the number of people receiving drug therapy in developing countries is estimated to rise three-fold by 2015 continued scale-up of access to ART will impact on the ability to

purchase drugs and the capacity to manufacture them.

ENCORE will determine the optimized dose of some antiretroviral drugs, such as Efavirenz, while maintaining effectiveness, and possibly improving safety/tolerability. If Efavirenz can be safely and effectively reduced from currently 600 mg daily to 400 mg daily, savings in treatment costs could amount to 20% - 50%.

► **More information:** Steve Offner, 02 9385 8107; \*Encore stands for Evaluation of Novel Concepts in Optimization of antiRetroviral Efficacy



Scanning electron micrograph of HIV-1 budding from cultured lymphocyte.

photo: C. Goldsmith; courtesy Centers for Disease Control and Prevention

## Cashing in innovatively

The **Baker IDI Heart and Diabetes Institute** has entered into a partnership with pharmaceutical multinational **Sanofi-Aventis** that will generate research funds of \$500,000 during 2009. Under the agreement, Baker IDI will receive 25 cents for each packet Sanofi-Aventis sells this year of its Plavix anti-platelet agent, which is used for the prevention of a number of thromboembolic disorders. According to Baker IDI, the money will be used to support the institute's research and preventative health programs.

The campaign is scheduled to begin at the end of April and funds from the sale of Plavix will be backdated to January 2009. The agreement will conclude at the end of 2009 and if successful, the parties will look to extending the arrangement into 2010.

In Australia, prescriptions under the **Pharmaceutical Benefit Scheme** for Plavix are restricted. They are confined to specific patient groups for specific indications. This means there is little flexibility and no incentive for clinicians to change their usual prescribing practices.

According to Baker IDI director **Professor Garry Jennings**, the arrangement moves away from traditional revenue-raising ventures by medical research institutes and makes better use of the marketing budgets of 'big pharma'.

► **More information:** Ebru Yaman, 0488 380 484

## Space-ial attraction

A **Joint Statement of Intent** has formally been signed between Australia and Italy to partner in the international \$3 billion **Square Kilometre Array (SKA)** project. It commits both countries to preparing a Memorandum of Understanding (MoU) that will formalise this relationship.

Australia is one of just two nations being considered to host the SKA project. In signing the document, Minister for Innovation, Industry, Science and Reserch, **Senator Kim Carr** says: "The SKA provides an important opportunity for us to improve our science and technology relationship with Italy." The MOU will build on existing relationships between the **Instituto Nazionale di Astrofisica (INAF)** and **CSIRO's Australia Telescope National Facility (ATNF)**. Senator Carr says it will also lead to co-operation and exchanges within industry, particularly in high-technology sectors.

► **More information:** [www.ska.gov.au](http://www.ska.gov.au).

## Thrusting into space

A revolutionary 'plasma thruster' developed at the **Australian National University** will be the first plasma engine tested in a prototype Satellite that to be launched into space within the next four years.

The project is funded by the the European firm **EADS-Astrium**, the world's largest aerospace and aeronautic company, and will be conducted as a three-way collaboration between a team at the ANU **Space Plasma Power and Propulsion (SP3) Group**, the **Surrey Space Centre** at the **University of Surrey (UK)** and the EADS-Astrium.

The thruster for space use will be based on a Helicon Double Layer Thruster (HDLT), which was developed by **Dr Christine Charles** as an innovative electrode-less magneto plasma thruster. It will be the first thruster of its kind in the world to be used for satellite station keeping and interplanetary space travel.

The 'plasma thruster' is a product of basic research with some funding by the **Australian Government**.

► **More information:** <http://news.anu.edu.au/>

## Poisonous octopus welcome

It was once thought to be only the realm of the blue-ringed octopus: scientists at **University of Melbourne**, **University of Brussels** and **Museum Victoria** have now found that all octopuses and cuttlefish, and some squid are venomous. This indicates they share a common, ancient venomous



**Cuttlefish may be cuddly but also venomous**  
photo: Rainer Zenz; commons.wikimedia.org/wiki/File:Georgia-Aquarium-Cuttlefish-RZ.jpg

ancestor and could provide new avenues for drug discovery.

**Dr Bryan Fry** from the Melbourne **Bio21 Institute** says while only blue-ringed octopus species are dangerous to humans, due to high concentrations of the neurotoxin tetrodotoxin in their posterior glands, other species also use their venom for predation, such as paralyzing a clam into opening its shell. "We

hope that by understanding the structure and mode of action of venom proteins we can benefit drug design for a range of conditions such as pain management, allergies and cancer," he says.

Cephalopods (octopuses, cuttlefish and squid) still remain an untapped resource for drug design and their venom may represent a unique class of compounds. Dr Fry obtained tissue samples from cephalopods ranging from Hong Kong, the Coral Sea, the Great Barrier Reef and Antarctica. The analysis of the genes for venom production then revealed a venomous ancestor producing one set of venom proteins. Over time additional proteins developed increasing the chemical arsenal.

The study is published in the *Journal of Molecular Evolution*.

► **More information:** <http://uninews.unimelb.edu.au/mediareleases.php>

## Open taps to space

A major upgrade of **CSIRO's** radio telescope, a set of six radio dishes near Narrabri in NSW, is almost completed and will turn the instrument's data stream into a torrent. The upgrade of the Australia Compact Array will lead to a 16 fold increase in its bandwidth, that is the radio spectrum that can be processed at any one time, boosting it from 128 MHz to 2 GHz.

"It's like going from dial-up access to the universe to having broadband," says **Mr Graeme Carrad**, assistant director for engineering at

**CSIRO's Australia Telescope National Facility (ATNF)**, which operates the telescope.

The upgrade has 'opened the taps', allowing eighty times more data to flow from the antennas to the rest of the system, says Mr Carrad.

"All this data could be captured, although astronomers may or may not choose to do so," Mr Carrad said. Thirty-two special processing boards, each with 26 layers and 4,000 components, were designed and built by the ATNF for this project. International demand for this technology has been strong, with CSIRO selling offshoots of the system to five radio observatories around the world.

► **More information:** [www.csiro.au](http://www.csiro.au)

## Immune wonders

**University of Melbourne** scientists have discovered previously unrecognised first-line defence mechanisms which are particularly important in barrier locations such as the skin and the gut, often used as portals of entry by viruses and bacteria.

Published in *Nature Immunology*, the researchers studied the functions of different subtypes of so called dendritic cells, which mediate the initial local immune response to viral infections. They used as a model system animals infected with *Herpes Simplex* virus, which is best known for causing cold sores. For the first time, the researchers identified a particular type of dendritic cell that presents virus particles to so called Killer T cells and sets off a cascade of immune responses. This finding could not only provide help in the treatment of viral skin infections, but also of auto-immune diseases of the skin such as psoriasis, where dendritic cells trigger the immune system to attack the body's own cells.

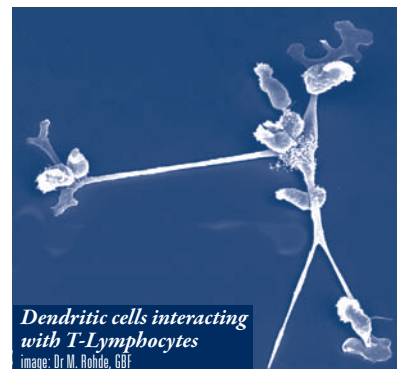
In a second study, also published in *Nature Immunology*, the researchers found that, after the infection subsides, so called memory T-cells stay located in the skin. There they trigger an instant response to recurring infections, instead of having, as previously thought, to travel via the blood to the site of infection. The authors propose the generation of large numbers of these 'skin resident' memory cells as an important goal for future vaccination strategies. Lead author of the second study, **Dr Thomas Gebhard**, says this is particularly relevant for *Herpes* infections as the virus can, while the immune response is developing, establish a dormant stage in nerve cells.

► **More information:** <http://uninews.unimelb.edu.au/mediareleases.php>

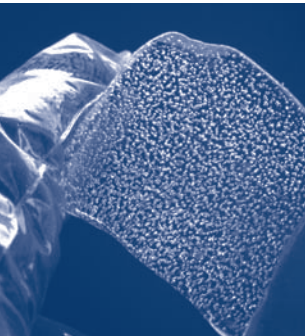
## Securely locked away

International ice core research, including contributions from **CSIRO** and **ANSTO**, has revealed that massive methane clathrate stores beneath the ocean and in permafrost are more stable in a warming world than previously thought. In methane clathrates methane is locked away as ice-like material but can return to gas if temperatures increase or pressures drop. Just a 10% release of methane would be equivalent in its impact on global warming to a ten-fold increase in CO<sub>2</sub> concentration.

Investigating how stable these methane clathrates were in times when the earth warmed, the multidisciplinary team undertook radiocarbon analysis of atmospheric methane trapped in ice core records spanning



**Dendritic cells interacting with T-Lymphocytes**  
image: Dr M. Rohde, GGF



*Air preserved for thousands of years*

photo: CSIRO

hundreds of thousands of years. The research revealed that although millions of years ago methane was released from methane clathrate storages, this did not occur in more recent times. Instead, large increases in methane approximately 12,000 years ago, when the Earth warmed rapidly from its last glacial state, were found to have

originated from ecological sources such as wetlands.

“The result is a good news outcome for climate scientists monitoring greenhouse gases and investigating the likely sources of methane in a warming world,” says CSIRO’s *Dr David Etheridge*, from the **Centre for Australian Weather and Climate Research**.

► [More information: www.csiro.au/news](http://www.csiro.au/news)

## Melting response

The world’s ice sheets might melt much faster than previously thought, suggests an international study published in *Nature Geoscience* involving researchers from **The Australian National University (ANU)** and **ANSTO**. The researchers dated the age of stalagmites that grew in submerged coastal caves in Italy and then determined when the sea level was above the cave and when it was below.

In periods of high sea level the stalagmites were colonised by aquatic worms secreting calcite. This left the stalagmites encased with fossil worm tubes, evidence for the presence of seawater in the cave.

The researchers determined that during a time from about 190,000 to 245,000 years ago there were three warm periods associated with three peaks in sea levels. The ice-sheets appeared to have responded quickly to increasing temperature and CO<sub>2</sub>, suggesting that the lag time between changes in temperature and sea level response is not as long as previously thought. “Our findings also support the idea that the sensitivity of ice sheets to climate change is partly a function of the size and configuration of the ice,” says lead author, ANU’s *Dr Andrea Dutton*.

► [More information: www.ansto.gov.au](http://www.ansto.gov.au)

## Diving robot

For the first time in Australia, a collaboration between **CSIRO Wealth from Oceans National Research Flagship** and the **Integrated Marine Observation System (IMOS)** has successfully deployed and retrieved a remotely controlled, deep ocean-going robotic submarine. For 60 days the glider had traversed the East Australian current and performed 430 dives.

Ocean gliders harvest their propulsion from the ocean itself and, by changing buoyancy, expend very little energy to descend and ascend. Equipped with respective sensors they sample the water for temperature, salinity, dissolved oxygen, chlorophyll and turbidity, and communicate after surfacing with on shore laboratories to relay data and receive instructions.

The **Australian National Facility for Ocean Gliders (ANFOG)** has now established a fleet of 8 vehicles, of which so called Slocum gliders are optimised for shallow coastal water, whereas Seagliders, propelled by a unique porpoising motion, can descend to a depth of nearly 1,000 m. This \$200,000 glider represents the latest tool in Australia’s \$94 million marine observing network, and according to CSIRO’s *Ken Ridgway*, is broadening the array of instruments available to scientists to research the East Australian Current and Leeuwin Currents, which influence local coastal conditions and affect climate, weather, fisheries, shipping and more. Together with data from research vessels, satellites and moored,

drifting and expendable instruments, the glider will add a new dimension to profiling the oceans around Australia.

► [More information: http://imos.org.au](http://imos.org.au)

## In the loop

An international research team headed by two **University of Adelaide** researchers has been awarded a US\$900,000 grant by the **Human Frontier Science Program** in order to help unravel ‘DNA looping’; the phenomenon is an important mechanism for regulating the expression of genes and is believed to play a key role in a number of diseases, including many cancers.

The looping occurs due to the binding of specialised proteins to different regions of the DNA. They also interact with each other so that the DNA loops in between them. *Dr Keith Shearwin* and *Dr Ian Dodd* will investigate how the DNA loops are formed and regulate gene expression by comparing DNA looping inside the cell with looping in the test tube and with predictions obtained through computer simulation.

Understanding how genes are controlled has huge implications for human health and anything depending on biology, says Dr Dodd. Some diseases, including some cancers, are believed to be caused by incorrect looping interactions and improper control of gene interactions.

► [More information: www.adelaide.edu.au](http://www.adelaide.edu.au)

*DNA Looping mediated by protein binding as shown through Atomic Force Microscopy (the proteins appear as white spots).*

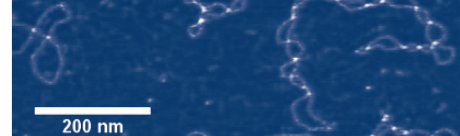


photo: The University of Adelaide

## A light at tunnel’s end

The **US National Institutes of Health (NIH)** has awarded more than \$1.2 million over four years to a team at the **University of Western Australia (UWA)** for research into the treatment of the incurable muscle-wasting disease *Duchenne Muscular Dystrophy (DMD)*. It is one of the most common serious genetic disorders in children, affecting approximately 1 in 3500 boys around the world. The disease is associated with specific errors in the gene that encodes dystrophin, a protein that plays a key structural role in muscle fibre function and stability.

In 2008, the UWA signed an exclusive worldwide licence agreement with US-based bio-pharmaceutical company **AVI BioPharma** to a patent based on the use of ‘antisense technology’ to restore dystrophin expression in Duchenne muscular dystrophy by ‘exon skipping’. This work by grant recipients, *Professors Steve Wilton* and *Sue Fletcher*, has been showcased last year in the journal *Science*.\* Professor Wilton, who heads the Molecular Genetic Therapies Group at the **UWA Centre for Neuromuscular and Neurological Disorders**, says clinical trials in the UK using the antisense oligonucleotide AVI-4658 developed in Perth have yielded promising results. “Now, for the first time we feel as though we may be able to give hope to some of those families who have been affected by this terrible disease,” he says.

► [More information: www.news.uwa.edu.au](http://www.news.uwa.edu.au); \*[Science \(2008\) 322, 1454](http://www.sciencemag.org)

## Induced tolerance

Scientists at the **Garvan Institute of Medical Research** may have found a preventative therapy for Type 1 diabetes, an autoimmune condition in

which the body's immune system attacks its insulin producing cells.

Research by PhD student *Eliana Mariño* and *Dr Shane Grey* suggests that a treatment with a molecule known as BCMA, if given prior to the onset of disease, may be able to prevent diabetes as immune cells become tolerant against insulin-producing cells they would otherwise attack and destroy. Previously, Mariño and Grey had shown that in the onset of the autoimmune response antibody producing immune cells migrate to the pancreas and pancreatic lymph node where they present specific insulin antigen to a subtype of immune cells, so called killer T-cells. Thus activated these cells destroy insulin producing cells.

In mice that spontaneously develop Type 1 diabetes, Eliana Mariño used BCMA to block a hormone BAFF, known to control survival B cells. Given prior to the onset of diabetes, none of the mice progressed to diabetes. It appears that, as B cells reduce, a subclass of T cells, so called T regulatory cells, rise in numbers subduing killer T cells. Remarkably, in the process these become tolerant of insulin producing cells.

BCMA is already being used in clinical trials for other autoimmune diseases, such as Sjogren's Syndrome and Lupus.

► [More information: www.garvan.org.au](http://www.garvan.org.au)

## Switched on

SWITCH, Australia's first vehicle-to-grid plug-in hybrid



electric vehicle, has been launched at the **University of Technology Sydney (UTS)**. Developed by a team from the Faculty of Engineering and IT and the **Institute for Sustainable Futures (ISF)**, the modified Toyota Prius can supply energy to the grid during times of peak demand and, at times of peak power generation, charged to store energy from renewable energy sources. On a large scale, this could level out peaks in power demand, says project director *Chris Dunstan* from the ISF. While the vehicle is only at the trial stage, it demonstrates the practicality and viability of the vehicle-to-grid concept, he says.

According to NSW Minister for Environment and Climate Change, *Carmel Tebbutt*, Switch could save up to 2.8 tonnes of greenhouse gas emissions a year while having a fuel cost equivalent of less than 40 cents per litre compared to \$1.50 per litre for a petrol-driven car.

SWITCH will be trialled as a fleet vehicle by staff at the NSW Department of Environment and Climate Change.

► [More information: www.newsroom.uts.edu.au](http://www.newsroom.uts.edu.au)

## Nickel went, we came

It is less well-known than the demise of dinosaurs, yet if some of the Earth's earliest life-forms – methane-producing microbes – had not died out, complex life may not have evolved, according to a paper in *Nature* authored by *Professor Mark Barley*, **University of Western Australia (UWA)**, and researchers from the **University of Alberta**.

By producing methane, which reacts with oxygen, these early microbes prevented the Earth's early atmosphere from being oxygenated, says Professor Barley. The researchers studied the nickel content of banded iron formations (our main source of iron ore) – rocks which preserve a history of the state of the oceans over millennia. They discovered that prior to 2.7 billion years ago the global oceans were rich in nickel, which 'methanogens' require to produce methane. As the planet began to cool, however, the nickel content in the oceans declined, and oxygen producing photosynthetic bacteria began to thrive while methanogens, starved of nickel, died resulting in a reduced methane content of the atmosphere.

"The nickel crash after its early boom 2.7 billion years ago helped make our planet habitable by complex life," Professor Barley says.

► [More information: Mark Barley, 08 6488 7322](http://www.usyd.edu.au)

## Baby killer smoking



Researchers from the **University of Sydney** have linked sudden infant death syndrome (SIDS) and general exposure to cigarette smoke by examining the brain tissue of babies suspected of having died of SIDS. They correlated the information from post mortems of 67 SIDS infants with the presence of risk factors associated with SIDS, such as tummy sleeping, sharing a bed with adults and exposure to smoking. Their analysis shows that death of brainstem cells, in a region important for the control of breathing and heart function, is elevated in SIDS babies compared to those who died of other causes. Of 67 investigated SIDS babies, 81% had been exposed to cigarette smoke, compared with 58% of non-SIDS infants.

By correlating the history of smoking with brain cell alterations independently from SIDS, *Dr Rita Machaalani* and *Dr Karen Waters* from the university's **Bosch Institute** also found that any exposure to smoke, *in utero* and in the postnatal period, can lead to brain cell changes. By separating this dataset to only the SIDS group, it was the SIDS with prior smoke exposure who had these changes, *Dr Machaalani* explains.

The study published in *Brain and Acta Neuropathologica* is unique because of the large dataset of brain tissue examined and the correlation of autopsy results with recorded risk factors.

► [More information: www.usyd.edu.au](http://www.usyd.edu.au)

## Brothers in genes: man & cow

Published in *Science*, the first mammalian livestock animal in the world, a female Hereford cow, has been sequenced and analysed (see also 'Opinion' p10), with involvement by Australian researchers. In addition, a separate study, also involving Australian scientists, used the sequence to undertake comparative genome sequencing for six more breeds investigating genetic changes. The resulting bovine 'HapMap' is a literal map of genetic diversity among different populations.

Co-author *Professor David Adelson*, chair of Bioinformatics and Computational Genetics at the **University of Adelaide**, says the genetic sequencing of 'Dominette' will significantly



impact on genetic selection for dairy production, for meat production and for food efficiency. He says the cattle and dairy industry will soon be able to use a relatively cheap test, costing several hundred dollars, to assess the genetic potential of their animals at birth.

The bovine genome, containing between 22,000 and 26,835 genes, was found to be more similar to that of humans than mice or rats, most frequently used in medical research. The cow's genome, however, features significant rearrangements, particularly in many of its immune genes – possibly an enhanced natural ability to defend itself from disease, according to CSIRO's *Dr Ross Tellam*.

The project led by the Baylor College of Medicine Human Genome Sequencing Center in Texas took six years, and involved 300 researchers from 25 different countries at a cost of US\$52 million.

► [More information: www.csiro.au; www.adelaide.edu.au](http://www.csiro.au)

## Era of complex science: biology & climate

In many areas of science, senior researchers like me have entered a new era, at last accessing the underlying complexity of the systems we study. This is immensely gratifying but also extremely challenging. In my case, after more than 40 years of drilling down on narrow mechanisms, I now begin to comprehend how they together control that interface between viral and vertebrate genomes we call infection. Take influenza, for example, which is generally most severe in the very young (no pre-existing immunity) and in the elderly as our immune systems fail with age. Sometimes, however, we see a rapidly fatal disease outcome in healthy, young adults and only recently we have realised that in these cases a massive over-reaction occurs in the early 'innate' response.

We've known for years how antibodies and so called 'killer-T cells', which attack the virus infected cells, work to protect us. This response is modulated by specialised molecules, called chemokines or cytokines. However, when excessively produced, which is the case in these young adults, cytokines can cause severe vascular leakage and shock.

These people drown in their own lung fluids!

In order to know what might be done medically, we need to understand which mechanisms should be enhanced or suppressed, perhaps with new drugs or bio-therapeutics.

Trying to deal with such issues has drawn us into the new, complex science called Systems Biology. Over the past decade we've seen the sequencing of the human, mouse and other genomes, an extraordinary expansion of 'chip' technologies that allow massive data acquisition via laser-drive reader systems and enormously enhanced computing for the analysis of massive data sets.

The numbers are made freely available online, so that others can analyze parameters that are of particular interest to them.

We experimentalists would be lost without the skill sets of PhD astrophysicists and mathematical/computer wizards who've come across into biology. Their input in pulling together the vast spectra of inter-related data drives the new sub-disciplines of genomics, proteomics, glycomics, lipidomics, transcriptomics and so forth. Such 'discovery' science isn't going to replace traditional 'reductionist' approaches where we've identified a cell or molecule of interest and then gone in depth to understand what it actually does, but it does point-up a whole spectrum of new targets and inter-related mechanisms for detailed attention.

That's why contemporary biology is so exciting and why, for example, Australia can't afford to cut back on funding basic research in the molecular sciences. If we lose our place now, we'll be toast! Intellectually, I would be toast in my own field of immunology if I'd quit 5 years back!

Talking about toast, another, great area of complex analysis that is of central importance for human wellbeing is climate science. Will our species be toast within the next millennium or so? Understanding what is happening globally requires, as with Systems Biology, the specialized analysis of massive, inter-related data sets. A few old geology and meteorology practitioners, in particular, are very uncomfortable with this process and over-state the case that their 'historical knowledge' is being ignored. Surely everyone understands that there have been enormous changes in the world's climate through geological time some of which humanity, and certainly not 6.8 billion people, could not readily survive. I've been advised to read geophysicist David Archer's *The Long Thaw* (Princeton University Press). You might also check the website of the Geological Society of America.<sup>1</sup>

Being skeptical is fine, but any senior scientist who denies outright a position taken by the vast majority of his active, younger colleagues

better be absolutely sure that he/she understands current and emerging data sets and deals with them in a way that is both competent and intellectually rigorous. Perhaps you've read that the famous 'hockey stick'

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graph is fraudulent. Look, for example, at the US Government NOAA Paleoclimatology website for leads to the validated version of the hockey stick.<sup>2</sup>

Like biologists, the climate scientists have benefited from massive advances in computing and other technology. For example, new satellites are now able to measure the depth and not just the circumference of the ice fields. This complex and continually evolving process requires pulling information together from a spectrum of disciplines ranging from astrophysics, to glaciology to marine biology. That's why the Intergovernmental Panel on Climate Change (IPCC) of the World Meteorology Organization/UN Environment Program is so important.

A very broad spectrum of specialists collates published, peer-reviewed research from a variety of areas and summarizes the information in ways that policy makers and others can comprehend. Despite what you might read the IPCC reports are nuanced and very (perhaps too) conservatively written. Look for yourself!<sup>3</sup>

If you take, for example, the recent beat-up in a national newspaper that claimed the IPCC process is discredited because the ice mass in Antarctica is increasing, though the West Antarctic Ice Sheet is breaking up, you will find that the IPCC actually predicted 5-20% more precipitation (snow goes to ice) over Antarctica through the next century due to greater hydrological activity in the warmer regions of the Southern Hemisphere. Though it is by no means imminent, the complete melt down of the West Antarctic Ice Sheet would cause sea levels to rise in excess of 5 meters.

Dealing with that in ways that don't involve serious conflict will require a level of social and political sophistication that has hitherto been lacking on our small planet. We can't afford to be self-serving and simplistic as we approach the complexities of the climate change issue, we have to think in the long term and we must do whatever we can now to moderate the situation.

<sup>1</sup> [www.geosociety.org/positions/position10.htm](http://www.geosociety.org/positions/position10.htm)

<sup>2</sup> [www.ncdc.noaa.gov/paleo/pubs/mann2008/mann2008.html](http://www.ncdc.noaa.gov/paleo/pubs/mann2008/mann2008.html)

<sup>3</sup> [www.ipcc.ch/ipccreports/ar4-syr.htm](http://www.ipcc.ch/ipccreports/ar4-syr.htm)

\*Peter Doherty shared the 1996 Nobel Prize for Medicine; he also runs a laboratory at St Jude Children's Research Hospital in Memphis, TN

# Genome analysis: the global bottleneck

The successful completion of the bovine genome sequencing project and associated hapmap project mark the birth of a new era in livestock and agricultural research. The size and scope of the project (US\$52M, 25 countries, >300 collaborators) is truly impressive. One of the unique aspects of this undertaking was the community based gene annotation that involved hundreds of individual researchers who volunteered their time and expertise, which made human curation of genes possible for an agricultural genome. The agricultural applications of this research are likely to be profound for both the dairy and beef cattle industries.

In spite of this success, such mega-dollar projects for single organism genome sequencing are probably headed for extinction, as the price of DNA sequencing continues to plummet and the cost of sequencing an animal or plant genome is now becoming affordable within the context of an individual research grant.

Another reason for this is that the process of puzzling together the raw data obtained from sequencing into the context of a whole genome is rapidly becoming easier.

The exponential growth of genome sequencing projects in the past 3-4 years has largely been driven by microorganisms and other life forms with small genomes (Figure 1). One of the key barriers to the adoption of next-generation DNA sequencing for large genomes is the difficulty of genome assembly from short reads. Significant improvements in assembly algorithms and software are making this less of a problem and it is only a matter of time before this barrier crumbles.

been able to do with other new techniques such as gene expression arrays. This has implications for how research grants are defined and funded; should wet bench projects that generate large data sets only be funded if their analysis projects/consortia are funded as well? These will be moot points if there are insufficient computational biologists and bioinformaticians to carry out the analyses.

This problem will not be restricted to DNA sequence datasets. Advances in proteomics and metabolomics instruments are lowering costs and will create additional complexity as their data are integrated with DNA sequence and expression data in what is currently called systems biology.



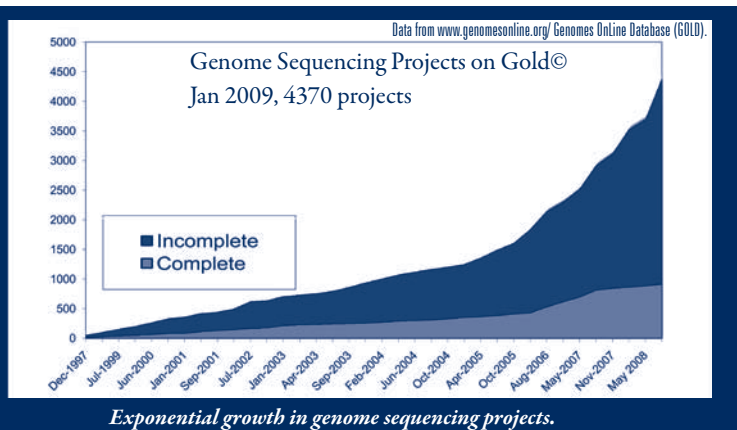
...it is clear that the analysis shortfall for biology is a global phenomenon, so if we want to remain competitive we have to generate 'in house' analytical know how and not just rely on overseas educational systems.

What to do? The short-term answer will be to engage more with the international research community in the form of research consortia in order to remain at the cutting edge. However, it is clear that the analysis shortfall for biology is a global phenomenon, so if we want to remain competitive we have to generate 'in house' analytical know how and not just rely on overseas educational systems.

It is therefore imperative that Australia allocate sufficient funds for bioinformatics.

One particular concern is that at present, bioinformatics and computational biology are not explicitly targeted as national technology funding priorities by either the ARC or NHMRC. Furthermore, funding a few more Centres of Excellence will not be the solution, because the analytical shortfall will be uniform and pervasive. Right now any bright person with an internet connection and a reasonably powerful desktop machine can become a computational/systems biologist, but they will not do so if there are no career paths and if training is hard to come by. At present there are few true interdisciplinary training programs in Australia that can attract and train the next generation of analytical biologists, and this needs to be addressed as a matter of urgency.

We live in exiting times; fifteen years ago I never dreamed that I would be involved in livestock genome sequencing efforts, but today I am an analysis team leader in two such consortia. While it's hard to predict where we might be in another fifteen years, it is clear that at present, the 'omics playing field has been leveled, and Australia needs to take advantage of this state of affairs to field a competitive team, as is done for the Olympic Games. The benefits of this investment will be twofold; it will be easier to forge strong collaborative links with overseas institutions that are already at the leading edge in order to participate in future multi-megadollar projects and it will ensure the continued high quality of local research and development in the biological sciences and the agricultural sector.



This new era of cheap, whole genome sequencing will revolutionize the way we do biology. But revolutions are never easy and in a Darwinian sense will impose strong selective pressure on labs and institutions.

This selective pressure will be exerted at the level of data analysis, as the genomics bottleneck shifts downstream to the computational biologists. The bovine genome project was a success because it enlisted the bovine research community as its analytical engine.

However, it still required about 15 analysis team leaders and numerous additional personnel to transform the raw data into knowledge.

It is perhaps this requirement that explains the fact that the number of completed genome sequences has flattened out in the past couple of years, while the number of incomplete projects is continuously increasing. Individual labs are not able to tackle all of the analyses required to characterise a genome sequence on their own, in contrast to what they have

Professor Warwick Anderson  
CHIEF EXECUTIVE OFFICER, NATIONAL HEALTH & MEDICAL RESEARCH COUNCIL

# Australia joins global cancer project

Health and medical research in the 21st century is marked by increasing international cooperation. This occurs through individual researchers working together seamlessly world-wide. The “research-without borders” approach is one of the many admirable features of scientific research in general. Since the Human Genome Project however, there has been increasing cooperation between funding agencies themselves to coordinate support for some major projects, particularly where there is a need to tap into the best expertise, wherever it might be found.

The International Cancer Genome Consortium (ICGC) is one such effort. The ICGC will help to coordinate current and future large-scale projects to understand the full range of genomic changes involved in the 50 most common cancers. If successful, this will provide researchers everywhere with the information they need about the genomics, epigenetics and transcriptomics of these cancers.

The ICGC spans 24 countries, including Canada, China, India, Japan, the United Kingdom, the United States and some European nations as well as Australia. Countries continue to join this international effort, which looks set to be the largest international research effort since the human genome project.

The Minister for Health and Ageing, The Hon Nicola Roxon MP, announced on 26 March 2009 that the Australian Government, through the NHMRC, will provide \$27.5 million funding for research into pancreatic and ovarian cancer. Each year 3000 Australians die from ovarian and pancreatic cancers. These two cancers were chosen after a call for applications by the NHMRC in July 2008, and following peer review

that have developed resistance to platinum-based therapies.

From a technical viewpoint, the genetic events that will be studied through the sequencing work include point mutations (single nucleotide polymorphisms or SNPs), insertions, deletions, copy number variants as well as epigenetics and gene expression.

With the remarkable advances in molecular sciences, informatics and sequencing in recent years, goals that were not achievable at the turn of the decade are now achievable through this international collaboration expected to last a decade or so. We now have a glimpse of what personalized approaches to cancer treatment, and perhaps what prevention might look like, but we need a much better understanding of the basic biology of tumor cells to achieve this.

NHMRC sees other advantages through joining the consortium. It will help build our national capacity for DNA sequencing and there are remarkable changes expected in the costs of sequencing in the near future. It will also expand our capabilities in bioinformatics; many have commented that in bioinformatics, despite nodes of excellence, our national capacity lags behind other advanced countries in health and medical research. Membership of ICGC will also further promote international collaborations, reduce duplication, and help develop plans for other international collaborative research efforts.

Australia has been a member of the ICGC from its inception, with the CEO of the NHMRC as an inaugural member of the ICGC Executive. Other leading Australian researchers and academics are represented on

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of the nine applications. This grant represents the single largest grant ever from the NHMRC for health and medical research, and importantly, the NHMRC funding will be leveraged to more than \$40 million, with partnerships in this research including the University of Queensland, NSW Cancer Council, Silicon Graphics, and Applied Biosystems, a division of Life Technologies Corporation.

The Chief Investigator is Associate Professor Sean Grimmond from the Institute of Molecular Biosciences at the University of Queensland, and fellow Chief Investigators include Professor Andrew Biankin from the Garvan Institute, for pancreatic cancer, and Professor David Bowtell and others from the Peter MacCallum Institute for ovarian cancer.

The pancreatic cancer work will be undertaken in collaboration with researchers at the Ontario Institute for Cancer Research. The Australian team will focus on fully sequencing 350 individually diagnosed cases of pancreatic cancer. For ovarian cancer, the project will sequence 150 cases - 50 primary serous OvCa, matched with 50 cases of relapse and 50 cases



various subcommittees of the ICGC, including the International Scientific Subcommittee, the Data Access subcommittee and the Ethics Committee

It is NHMRC's fervent hope that the project will offer hope to people around the world that we can discover better ways of preventing, diagnosing and treating cancers within the next decade.

\*Further details the ICGC may be found at <http://icgc.org>.

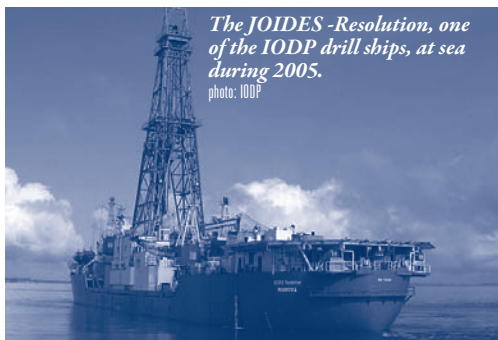
## Secrets under the sea

The **Australian-New Zealand IODP Consortium** (ANZIC) has signed up to the world's largest ocean research program [The Integrated Ocean Drilling Program](#) (IODP), which is dedicated to exploring the sub-seafloor.

The Australian involvement in the partnership is led by **Professor Neville Exon** from the **Australian National University** and is funded by the **Australian Research Council**, 14 universities and three government agencies.

The membership will allow local scientists to participate in the ten expeditions scheduled this year, including ocean drilling in the Pacific Ocean, Bering Sea, Antarctica and a research expedition scheduled to investigate environmental changes in the Great Barrier Reef. The membership will also include access to IODP activities such as shipboard and post-cruise research, development and leadership of drilling proposals, and participation in planning and advisory committees.

► **More information:** [Neville Exon 02 6125 5131](#)



*The JOIDES-Resolution, one of the IODP drill ships, at sea during 2005.*  
photo: IODP

## Regenerating potential

The **Australian Regenerative Medicine Institute** (ARMI), based at **Monash University**, has been officially opened. At full capacity it will be one of the world's largest regenerative medicine and stem cell research centres, according to director, **Professor Nadia Rosenthal**. She says that by unravelling the basic mechanisms of the regenerative process, ARMI research will provide the basis of treatments for conditions such as neurodegenerative disorders, diabetes, arthritis, musculo-skeletal and cardiovascular diseases.

► **More information:** [Samantha Blair, 03 9903 4841, 0439 013 951](#)

## Hot & humid potential

Two new initiatives are to strengthen tropical research in Australia.

### Queensland

The launch of the not-for-profit organisation **TropLinks** is set to boost Australia's ability to benefit from the predicted \$US40 trillion global tropical economy. TropLinks is a network of research bodies, companies, industry groups and economic development organisations with specific interest in issues affecting the tropics. Supported by **Queensland's Department of Employment, Economic Development and Innovation**, TropLinks will operate from northern Queensland but will encourage input from researchers nationally and internationally.

### Western Australia

**Murdoch University** has launched a new **Western Australian Tropical Research Initiative** (WATRI) which will bring together its international project specialists to partner with governments and industry in preserving and sustainably developing the state's tropical north. WATRI will be headed by **Dr Richard Bell** as interim director and build on Murdoch's expertise in the tropics and in sub-saharan Africa. Areas of expertise

include agriculture, minerals, marine science, biosecurity, sociology, healthcare, medicine, education, indigenous expertise, eco-tourism, environmental science, ecology and climatology.

► **More information:** [\(UId\) Kate Haggman, 07 3224 4504, 0400 548 013, \(WA\) http://new.www.murdoch.edu.au](#)

## Sunny focus

The **University of South Australia** has opened a solar testing facility at the University's **Sustainable Energy Industry Support Centre** at Mawson Lakes Campus.

The centre will focus on solar hot water applications in Australia through independent testing, product development and monitoring services to support local manufacturers and suppliers of solar hot water systems. At the testing facility solar thermal technologies are put to the test in a range of ways including measuring thermal performance of solar collectors, checking the impact of rainfall and large hail stones, evaluating safety and performance during extended periods of no hot water draw-off and protection against freezing temperatures.

► **More information:** [Kelly Stone, 08 8302 0963, kelly.stone@unisa.edu.au](#)

## Spacey outlook

### Tasmania

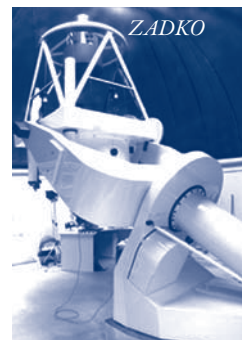
The **AuScope organisation** is establishing a triangle-shaped network of telescopes to examine the structure and evolution of the Australian continent in time and space. As part of this initiative, a new 12 metre telescope dish has been installed at the **University of Tasmania's** (UTAS) **Mount Pleasant Observatory**. Telescopes at Yarragadee in Western Australia and Katherine in the Northern Territory will follow later this year. AuScope is funded by the **Australian Government** under the **National Collaborative Research Infrastructure Strategy** (NCRIS).

### Western Australia

As part of a global network of telescopes linked to a NASA satellite ground station, the **University of Western Australia** (UWA) has launched Western Australia's biggest telescope, the Zadko telescope, co-located with the **Gravity Discovery Centre** at Gingin, north of Perth. Joint international projects will use the telescope to search for massive cosmic explosions known as gamma ray bursts, which herald the formation of black holes at the edge of the known universe. It has already detected one of the biggest explosions in the universe which occurred more than 11 billion years ago.

It will also be used to detect potentially hazardous near-earth asteroids and to trace dangerous space junk.

► **More information:** [\(UTAS\), 03 6226 2124, www-ra.phys.utas.edu.au/auscope; \(UWA\) Janine MacDonald, 08 6488 5563, 0432 637 716](#)



## Sino friends

The **Go8** has signed a *Memorandum of Understanding* to deepen its co-operation with the leading research universities in China, known as the C9. The C9 is a consortium of universities that has agreed to collaborate to enhance its international linkages and respond more effectively to global challenges. As part of the ongoing co-operation between the Go8 and C9, a number of students currently enrolled at Go8 universities have been awarded full scholarships to study at the **Harbin Institute of Technology**.

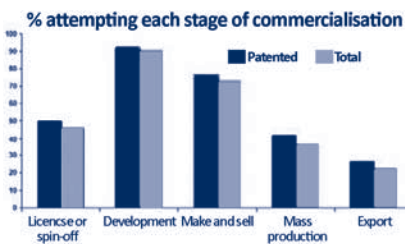
► **More information:** [www.go8.edu.au/](#)

## Successful rejects

A working paper from the **Melbourne Institute of Applied Economic and Social Research** questions the importance of patents for the successful commercialisation of inventions. An analysis of survey data obtained with 3,736 Australian inventions subject to a patent application between 1986 and 2005 found that firstly, patents played only a modest role in the commercialisation success and secondly, many innovations that were not patented were nonetheless commercialised. The researchers conclude that patents are neither a necessary nor sufficient condition for successful commercialisation.

The research by *Associate Professor Elizabeth Webster* and *Dr Paul Jensen* was made possible because almost half of the patent applications included in the survey were not granted yet many applicants nevertheless proceeded with the commercialisation of their invention – for example, 86.9% of patent applications that were rejected proceeded with commercialisation compared to 92.1% of inventions that were granted a patent. The authors found that while significant, the positive impact of a patent on commercialisation was relatively modest, increasing the probability of being commercialised by just 2% to 8%.

► **More information:** Elizabeth Webster, 03 8344 2114



## Not just another kinase

A group of scientists led by *Professor Jamie Rossjohn* at **Monash University's** Protein Crystallography Unit have, in collaboration with the Australian biotech company **Cytopia** and the **Australian Synchrotron**, unravelled the 3-dimensional structure of Janus kinase-1 (JAK-1), which is implicated in some types of cancer and viral infections. JAK kinases are a group of cell-growth promoting enzymes that act via the Janus Kinase/Signal Transducer and Activator of Transcription (JAK/STAT) pathway, and inappropriate activation of the pathway has been associated with human cancer development.

According to information released by the Australian Synchrotron the elucidation of the JAK-1 structure could be an important step in improving experimental anti-cancer drugs designed to block JAK-1 activity. *Dr Christopher Burns*, director of research at Cytopia, says that the company is now in the final stages of using the work at the Australian Synchrotron and allowing a generation of JAK targeted drugs to be trialled. The research was published in the *Journal of Molecular Biology*.

► **More information:** Jennifer Cook, Jennifer.Cook@synchrotron.org.au

## Hairy diagnostics

The **Australian Synchrotron**, the largest of its kind in the Southern Hemisphere, has entered a 2-year commercial user agreement with **Fermiscan Holdings Limited**, which will further test and commercialise an innovative non-invasive diagnostic test for the detection of breast cancer. Fermiscan's test uses samples of a patient's hair, rather than traditional imaging of the breast using mammograms or ultra-sounds.

A large scale clinical trial program (FER 2k trial) in 2008 found the test had accuracy of 74% in identifying the presence of breast cancer in women under 70 years of age and a negative predictive value of 99.5%.

The use of the Australian Synchrotron is expected to significantly

reduce costs and provide logistical benefits over Fermiscan's recent use of the synchrotron in Chicago.

► **More information:** [www.synchrotron.org.au](http://www.synchrotron.org.au); [www.fermiscan.com.au](http://www.fermiscan.com.au)

## Snail wonders

Conopeptides are bioactive compounds of cone snails. The 500 snail species contain over 50,000 such venom peptides targeting specific ion channels, receptors and transporters. Researchers at the **University of Queensland** and Queensland company **Xenome Limited** have produced a set of analogs to chi-conopeptides that show analgesic potential for the treatment of neuropathic pain by inhibiting the noradrenaline transporter, also known as the norepinephrine transporter (NET).

Xenome has announced that it was awarded a US patent Nr 7,507,717 entitled *Type II chi-conotoxin peptides (noradrenaline) transporter inhibitors*.

The patent adds to Xenome's already existing patent portfolio surrounding chi-conopeptides and analogues, including Xen2174, the company's lead molecule. Xen2174 has shown promise as a best-in-class pain therapeutic and is currently in clinical development for the treatment of moderate to severe pain in various acute and chronic pain indications.

The newly issued patent provides Xenome with a proprietary position on multiple families of analogues of the chi-conotoxin, Mr1A, through to the end of 2025. According to Xenome's chief executive officer *Dr Ian Nisbet* the multiple patents issued in the US and other territories will be highly valued by potential partners.

► **More information:** [www.xenome.com](http://www.xenome.com)

## Starving potential

**ImClone Systems**, a licensee of **Circadian Technologies**, has released data of preclinical animal studies with the monoclonal antibody, IMC-3C5, which targets the Vascular Endothelial Growth Factor Receptor 3 (VEGFR-3) protein. The data, obtained in subcutaneous mouse tumour models, revealed that combined treatment with a IMC-3C5 and standard anti-cancer chemotherapy agent for lung cancer, cisplatin, or for head and neck cancer, docetaxel, did inhibit tumour growth significantly better than either agent alone. According to *Mr Robert Klupacs*, managing director of Circadian, this indicates that VEGFR-3 antibodies may have the potential to improve existing chemotherapy treatments.

ImClone Systems and Circadian announced in October 2008 that the VEGFR-3 antibody had been designated as a formal pre-clinical development candidate for oncology indications.

VEGFR-3 promotes the development of blood vessels and lymphatic vessels supporting tumours and blocking the VEGFR-3 pathway is expected to 'starve' tumours through reduced blood supply, also preventing the spread of cancerous cells through the lymphatic system.

ImClone Systems is developing IMC-3C5 under an exclusive worldwide license from Circadian (through a wholly owned subsidiary) in return for annual license fees and royalties on potential product sales.

► **More information:** Robert Klupacs, 03 9826 0399

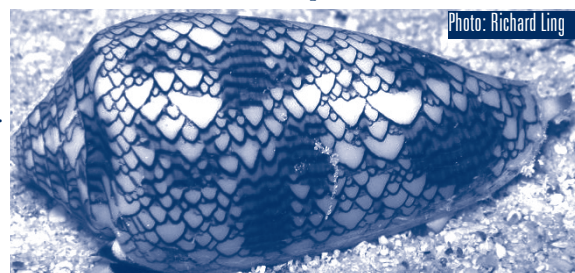


Photo: Richard Ling

A live Textile cone, *Conus textile*

## Dual actor

**Bionomics Limited's** BNC105 has been named third most innovative product in the **Anthill Magazine's** inaugural 'SMART 100' Index. The compound provides a new method to attack cancer tumours by blocking the blood supply to a solid tumour, effectively starving the tumour of nutrients. An important benefit of this approach is the unlikely occurrence of mutant tumour cells resistant to the therapy.

According to Bionomics, initial tests show that BNC105 has the ability to both block the supply of nutrients to a tumour as well as directly destroy the cancer cells, suggesting a 'dual mode' of operation. Pharmacokinetic studies further indicate that BNC105 is selectively retained in tumour cells enhancing the selectivity of action and therefore enhanced safety margin in treatment.

To date, BNC105 has been demonstrated to reduce tumour blood supply in mouse models of human breast, prostate, lung, colon, brain and also head and neck cancers, according to the company. New preclinical data presented at the *Annual American Association for Cancer Research (AACR) Conference*, showed a single cycle of BNC105 was effective in delaying the growth of throat tumours in animal models and improving the survival rate of the animals. BNC105 was also found to combine with radiation therapy to a more effective anti-tumour therapy for this cancer type and appears to ameliorate radiation induced tumour ulceration.

A phase I clinical trial with BNC105 is currently conducted in patients with advanced cancers at the **Peter MacCallum Cancer Centre**, the **Western Hospital**, the **Austin Hospital** and the **Royal Melbourne Hospital**.

► [More information: www.bionomics.com.au](http://www.bionomics.com.au)

## Promising switch

Results of pre-clinical experiments with PG11144, a product developed by **Progen Pharmaceuticals Limited** and collaborators, show that it successfully inhibits tumour growth by 'switching on' important anti-cancer genes. According to Progen the findings, which were presented at the *Annual American Association for Cancer Research (AACR) Conference*, are a significant achievement in epigenetics research and cancer therapeutics.

PG11144 reactivates silenced tumour suppressor genes inactivated in cancer, by inhibiting lysine specific demethylase 1 (LSD1), an enzyme known to contribute to the silencing of these genes. Such epigenetics technology represents one of the latest breakthroughs in cancer drug development which focuses on expression (switching on) or silencing (switching off) of certain genes. According to Progen's chief scientific officer **Dr Laurence Marton**, the use of LSD1 inhibitors represents a highly promising and novel approach to cancer prevention and therapy, and may be suitable for multiple indications.

► [More information: www.progen.com.au](http://www.progen.com.au)

## Tragic attraction

An independent study conducted by researchers at the **University of California (UCLA)** has validated the drug strategy of **Prana Biotechnology Limited** for Alzheimer's Disease (AD) in targeting the toxic interaction between so called Abeta protein and brain metals, such as zinc. Published in the *Journal of Neuroscience\**, the study found that release of zinc from synapses is critical for Abeta to form oligomers and aggregates, which is known to damage synapses and cause cognitive loss.

Prana's lead Alzheimer's Disease compound, PBT2, inhibits this interaction of Abeta and zinc and the study findings could explain the ability of PBT2 to restore normal function to Abeta-impaired synapses, reversing cognitive loss in animal models of AD.

PBT2 has completed a Phase IIa study in AD patients, demonstrating a lowering of Abeta levels in the cerebrospinal fluid and signs of cognitive improvement within three months. **Dr Jeffrey Cummings**, chair of Prana's Scientific Advisory Board, notes that the UCLA study shows synaptic activity stimulates the release of Abeta and zinc leading to the build up of toxic Abeta oligomers at the synapse. Previous studies demonstrating that PBT2 can disperse Abeta oligomers attracted by synaptic zinc, suggest that the benefit of PBT2 seen in the recent clinical trial may reflect this synaptic effect, he says.

► [More information: www.pranabio.com](http://www.pranabio.com);  
\*Deshpande A, J. *Neurosci* 2009, 29 (13)

## Focus breast

**Neuren Pharmaceuticals** and the New Zealand-based **Breast Cancer Research Trust** have established a new company, **Perseis Therapeutics Limited**, to target breast and other cancers in developing Neuren's TFF-1, TFF-3 and anti-Growth Hormone programs. Neuren will retain a majority interest in the company, which will be headquartered in Auckland, New Zealand,

The **Breast Cancer Research Trust** will provide NZ\$1.18 million in funding to obtain definitive *in vivo* proof of efficacy for all three programs. At the end of this first round of funding, Perseis will seek additional funding, licensing or co-development agreements to continue development of these programs. The TFF-1 program had been licensed to a European specialty pharmaceutical company. Neuren has, at no cost, re-acquired rights to the program, while the other company has taken an option to license the program back by March 2010.

► [More information: www.neurenpharma.com/](http://www.neurenpharma.com/)

## Encapsulated independence

Early results of an ongoing DIABECCELL® Phase I/IIa clinical trial show that a type 1 diabetes patient, who was repeatedly treated with the encapsulated insulin producing porcine cells, is now insulin independent.

According to **Living Cell Technologies (LCT)**, the 37 year old woman had insulin injected daily for 15 years but is now able to maintain good blood glucose control without the injections. The live porcine cells in intact capsules have been biopsied from the site of implants in the abdomen and porcine insulin was detected in the patient's blood.

At this early stage of clinical trials, results show that insulin independence is potentially achievable at least in some patients and that repeat implants are safe, says LCT medical director **Professor Bob Elliott**.

In the safety and dose finding study, seven patients received low or medium dose implants (5,000 to 10,000 islet equivalents (IEQs) per kg body weight) and some have had a repeat implant at least six months after the first. There have been no remarkable adverse events attributed to repeat implants.

Responding to the recent outbreak of swine influenza in parts of the world, LCT has also released a statement assuring that DIABECCELL® is free of pig viruses, bacteria and parasites. According to expert advice by **Professor Roger Morris**, emeritus professor of New Zealand's **Massey University**, swine influenza is not endemic in New Zealand.

Viral infections from pigs to humans have never arisen from pig tissue

implanted into humans, LCT states and further denotes that LCT's pig herd is derived from the Sub-Antarctic Auckland Islands and bred in bird-proof pathogen free facilities. Professor Elliott says that "even if swine influenza did happen in other New Zealand pigs it is very unlikely to occur in this herd."

► [More information: www.lct.com.au/latest-news.php](http://www.lct.com.au/latest-news.php)

## Happy with go ahead

An independent Data Safety Monitoring Board (DSMB) has given **pSivida** a green light to continue, without change of current protocols, two pivotal Phase III clinical trials with Illuvien™ (formerly known as Medidur FA™) for the treatment of diabetic macular edema (DME). The DSMB provides an independent evaluation of all trial data to identify potential safety issues that might warrant modification or early termination of ongoing clinical studies.

Illuvien, an intravitreal insert inserted into the patient's eye with a 25-gauge needle, delivers fluocinolone acetonide, a corticosteroid, over a sustained period of time. These intraocular steroids are promising new therapies that could offer an alternative to current laser therapies. By targeting drugs to tissues at the back of the eye, sustained-release implants could avoid the need for repeated intravitreal injections or systemic drugs. The Phase III clinical trials, known collectively as the FAME™ study (Fluocinolone Acetonide in Diabetic Macular Edema), consist of two 36-month, doublemasked, randomized, multi-center trials in the US, Canada, Europe and India in support of a planned global registration filing. The trials are conducted by the company's US-based licensing partner **Alimera Sciences, Inc.**

► [More information: www.psvida.com/news/ASXAnnouncements.asp](http://www.psvida.com/news/ASXAnnouncements.asp)

## Drought resistance

*Starpharma*

**Starpharma Holdings Limited** has successfully raised at least \$4.3 million and up to \$4.6 million, through a private placement to existing and new institutional and sophisticated investors. The company says this will boost the company's cash reserves to over \$10 million and provide sufficient operating capital to commercialise the VivaGel® coated condom with Starpharma's partner SSL International Plc. In addition, it will supplement grant funding to further advance the stand-alone VivaGel® development program. The funds will also support further partnering and commercialization of Starpharma's dendrimer applications, and strengthen the company's balance sheet by providing additional working capital.

The placement led by **Acorn Capital**, one of Australia's few specialist funds to invest solely in Australian microcap and small cap stocks, involves a first close of \$3.1 million with the immediate issue of approximately 11.8 million ordinary shares at \$0.26 per share. To enable a major institutional participant to take up its maximum allocation, a second tranche of shares will be issued in May raising a further \$1.2 to \$1.5 million. The two tranches of shares will be under 15% of issued capital and shareholder approval is not required.

*Mesoblast*

**Mesoblast Limited** raised \$10.81 million through a private placement to existing, as well as new, institutional and sophisticated investors.

Together with its reported current working capital of \$9.6 million, the company says it will use the funds to expand clinical trial programs focussing on bone and cartilage regenerative products for spinal vertebral disc disease. These programs will be pursued in parallel to the company's

ongoing Phase 2 clinical trial in knee osteoarthritis.

The placement of 15.02 million shares was oversubscribed and was made at a 10% discount to the closing price of the company's shares on 25 March 2009.

► [More information: Starpharma, www.starpharma.com](http://www.starpharma.com); [Mesoblast, www.mesoblast.com](http://www.mesoblast.com)

## Pulsating implants

The first two implants of **Sunshine Heart's** C-Pulse™ heart assist system have been successfully completed in an FDA approved US clinical trial which is currently conducted with 20 people at the **Ohio State University Medical Center** in Columbus, US.

According to **Dr Benjamin Sun**, who heads the Division of Cardiothoracic Surgery at the centre and conducted the implants, the C-Pulse system has the potential to offer a new therapy option for the treatment of moderate heart failure.

**Dr William Peters**, medical director of Sunshine Heart and inventor of the system says that in prior clinical studies the C-Pulse system increased blood flow to the body and to the heart muscle itself. The device operates without coming into direct contact with the blood, so avoiding potential complications with systems that do contact blood. A particular feature in the design of the C-Pulse is also that patients can safely disconnect from the device for short periods for their convenience.

► [More information: www.sunshineheart.com/](http://www.sunshineheart.com/)



*The C-Pulse Cuff. An implanted non-blood contact pump*

## Allogeneic fusion

**Mesoblast Limited** has received approval to commence a Phase 2 trial at Melbourne's **Epworth Hospital** of its allogeneic, or 'off-the-shelf', cell therapy product for fusion of the cervical spine.

The 24-patient randomised, controlled trial will compare the safety and effectiveness of Mesoblast's product NeoFuse™ against a procedure using a patient's own hipbone (autograft). In recently completed preclinical trials at **Monash University**, Mesoblast's allogeneic cells resulted in earlier and more robust fusion of the cervical spine than autograft, without any adverse events.

► [More information: www.mesoblast.com/](http://www.mesoblast.com/)

## Eastern engagement

**Polartechnics Limited** has signed an agreement with Eastern European medical supplier **Global Logistic Services (GLS)** as part of the **Mediconsult Group of Companies and Partners** ([www.medcogc.org](http://www.medcogc.org)), for the distribution of the cervical cancer screening device, TruScreen in Bulgaria and Romania. Both countries have historically high mortality rates and low screening access and, due to existing CE mark approval, True Screen will have immediate entry into both markets. In 2004, Romania reported mortality rates for cervical cancer (16 per 100,000) eight times higher than Australia, and to date 80% of sexually active Romanian

women have never had any cervical cancer screening.

According to GLS general manager *Dr Boyan Doganov*, the Governments of Bulgaria and Romania are now engaged in developing and implementing comprehensive programs for prevention of cervical cancer. Polartechnics believes its products could increase the reliability and efficiency of the programs, and reduce the incidence and mortality rates associated with reproductive diseases. The company has recently commenced a multi-centre trial of TruScreen in Poland to provide clinical support for TruScreen in Eastern Europe.

► [More information: www.polartechnics.com.au](http://www.polartechnics.com.au)

## Friendly reward

Avexa has been awarded a grant under round 8 of the **Australia-China Special Fund for Science and Technology Cooperation** to support its collaborative drug-discovery projects with **TargetDrug** of Shanghai, China. Funding from this grant, which is awarded on a merit basis, is in excess of \$190,000, and contributes towards a combined total investment of \$600,000 which is shared between TargetDrug and Avexa.

The two years of collaboration between Avexa and TargetDrug have already led to patent applications on two projects in HIV and HCV. The funds from the grant will be used to further the HIV and HCV programs. The component of the grant awarded to Avexa will fund the synthesis and antiviral assay of new antiviral molecules, building on active compounds that have been discovered during the collaboration. The component of the grant awarded to TargetDrug will fund the establishment of compound-profiling assays, which will be used to screen the Avexa compounds for optimal drug-like properties and to help select potential clinical candidates.

► [More information: www.avexa.com.au/news](http://www.avexa.com.au/news)

## Japanese prospect

**Biota Holdings Limited** has announced that **Daiichi Sankyo**, the co-owner and discoverer of the long acting neuraminidase inhibitor (LANI) CS-8958, has signed a contract to manufacture and market the product in Japan, pending the successful completion of the pivotal Phase III clinical studies and on obtaining registration approval.

Biota, as one of the owners, will receive an undisclosed royalty on sales and a number of fixed sum payments on the achievement of certain sales milestones in the Japanese market. All other key markets for CS-8958 in the world, including the US, remain available for licensing by the partners.

Biota and Daiichi Sankyo will share commercial returns from licensing outside Japan. In 2003, Biota and Daiichi Sankyo merged their respective LANI programs and Daiichi Sankyo retained the option to manufacture and market CS-8958 in Japan in return for funding the Japanese trials.

In a separated development, patient enrolment for the key Phase III studies with CS-8958 in Asia is completed with results expected to be released mid year. The results from the earlier Phase II trial, reported on 31 July 2008, concluded that 'inhaled CS-8958 administered once only was statistically indistinguishable from 75mg of oseltamivir administered twice daily for five consecutive days.'

► [More information: www.biota.com.au/](http://www.biota.com.au/)

## Money bath

**Biota Holdings Limited** was notified by **GlaxoSmithKline** (GSK) that for the three months ended 31 March 2009 indicated royalty payments of

\$32.3 million from Relenza sales totalled \$462 million. Indicative royalties for the nine months to 31 March 2009 total \$36.1 million. Biota *Peter Cook* attributed the performance to recent significant orders for pandemic stockpiling from the UK and Japanese Governments.

► [More information: www.Biota.com](http://www.Biota.com)

## Fast spreading

The **American Museum of Natural History** (AMNH) has chosen Geneious software created by NZ-based **Biomatters Limited** to support research at the **Sackler Institute for Comparative Genomics** (SICG).

According to SICG manager *Matthew S. Leslie*, Geneious will support ongoing research into the tree of life, comparative genomics in biodiversity conservation, and innovative approaches to issues in human health and disease. The SICG will employ Geneious to streamline their need to perform sequence visualization, assembly, primer design and BLAST searching.

As part of the agreement with the AMNH, Biomatters has also agreed to donate several Geneious software licenses to **Diponegoro University** in Indonesia and the **International Centre of Insect Physiology** and the **University of the Philippines Marine Science Institute**. Since its launch in 2006, Geneious has been purchased by over 600 universities and research facilities worldwide.

► [More information: www.nzbio.org.nz/files/](http://www.nzbio.org.nz/files/)

## Bladder news

New Zealand company **Pacific Edge Biotechnology Limited** has recently been awarded a patent in Singapore for its bladder cancer diagnostic technology. The non-invasive test can be used with small volumes of urine and could provide a quick and accurate measure of the presence of cancer. It may further be useful for monitoring treated patients for recurrence. The company anticipates the issue of the patent in other targeted countries to follow over the next 12 to 24 months.

Bladder cancer, with globally 365,000 new cases annually and 47,000 deaths, one of the most common cancers. It also has the highest total medical costs of any cancer driven in part by the very high recurrence of 60-80%, of which approximately 15% recur as later stage tumours. Pacific Edge expects to offer this test to Australasian urologists through its Dunedin based laboratory following completion of its clinical trials later this year. Clinical trials are currently being conducted in New Zealand, Australia and Russia with the recruitment of up to 1000 patients.

► [More information: www.nzbio.org.nz/files/](http://www.nzbio.org.nz/files/)

## Breathing easy

According to **Avita Medical Limited**, revenue for the 2009 year to date from its respiratory products, including the Breath-A-Tech and Funhaler spacers, is \$1.829 million, up 72% on the same period last year (\$1.061 million).

In February 2009, the company announced a major revision of its spacer manufacturing process including the relocation of manufacturing to a new GMP facility in Malaysia. All tool qualification, validation processes and first production run have been completed, the company states, and an initial production lot of Breath-A-Tech spacers has been shipped approximately 1 week ahead of schedule. The new processes are estimated to have reduced production costs by more than 30%.

► [More information: www.avitamedical.com](http://www.avitamedical.com)

## WA environment report

Western Australia's **Environmental Protection Authority** (EPA) has recommended a series of reforms to improve the State's Environmental Impact Assessment (EIA) process. EIA is a predictive tool systematically applied to assess, at the early stages of development, a proposal's environmental acceptability and whether conditions should be applied to control potential risks and impacts.

According to chairman **Dr Paul Vogel**, EPA initiated a review of its processes last year and developed a set of recommendations to deliver better environmental protection and to improve the efficiency, transparency and consistency of the EIA process and policies, while enabling environmentally sustainable development. These include:

- a new risk-based approach to EIA focussing on environmental risks and impacts that matter, and deliver greater consistency and certainty in decision-making;
- approvals focussing on environmental outcomes rather than project design details, with conditions that are clear, relevant, reasonable and auditable;
- timelines for key steps in the EIA process, with transparent reporting against the timelines, analysis of any delays, and recommendations for improvement;
- increased parallel processing with other assessment and approval processes;
- increased use of strategic environmental assessment to deliver better environmental outcomes and expedited assessment for subsequent development proposals;
- improved project management with clear accountability, project tracking; and
- shared government - industry environmental data system to allow more informed project planning by industry, better decision-making by government and reduced duplication of effort and expenditure across the board.

WA Environment Minister **Donna Faragher** has announced the appointment of a taskforce chaired by Dr Vogel, to develop a state-of-the-art environmental data system for WA, using a co-investment government-industry-community partnership model for collecting, reporting and accessing environmental data.

She will also establish an Environmental Stakeholder Advisory Committee comprising representatives from conservation and industry groups to consider the outcomes of the EIA Review and the current native vegetation clearing review (the 'Middle Review') when completed and to provide advice on future legislative reform within the environment portfolio.

► **More information:** (EPA) **Charlie Maling**, 08 6467 5415, 0400 866 450, [www.epa.wa.gov.au](http://www.epa.wa.gov.au); WA Minister, 08 9213 7250

## Tassie opportunities

Tasmania's Premier **David Bartlett** has announced Climate Change and Veteran Affairs as new policy priority areas for the **Tasmanian Government**, and expressed the commitment to ensure that Tasmania also capitalises on the opportunities climate change represents, through its strong renewable energy base.

In a separate development, Premier Bartlett has launched *Connected*

*Tasmania – A 21st Century Digital Research Agenda*, one of a series of forums conducted by the **Tasmania Electronic Commerce Centre** (TECC) which will highlight the importance of Tasmania being selected to commence the rollout of the National Broadband Network. Premier Bartlett says the State will be the showcase for the rest of Australia and leap frog the rest of the world in terms of coverage, adding that State Government and the **University of Tasmania** jointly support the TECC, "because we want to invest in the cutting edge research that gets businesses excited about coming to Tasmania."

In a consortia with industry and State Government, TECC has previously been involved in the first major 'brownfields' FTTP optic fibre ultra broadband trial, TasCOLT, which provided also the template for the State's National Broadband Network (NBN) bid. TECC chief executive officer, **Mr John McCann** says that TasCOLT demonstrated that Tasmania is well set up to conduct the NBN trials and is currently developing research sector interest, designing trials and demonstration projects for households, enterprises and communities for new devices, services and applications that can now be delivered on ultra fast optic fibre and wireless infrastructure. In March, the TasColt project had received the **Australian Telecommunications User Group Award**.

► **More information:** (Premier Bartlett) 03 6233 6573; (TECC) **John McCann**, 0419 322 551, [mccann@tecc.com.au](mailto:mccann@tecc.com.au)

## Healthy soils

The **Victorian Government** will invest \$5 million over five years in the *Measuring and Modelling the Impacts of Farming Systems and Climate on Soil Health Project*, which is to study soil health in Victoria.

According to Minister for Agriculture **Joe Helper**, the project is critical for the future design of farming systems that will protect and improve Victoria's soil resources. The research will be conducted on a range of soil types from across

the state and will look at how improved soil health can assist farmers in becoming more productive. The project builds on comprehensive research conducted by **Department of Primary Industries'** (DPI) scientists on soil-plant-climate interactions, says Mr Helper adding that it will also support the organisation and delivery of data as well as information and knowledge for modelling and measuring the health of our soils.

► **More information:** [www.premier.vic.gov.au/minister-for-agriculture](http://www.premier.vic.gov.au/minister-for-agriculture)

## Debatable Vic regulations

As the CO<sub>2</sub>CRC carbon storage trial near Nirranda reached its half way mark of 50,000 tonne CO<sub>2</sub> injected underground, Victoria's Minister for Energy and Resources **Peter Batchelor** launched a new carbon capture and storage (CCS) regulations discussion paper. It follows the Victorian

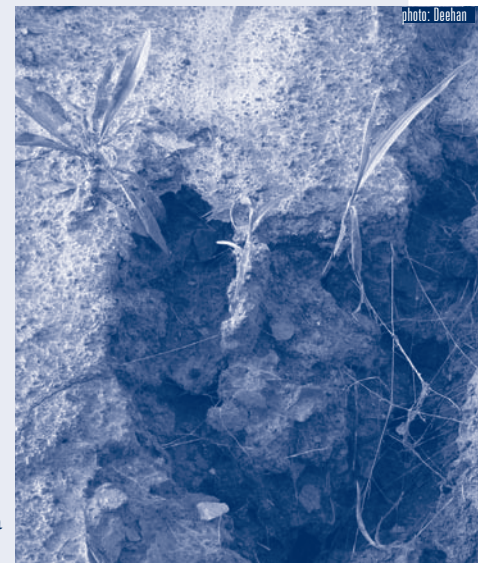


photo: Deehan

Greenhouse Gas Geological Sequestration Act 2008 – the first stand-alone legislation in Australia for CCS. “Work is now being undertaken to prepare the guidelines and regulations to support the Act. The discussion paper provides an overview of where regulations might be required and we are now seeking public and industry input,” says Mr Batchelor.

Submissions are open until 20 May 2009. The draft regulations will be released later this year for further public comment before the regulations and guidelines are finalised for the introduction of the Act no later than 01 January 2010.

Mr Batchelor also launched an issues paper for public comment on the proposed review of the regulatory framework for Victoria’s minerals industry. The closing date for submissions is 26 June 2009.

► **More information:** [www.premier.vic.gov.au/minister-for-energy-resources/](http://www.premier.vic.gov.au/minister-for-energy-resources/); [www.dpi.vic.gov.au/MRSDareview](http://www.dpi.vic.gov.au/MRSDareview)

## Gold fever 3D

The Victorian Government has launched the Bendigo Zone model which, developed by GeoScience Victoria, is the first completed component of a whole-of-Victoria 3-dimensional geological model under the \$2.5 million Rediscover Victoria 3D initiative. The Bendigo Zone covers an area of 30,000 square kilometres which, according to data from Geoscience Victoria, could harbor more than 1000 tonnes of undiscovered gold deposits.

The 3-dimensional model, which delved 35 kilometres below the earth’s surface, is based on 150 years of geological mapping and recently acquired geophysical data, including gravity, magnetic and seismic data, says Victoria’s Minister for Energy and Resources, **Peter Batchelor**. Using the model, faults and different layers of rock can be visualised and the location of undiscovered deposits such as minerals, gold and other base metals, more accurately predicted. This could reduce exploration time, costs and risk, Mr Batchelor says. He adds that the model also reveals how heat flows through layers of rock, which could assist geothermal explorations.

Western Victoria, which includes the Ararat and Stawell goldfields and promising copper prospects, is the next region to be developed under the Rediscover Victoria 3D project, which is set to become Australia’s most comprehensive onshore and offshore 3-dimensional geological model.

► **More information:** [www.premier.vic.gov.au/minister-for-energy-resources/](http://www.premier.vic.gov.au/minister-for-energy-resources/)

## Farming buddies

A new partnership between the Queensland Department of Primary Industries and Fisheries and the University of Queensland (UQ) aims to expand the scope and improve the quality of research conducted for the agricultural sector. The alliance will incorporate the Centre for Nutrition and Food Sciences already established at UQ along with advanced interdisciplinary plant and animal research that will be negotiated as part of the formal partnership.

Minister for Primary Industries, Fisheries, Rural and Regional Queensland **Tim Mulherin** says the alliance will remove critical production constraints from the \$3.3 billion beef export trade by responding to climate change and decreasing food safety risks

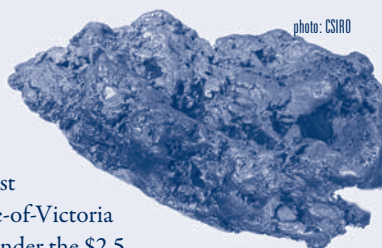


photo: CSIRO

A nugget from Victorian goldfields

to protect human health. It will also provide a sharper focus for research in advanced plant science to assist the future development and international competitiveness of Queensland’s field crop and horticulture industries, he says. Mr Mulherin further adds that the partnership will complement already existing collaborations with UQ, such as the creation of the Centre for Advanced Animal Science at Gatton and the Crop Development Facility at Redlands.

► **More information:** [Matt.Watson 3239 3120](mailto:Matt.Watson@32393120)

## Marketable Vic ideas

Victoria is investing \$1.6 million into regional innovation as part of the Government’s *VicStart Regional Technology Commercialisation Program*. The program is part of the new \$40 million *Boosting Highly Innovative SMEs* initiative (BHIS) announced in the Government’s \$300 million Innovation Statement.

“The \$1.6 million funding will be used to support innovative regional companies get their products from the idea stage through to the marketplace,” says Innovation Minister **Gavin Jennings**.

► **More information:** [www.premier.vic.gov.au/minister-for-innovation/](http://www.premier.vic.gov.au/minister-for-innovation/)

## GM canola

Western Australia’s Agriculture and Food Minister **Terry Redman** has released details of the locations of the 20 genetically modified canola trials in Western Australia. The locations comprise 17 farmer trials and three research trials, covering 854 hectares across the State. The sites vary in size from 30 to 70 hectares.

“One of the research trials will look at issues of glyphosate on wild radish and demonstrate the differences in weed management with the different herbicide technologies that might be available to farmers. The two other research sites at Geraldton and Esperance will demonstrate the Roundup Ready technology in different conditions and comparing the different herbicide tolerant systems available (such as RR, TT, Clearfield),” Mr Redman says.

► **More information:** [www.agric.wa.gov.au](http://www.agric.wa.gov.au), [gmcrops@agric.wa.com.au](mailto:gmcrops@agric.wa.com.au)



Some food for thoughts: according to Greenpeace glufosinate resistant GM Canola gone wild in Japan.

image: Lindsay Keenan/Greenpeace

## Fulbright fever

The South Australian Government will invest \$150,000 to establish the first *Fulbright South Australia Scholarship*, with support from Flinders University, the University of Adelaide, and the University of South Australia, industry and individuals. The scholarship is valued at \$50,000 and will allow a postgraduate or postdoctoral student to research or study for one year in the US.

► **More information:** [commsmanager@fulbright.com.au](mailto:commsmanager@fulbright.com.au), 02 6260 4460

## Weather man

Atmospheric scientist **Dr Greg Ayers** has been appointed the new director of the Bureau of Meteorology. Dr Ayers joined the CSIRO in 1975 and has held roles including chief of atmospheric research. Since 2005 he has been chief of CSIRO's Marine and Atmospheric Research.



*Greg Ayers*

## On the pulse

**Dr Shashi Sharma**, adjunct professor in the School of Biological Sciences and Biotechnology, Murdoch University, has received a Gold Medal at the International Conference on Grain Legumes, organised by the Indian Society of Pulses Research and Development in India. Professor Sharma is a nematologist and the award recognises his significant international contributions to pulses research and development.



*Shashi Sharma*

## ARC bio-exec

The Australian Research Council has appointed **Dr Liz Jazwinska** as executive director for



*Liz Jazwinska*

biological sciences and biotechnology. She has held various appointments at the ARC including member and chair of the College of Experts in Biological Sciences and Biotechnology, member of the Federation Fellowships committee and member of the ARC advisory board. Dr Jazwinska has

over 24 years' experience in biological sciences and biotechnology in both academia and industry.

## Secure achiever

Curtin University of Technology internet security expert **Dr Helen Armstrong** has won the WA Achiever Award for her contribution to IT in Western Australia. She was instrumental in establishing the first Cisco Academy for the Vision Impaired in the world, working with the Association for the Blind WA, Cisco Systems Inc. and the Department of Employment and Workplace Relations.



*Helen Armstrong*

## Reef appointment

Daniel Gschwind has been appointed to the Great Barrier Reef Marine Park Authority. Currently the chief executive officer of the Queensland Tourism Industry Council, Mr Gschwind is involved in a number of Great Barrier Reef-related board and

committees including the Reef and Rainforest Research Centre and the Queensland Environment Minister's Tourism Forum.

## Oxidising fame

The US-based professional organisation NACE International has awarded DSTO corrosion expert **Dr Bruce Hinton** the 2009 Frank Newman Speller Award for his 'sustained and insightful application of science and engineering to the solution and prevention of corrosion on Australian Defence Force aircraft'. Conducted over a 40-year period, his research into corrosion problems, including atmospheric corrosion, corrosion sensors and corrosion inhibition, has increased aircraft availability for operational use, and significantly reduced the time and money spent on aircraft maintenance.



*Bruce Hinton*

## Healthy educator

Bond University has appointed **Professor Richard Hays** as dean of the Faculty of Health Sciences and Medicine and as Pro Vice Chancellor (teaching and learning). Professor Hays is currently chair of medical



*Richard Hays*

education and head of the School of Medicine at Keele University in the UK. Previously he was the foundation head of school, the foundation chair of general practice and rural medicine, and the chair of medical education at the James Cook University Medical School.

## Regional appointment

**Professor Peter Lee** will take up the position of vice-chancellor at Southern Cross University in early September. Currently deputy vice-chancellor and vice-president (Academic) of the University of South Australia, Professor Lee will succeed vice-chancellor **Professor Paul Clark**, who is retiring in August. Prior to his current position at the University of South Australia, Professor Lee held executive roles at the Curtin University of Technology, Murdoch University and the University of Queensland. From 2004 to 2008 he was named in the top 100 most influential engineers by Engineers Australia and was the recipient of the Australian Government Centenary Medal in 2003.



*Peter Lee*

## Wetlands expert

James Cook University's **George Lukacs** has been appointed to the expert panel of the international wetlands organisation Ramsar for a four-year term. For the past 15 years, Mr Lukacs has worked with the Australian Centre for Tropical Freshwater Research.

His research interests include wetland ecology, irrigation and natural resource management.

## Dammed effort

University of New South Wales graduate engineer **Alexandra Bennett**, now working at Hyder Consulting, won the 2009 Australian Water Association National Undergraduate Water Prize for her thesis project, *Fill in the Dams*. The project looked at converting small dams in inland Australia to groundwater dams by filling them with coarse material such as sand or gravel. Such groundwater dams, where the water is held in the gravel or sand, dramatically reduce the evaporation losses compared with conventional dams.



*Alexandra Bennett*

## Healthy connection

Healthcare, business and ICT consultant **Dr Phil Gurney** is the new chief executive officer of the Australian e-Health Research Centre

(AEHRC), a joint venture between CSIRO and the Queensland Government. Previously a senior executive at Leica Biosystems in Melbourne, where he focused on strategic development to build market opportunities in tissue pathology, he also co-founded Virtual Photonics Pty Ltd (now called VPIsystems Inc),



*Phil Gurney*

a network planning software company. Dr Gurney replaces founding chief executive officer **Gary Morgan**, who has been appointed deputy director (Operations) for CSIRO's ICT Centre.

## Northern light

**Simone Liddy**, from Charles Darwin University, has taken top honours in the Power and Water Science and Engineering category of the Northern Territory Young Achievers Awards. She was also the overall Young Achiever of the Year for the Northern Territory. Simone last year completed her Bachelor in Pharmaceutical Studies becoming the first Indigenous student to graduate from the course.

## Food fellow

**Garry Menz**, a PhD student at the University of Ballarat, has been awarded the Veneto Victoria Research Fellowship in Food Science to further his research into brewing and fermentation. He has isolated a number of lactic acid bacteria from Victorian micro-breweries and is investigating their potential for spoiling beer. Mr Menz will work at Veneto Agricoltura in the town of Thiene, as well as at the University of Padua. Both have extensive experience in the identification of lactic acid bacteria. By using DNA-fingerprinting he will identify the bacteria, screen them for hop-resistance genes and study the effects of some of the inherent antibacterial properties of beer on them.

## Era-tic alliance

Welcomed by Minister for Innovation, Industry, Science and Research **Senator Kim Carr** as a new era of cooperation, the **University of Western Australia** and the **Australian Institute of Marine Science (AIMS)** have signed a Memorandum of Understanding to invest more than \$2million over five years in a joint research fund to support research fellows and PhD students working on marine science issues.

Senator Carr says the increased effort in marine science is essential to address climate change and also explore opportunities for marine industries off the West Australian coast.

► **More information:** Ms Janine MacDonald, 08 6488 5563

## Water to wine?

The world's first coal-to-liquids demonstration plant to use Underground Coal Gasification (UCG) technology has been launched. **Linc Energy's** demonstration plant near Chinchilla in Queensland is producing clean synthetic diesel and jet fuel from gas sourced from deep underground coal reserves.

According to the Minister for Resources and Energy, **Martin Ferguson**, a domestic synthetic fuels industry could reduce the growing trade deficit in petroleum products, which last year was \$15 billion.

The technology increases Australia's energy security, he says, while producing fuels containing almost zero sulphur and no aromatics, with a carbon footprint comparable to conventional fuels.

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

## Hot drilling helpers

**MNGI Pty Ltd** and **Panax Geothermal Ltd** will both receive matching grants of \$7 million, subject to offer negotiations, under the first round of the **Australian Government's Geothermal Drilling** program to commence in June 2009.

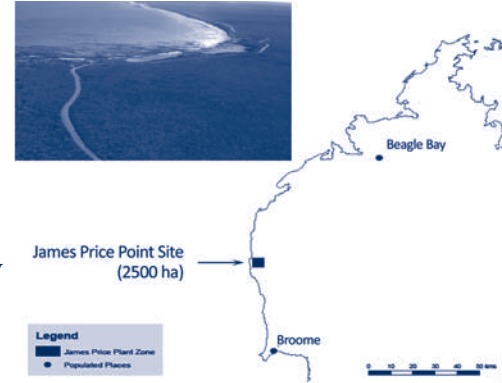
Adelaide-based **Petratherm Ltd** subsidiary MNGI is receiving the grant for the Paralana Geothermal Project, a joint venture between Petratherm (69%), **Beach Petroleum** (21%) and **TRUenergy** (10%). The project is testing in the Adelaide Fold Belt at Paralana an engineered geothermal system (EGS) which applies a 'Heat Exchanger Within Insulator' (HEWI) model. The technology could reduce drilling costs and risks associated with the current practice of developing heat exchangers within the heat producing, relatively impermeable granite. The HEWI model aims to instead establish the heat exchanger within an overlying insulating sediment at 3-4 km depth, which at Paralana is >200 °C, naturally permeable and porous.

Panax Geothermal's Limestone Coast Geothermal Project in South Australia aims to deliver the first conventional geothermal energy development based on a deep and insulated sedimentary basin heated by conduction from underlying hot basement rocks. The project, carried out by Panax subsidiary **Scopenergy Pty Ltd** was developed by targeting 'blind' geothermal resources in sandstone units in an area of high heat flow in the Otway Basin. Success will prove the concept for the Limestone Coast where a resource potential of around 1500 MW has been inferred. The project concept is that commercially viable geothermal reservoirs can be utilised in deep sedimentary basins buried under a thick layer of sedimentary rocks with low thermal conductivity.

► **More information:** Tracey Winters, 0439 991 730; [www.ret.gov.au](http://www.ret.gov.au); [www.petratherm.com.au](http://www.petratherm.com.au); [www.panaxgeothermal.com.au](http://www.panaxgeothermal.com.au)

## Happy faces

A landmark agreement has been reached between the **Kimberley Land Council (KLC)**, **Woodside** and the **Western Australian Government**, to move forward with the **Kimberley Liquefied Natural Gas (LNG)** precinct at James Price Point. A related Heads of Agreement between

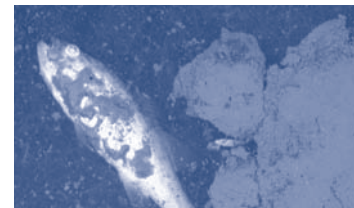


Woodside, the State of Western Australia and the KLC on behalf of Traditional Owners has been signed and executed, which outlines commitments for all the parties involved, and significant financial and other benefits for Indigenous people in the Kimberley. The agreement is, however, subject to a number of conditions. It will also require the development of a detailed Indigenous Land Use Agreement(s) which will enable the State of Western Australia to secure land for the precinct at James Price Point. Respective negotiations will commence later in 2009.

► **More information:** WA government; 9222 9475; Australian Government, [www.ret.gov.au](http://www.ret.gov.au); Woodside, [www.woodside.com.au](http://www.woodside.com.au)

## Blue-green advice

A high-level **Blue-green Algae Advisory Panel** has been established to advise on the ongoing response to the blue-green algae outbreak currently affecting the River Murray.



According to **Senator Penny Wong**, Minister for Climate Change and Water, the panel will provide expert advice on any further measures required to contain the outbreak and manage the risks that it poses to public health. It will be chaired by **Murray-Darling Basin Authority** chief executive **Rob Freeman** and further include:

- **Dr David Cunliffe** (water quality/human health) – director of the Environmental Health Service with the **South Australia Department of Human Services**;
- **Dr Terry Hillman** (water quality/river health) – former director of the **Murray-Darling Freshwater Research Centre** who is a member of the Independent Sustainable Rivers Audit Group for the **Murray-Darling Basin Ministerial Council**, and an adjunct professor at **La Trobe University**; and
- **Dr Chris Bourke** (animal health/toxicology) – a veterinary toxicologist who recently retired from a position as principal research scientist with the **NSW Department of Primary Industries**.

► **More information:** [www.environment.gov.au/minister/wong/2009](http://www.environment.gov.au/minister/wong/2009)

## Drill, baby, drill

The 13 new offshore petroleum exploration permits in Commonwealth waters, awarded under the first round of the **2008 Acreage Release**, are estimated to generate \$155 million of offshore exploration investment.

The permits are located in waters off Western Australia and the Territory of the Ashmore and Cartier Islands and include:

- Five permits in the Bonaparte Basin, Territory of Ashmore and Cartier Islands to **Bengal Energy Ltd**, **Silver Wave Energy Pte Ltd** and **Tata Petrodyne Ltd**;

- One permit in the Browse Basin, Territory of Ashmore and Cartier Islands to **Woodside Energy Ltd** (Operator) and **Mitsui E&P Australia Pty Ltd**;
- Three permits in the Browse Basin, off Western Australia to **Hunt Oil Company** (Operator) and **SK Energy Co., Ltd** and **Woodside Energy Ltd** (Operator) and **Mitsui E&P Australia Pty Ltd**; and
- Four permits in the Carnarvon Basin, off Western Australia to **Apache Northwest Pty Ltd** (Operator) and **Kufpec Australia Pty Ltd**, **Apache Northwest Pty Ltd**, and **Woodside Energy Ltd** (Operator) and **Mitsui E&P Australia Pty Ltd**.

The new permits are awarded for initially six years, and may be renewed twice for periods of five years. They will be jointly administered by the Australian Government and the respective State and Territory Governments.

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

## Deep flow

Six new projects to improve groundwater management across Australia will receive \$8.4 million through the **National Water Commission's** \$82 million National Groundwater Action Plan. Minister for Climate Change and Water **Senator Penny Wong** says groundwater accounting for more than 30% of our total water consumption has received far less attention and interest than surface water. Funded projects include:

- \$2.46 million for a study of groundwater-dependent ecosystems in WA's mid-west region, where vulnerable wetlands are under development pressure from mining, horticultural and urban activities.
- \$2.4 million for a project to assess sustainable groundwater yields in Victoria as the basis for capping groundwater use under the new Murray-Darlin Basin Plan.
- \$1.12 million to assess major spring systems flowing from Northern Territory's (NT) Ooloo-Dolostone aquifer to the Daly River.
- \$825,000 for a comprehensive stocktake of NT groundwater resources.
- \$960,000 for research into how changes in the New South Wales groundwater quality in coastal aquifers can affect estuarine and marine ecosystems.
- \$637,000 to help develop a sustainable groundwater management framework in Tasmania, consistent with the National Water Initiative.

► **More information:** [www.nwc.gov.au](http://www.nwc.gov.au)

## Rural leader

The **National Institute for Rural and Regional Australia** (NIRRA) has officially opened at the **Australian National University** to promote rural and regional research, teaching and the academic contribution to policy and issues. For the first time, researchers from across Australia and a range of discipline areas working on rural and regional issues will be linked to other researchers and government and industry contacts via a national network that will facilitate the sharing of information and ideas.

There is a need for leadership in rural and regional Australia that crosses institutional and disciplinary boundaries, says NIRRA director **Dr Linda Botterill**.

The NIRRA activities will include an online network, a network of contacts with governments, other universities and peak industry bodies, lecture and seminar series, visiting fellowship programs and graduate education.

► **More information:** Linda Botterill, 02 6125 7664, 0419 514 578

## Calculated seed

The **Southern Tree Breeding Association** (STBA) and **PlantPlan Genetics Pty Ltd** have developed a new specialist software program, SEEDPLAN®, which provides orchard managers, growers and nurseries with a tool to better match specific seed lots with suitable growing environments and production systems. SEEDPLAN® integrates the bio-economic characteristics of seeds such as type of product, productivity levels, haulage distance, site location, prices, rotation lengths and



harvesting costs, and then calculates these factors using industry data, as well as genetic differences, to determine economic gain.

In a pilot study in Blue Gum for WA Plantation Resources (WAPRES) the use of SEEDPLAN® added, on average, a further \$250 net present value (NPV) per hectare in harvested product. Ultimately, the program is expected to deliver additional value of up to \$10 million per annum, based on an annual harvesting of 20,000 hectares.

Further studies are currently underway for Pine and other species where the gains are expected to be larger as the products are more diverse.

Following the conclusion of the study, STBA plans to further develop the system and integrate SEEDPLAN® with the national breeding and deployment programs for plantation forestry.

► **More information:** Report for project PN07.4025, [www.fwpa.com.au](http://www.fwpa.com.au)

## Burdened sector

A new report by the **Productivity Commission** says removing unnecessary regulatory burdens on the upstream petroleum sector, with some individual projects requiring investment of tens of billions of dollars, could provide gains to the community amounting to billions of dollars each year. These would come through reducing delays which increase project costs, reduce flexibility in responding to market conditions, impede the financing of projects, and defer production and revenues.

The *Review of Regulatory Burden on the Upstream Petroleum (Oil and Gas) Sector* found that current regulatory requirements in Australia's regulatory framework for oil and gas projects are overly complex, often overlapping and duplicative, and that collectively they impose significant unnecessary burdens. Commissioner **Philip Weickhardt** observed that the time it takes to approve major projects should be cut by half, but this would require the elimination of current duplicative processes between the **Australian and State and Territory Governments**.

This would require a suite of reforms, he says.

The commission recommends a national offshore petroleum regulator to which States and Territories could 'opt-in' and transfer their responsibilities for State and Territory waters and for pipelines. Existing arrangements could be streamlined through greater use of statutory timelines and improved reporting of performance to improve transparency and accountability, and also by introducing a lead agency within the States and the Northern Territory for petroleum approval processes.

► **More information:** Lisa Gropp, 03 9653 2392

## Ether senses

The **World Wide Web Consortium** (W3C), an international body responsible for developing global web standards, has set up a **Semantic Sensor Network Incubator Group** to develop standards for sharing information collected by sensors and sensor networks over the Internet.

Co-chaired by **Dr Kerry Taylor** and **Amit Parashar** of **CSIRO's ICT Centre**, the incubator group will set up an ontology for different types of sensing devices, and a new standard to enable sensors to interact using the Web, in the W3C's XML format.

"Together, they will smooth the way for large scale interoperation of sensors and sensor networks—an important step in enabling a world wide web of environmental sensors," says Dr Taylor.

CSIRO's research into sensors and sensor networks aims to increase the quality, and reduce the cost, of capturing environmental data. It addresses the growing demand for information about the environmental systems that support Australia's agricultural, resource and process-based industries.

► [More information: www.csiro.au/news/MediaCentre.html](http://www.csiro.au/news/MediaCentre.html)

## Let's talk 400 MHz

The **Australian Communications and Media Authority** (ACMA) has announced a number of proposals for future spectrum arrangements in the 400MHz band, including a harmonised band for government use and measures to allow more efficient use of this spectrum. The two initiatives are outlined in ACMA's discussion paper *Spectrum Proposals: 403-520 MHz – Proposals for future arrangements in the 400 MHz band*. The exclusive government use of the sub-band 403-430 MHz may significantly advance interoperability, according to ACMA chairman **Chris Chapman**.

The review of the band has a number of drivers, including the current congestion in the band in major capital cities, creating shortages of land mobile licences, and the growing need to support more efficient technologies.

► [More information: www.acma.gov.au](http://www.acma.gov.au)

## Attractive mobility

Figures released by the **Australian Bureau of Statistics** (ABS) show wireless broadband subscriptions tripled in 2008, accounting for 21% (or 1,462,000) of all broadband subscriptions, up from 481,000 in December 2007. Australia had almost eight million internet subscribers at December 2008. Of these, 84% chose broadband connections, with around 50% (four million) opting for faster connections (1.5 megabits per second or greater), an increase of 15% from December 2007.

► [More information: www.ABS.gov.au](http://www.ABS.gov.au)

## Quantum sell

**University of Melbourne** researchers at **Quantum Communications Victoria** (QCV) have sold the world's first Single Photon Source, which is based on quantum technology, to a German Government-based Standards Agency. Single Photon Sources are the key to advances in Quantum Communications which will provide unprecedented Ultra-high Security for information transfer. The German organisation will use the device to

test standards of optical and electronic equipment.

However, the Single Photon Technology has the potential to be used for various quantum-based applications, including as a component in secure telecommunications systems. **Dr Steve Trpkovski**, director of product development at QCV, believes that this will be invaluable in countering cyber-terrorism and corporate espionage by enabling secure communication via optical fibre or satellite.

► [More information: uninews.unimelb.edu.au/mediareleases.php](http://uninews.unimelb.edu.au/mediareleases.php)

## Slow sparkles green

Astonishing, light can be slowed down – indeed to the speed of a swiftly moving bicycle ( $17 \text{ m s}^{-1}$ ).

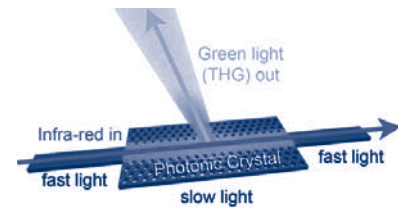
Slow light provides stronger light-matter interactions and better control over the spectral bandwidth.

With it the development of sophisticated all-optical information

processing that can slow, store, switch and time-delay optical data bits is feasible, setting the scene for optical telecommunication networks without the need to convert optical data into the electronic domain.

One way of slowing light is passing it through photonic crystal waveguides. Researchers at the **University of Sydney** have now discovered that when passing infrared laser light through the crystal, green light – which is of higher energy – is emitted, in a process called third harmonic generation. The effect, published in the journal *Nature Photonics*\*, has opened up a whole new field of possibilities for communications devices, including exponentially shrinking the hardware needed to guarantee high quality internet connection. Study author **Dr Christelle Monat** says that, used in small green light indicators, it could also help users of numerous internet applications, such as informing companies of a problem in the clarity of their connections, which then can be fixed "in real-time, all without the end-user even noticing."

► [More information: www.usyd.edu.au/news/](http://www.usyd.edu.au/news/); Special issue of *Nature Photonics* on slow light, *Nature Photonics* 2, 447 (2008)



## Data deluge

The **Australian National Data Service** (ANDS) is a new \$20 million service established by **Monash University**, the **CSIRO** and the **Australian National University** offering a suite of services to assist researchers to identify, locate, access, analyse and share research data. ANDS Steering Committee chair **Dr Ron Sandland** says the service will encourage a culture of sharing and re-use of Australian research data.

"Through ANDS work that may once have been restricted to a small group of colleagues can be made available to peers from around the world," he says. According to executive director **Dr Ross Wilkinson**, in the next five years more research data will be produced than in all of previous human history. The challenge will be to manage and store this work. ANDS will assist institutions and research groups to better manage and realise the full potential of their research data assets, he says.

ANDS is funded by the **Australian Government's** National Collaborative Research Infrastructure Strategy (NCRIS).

► [More information: Ross Wilkinson, ross.wilkinson@ands.org.au](mailto:ross.wilkinson@ands.org.au)

# Delayed response - does it matter?

The **Australian Government** will delay an emissions trading scheme (ETS) until 1 July 2011. In a significant shift from its previous CPRS White Paper, it is setting a new upper limit of its carbon pollution reduction target to 25% below 2000 levels by 2020, subject to an international agreement on stabilising global levels of CO<sub>2</sub> equivalent at 450 parts per million or lower by mid century. In the absence of such agreement, the Government will retain its unconditional commitment to reduce carbon pollution by 5% by 2020. A 15% reduction by 2020 would be subject to major developing countries committing to substantially restrain emissions and advanced economies taking on commitments comparable to Australia.

A Ratification Review will be established in addition to the Joint Standing Committee on Treaties (JSCOT) Process to assess whether the terms of any global agreement meet the conditions set out for Australia to adopt the 25% target. Such a target could be met through a CPRS, the expanded Renewable Energy Target (RET), and investments in clean, renewable energy and energy efficiency and strategic investment in carbon capture and storage. In addition, up to 5% of a 25% target could result from purchasing international credits, such as avoided deforestation credits, using CPRS revenue no earlier than 2015. The new measures of the revised CPRS include:

- in the first year of introduction, 2011-12, permits will have a fixed price of \$10 per tonne, and then transition to full market trading;
- a new Global Recession Buffer will be provided as part of the assistance package for emissions intensive trade exposed industries;
- industries eligible for 60 per cent assistance will receive a 10% buffer, while industries eligible for 90% assistance will receive a 5% buffer; and
- eligible businesses will receive funding to undertake energy efficiency measures from 1 July 2009.

► **More information:** [www.pm.gov.au/media/Release/2009/media\\_release\\_0966.cfm](http://www.pm.gov.au/media/Release/2009/media_release_0966.cfm)

## Reactions:

**Professor Kevin Parton**, the Institute for Land, Water and the Environment, **Charles Sturt University**: "A number of comments could be made about the second component, a fixed price for an unlimited supply of permits for the first year of the scheme. First, it seems like a prudent introduction instead of moving directly to a free market. Second, however, \$10/t seems a low price relative to those prices expected by some commentators, and if so, would be another gain for business. Third though, as a means of gaining acceptance for the scheme, a fixed introductory price has much to commend it. At the start it will allow firms to simply concentrate on their quantity of greenhouse gas emissions, without having to estimate a price/quantity relationship. Then the experience of one year of operation of the scheme will allow firms to be more confident of the evolving price/quantity relationships, and be more able to effectively participate in an auction market for permits from the second year onwards."

**John Quiggin**, ARC Federation Fellow, **University of Queensland**. "The good news in this shift is that the government is now prepared to offer a 25% reduction in Australia's emissions, conditional on an international agreement being reached in Copenhagen. In this context, a one-year delay in the commencement of the scheme and a temporary cap on the price of emissions is a reasonable trade-off to secure broader support for the scheme."

**Dr Mark Diesendorf**, deputy director of the Institute of Environmental Studies, **University of New South Wales**.

"Since the existing ETS proposal would be unlikely to reduce Australia's emissions, a delay doesn't matter. Shortcomings of the ETS include:

- the tiny unconditional 5% target;
- the transfer of billions of dollars worth of free emission permits to the



image: Elwinmedia

biggest greenhouse polluters; the ability of other polluters to offset all of their emissions in overseas projects of questionable effectiveness and additionality; the fact that emission permits would be permanent property rights instead of temporary licences; the cap on the carbon price, which should be replaced by a floor (minimum) carbon price.

The important actions needed from the government are to speed up the implementation of so-called 'complementary' policies, including: the expanded Renewable Energy Target, without giving accreditation to solar hot water; grants to solar, wind and biomass from the Renewable Energy Fund and Energy Innovation Fund; feed-in tariffs for large solar thermal power stations; a ban on new conventional coal-fired power stations. The first two items were election promises that have already been delayed unnecessarily for 18 months. Meanwhile the ETS should be reformed or replaced with a national carbon tax."

**Dr Ben McNeil**, Climate Change Research Centre, **University of New South Wales**. "It is extremely important for the government to have a carefully thought out ETS scheme and meaningful carbon reduction target. Putting a 25% reduction target on the table gives the best chance for a good outcome in Copenhagen and will importantly also send a signal to drive low carbon investment in Australia towards 2020. We now just have to make sure that a 25% reduction target becomes reality, since it would be in Australia's long term economic and environmental best interests."

**Ian Lowe**, emeritus professor, **Griffith University** & president of the **Australian Conservation Foundation**. "On balance this is a welcome change. The 25% target is a significant step forward. It puts Australia in a leadership position along with the EU in relation to developed countries targets which will be crucial for a sound Copenhagen outcome."

► **More information:** [www.pm.gov.au](http://www.pm.gov.au); [www.aussmc.org](http://www.aussmc.org)

On the Radar keeps you informed of upcoming reports & funding opportunities. For details of jobs and conferences: [www.ARDR.com.au](http://www.ARDR.com.au)

## Events & Reports

**The Prime Minister's Science, Engineering and Innovation Council (PMSEIC) will meet on 5 June 2009**

**National Budget – Tuesday 12 May.**  
More information: [www.budget.gov.au/](http://www.budget.gov.au/). Budget information relating to the Innovation, Industry, Science and Research Portfolio will be available after 7.30pm at [www.innovation.gov.au/General/Corporate/Pages/Budget200910.aspx](http://www.innovation.gov.au/General/Corporate/Pages/Budget200910.aspx)

**National Innovation System Review. The Federal Government will consider the recommendations of the NIS Review and the Bradley Review of Higher Education and release a White Paper in the context of the 2009-10 budget.**  
More information: [www.innovation.gov.au/innovationreview/](http://www.innovation.gov.au/innovationreview/)

## Grants and programs

**Note: The Federal Government has introduced a new database called Grant Finder to help find research and industry grants.**  
More information: [www.business.gov.au/bep2005/grantfinder/grantfinderlist.aspx](http://www.business.gov.au/bep2005/grantfinder/grantfinderlist.aspx)

**The \$1.3 billion Green Car Innovation Fund is open for application. The funding will commence from 1 July 2009 but interested parties will be able to lodge applications at any time.**  
More information: Patrick Pantano, 0417 181 936

**2009/10 VESKI Innovation Fellowships to undertake Research in Melbourne are now open closing 5pm 22<sup>nd</sup> May.**  
More information: <http://www.veski.org.au/NewsView.aspx?id=134>

### NHMRC:

**Programs Grants - close July 09**

**Australia-EU Collaborative Research Grants - close May 09 and Dec 09**

**European Molecular Biology Laboratory (EMBL) - close Aug 09**

### NHMRC Building capacity:

Development Grants - close 30 June 09  
Australia Fellowship - close 10 July  
Postgrad Scholarships - close 31 July 09  
More information: [www.nhmrc.gov.au](http://www.nhmrc.gov.au)

### ARC:

**Linkage Infrastructure, Equip & Facilities – close 20 May 2009**

**Linkage Projects (Round 2; commencing July 2010) – close 18 Nov 2009**  
More information: [www.arc.gov.au/media/important\\_dates.htm](http://www.arc.gov.au/media/important_dates.htm)

### Clean Business Australia:

**Climate Ready (\$90 million over 4 years) Round 4 - closes 25 June 2009**

**Re-Tooling for Climate Change (\$75 million over 4 years) Round 3 - closes 1 June 09**

**Green Building Fund (\$90 million over 4 years) Round - closes 30 June 09. Round 2 closing date TBA.**  
More information: [www.ausindustry.gov.au](http://www.ausindustry.gov.au)

## Conferences

**Heart Foundation Conference**  
14 to 16 May 2009, Brisbane, QLD

**Generic Medicines Australia 2009**  
17 to 19 May 2009, Sydney, NSW

**Physicians Week 2009**  
17 to 20 May 2009, Sydney, NSW

**10th National Rural Health Conference**  
17 to 20 May 2009, Cairns, QLD

**Museums Australia National Conference 2009**  
17 to 19 May 2009, Newcastle, NSW

**Going Green Expo**  
19 to 21 May 2009, Brisbane, QLD

**Designbuild 2009**  
21 to 23 May 2009, Sydney, NSW

**RANZCP 2009 Congress: Living in Interesting Times**  
24 to 28 May 2009, Adelaide, SA

### Minerals Week 2009

25 to 28 May 2009, Canberra, ACT

**CRCA Conference 2009. Pathfinders: The Innovator's Conference**  
26 to 28 May 2009, Canberra, ACT

**Inaugural Go8 Directors' Conference**  
28 to 29 May 2009, Melbourne, VIC

**Dietetics & Nutrition: Exploring New Territory Conference**  
28 to 30 May 2009, Darwin, NT

**ICOMS Asset Management Conference**  
1 to 5 June 2009, Sydney, NSW

**Pipeline Integrity & Reliability Forum**  
2 to 3 June 2009, QLD, Australia

**2009 Alzheimer's Australia National Conference**  
2 to 5 June 2009, Adelaide, SA

**WasteQ Conference and Exhibition**  
3 to 5 June 2009, Brisbane, QLD

**CA Expo 2009**  
3 to 4 June 2009, Melbourne, VIC

**Power & Electricity World 2009**  
9 to 11 June 2009, Sydney, NSW

**Mining the Pilbara**  
10 to 11 June 2009, Karratha, WA

**Smart 2009 Conference**  
10 to 11 June 2009, Sydney, NSW

**Billing and SMART Metering Australia 2009**  
11 June 2009, Sydney, NSW

**Pharmacy Expo**  
12 to 14 June 2009, Sydney, NSW

**12th Case Management Society of Australia National Conference**  
18 to 19 June 2009, Melbourne, VIC

**Wildfire Management Conference 2009**  
18 to 20 June 2009, Sydney, NSW

**Fishers for Fish Habitat Forum**  
18 to 19 June 2009, Ballina, NSW, Australia

**Nanophotonics Down Under: Devices and Applications**  
21 to 24 June 2009, Melbourne, VIC

**5th World Congress of Pediatric Cardiology and Cardiac Surgery**  
22 to 26 June 2009, Cairns, QLD

**National Farmers Federation - National Congress**  
22 to 23 June 2009, Brisbane, QLD

**Innovation in Agriculture Awards**  
22 June 2009, Brisbane, QLD

**Industrial and Organisational Psychology Conference**  
25 to 28 June 2009, Sydney, NSW

**Disability Studies Conference**  
26 to 27 June 2009, Sydney, NSW

**4th Light Metals Technology Conference**  
28 Jun to 1 July 2009, Gold Coast, QLD

**Metaphysics of Science**  
3 to 5 July 2009, Melbourne, VIC

**CONASTA 58: The Conference of the Australian Science Teachers Association**  
4 to 7 July 2009, Launceston, TAS

**Innovation, Services and Smart Information Use symposium**  
4 July 2009, Melbourne, VIC

**AMEC2009: 9th Australian Mars Exploration Conference**  
5 to 6 July 2009, Adelaide, SA

**Youth ANZAAS 2009**  
5 to 10 July 2009, Melbourne, VIC

**AMSA2009: Marine Connectivity**  
5 to 9 July 2009, Adelaide, SA

**Australian Microbiology Meeting & Exhibition 2009**  
6 to 10 July 2009, Perth, WA

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## JOBS

### INSTITUTION

### CLOSING DATE

<a href="#">Executive Director - Institute for Marine and Antarctic Studies</a>	University of Tasmania   TAS	25 May
<a href="#">Deputy Director (Research)</a>	University of New South Wales   NSW	25 May
<a href="#">Research Fellow - School of Medicine, College of Health and Science</a>	University of Western Sydney   NSW	17 May
<a href="#">Lecturer/Senior Lecturer (Pharmacology)</a>	University of Sydney   NSW	31 May
<a href="#">Research Fellow - Molecular Microbial Ecology</a>	University of Tasmania   TAS	18 May
<a href="#">Associate Professor of Physiotherapy</a>	University of Canberra   ACT	29 May
<a href="#">Director, EMBL Australia - Australian Regenerative Medicine Institute</a>	Monash University   VIC	15 May
<a href="#">Senior Research Fellow - Department of Epidemiology and Preventive Medicine</a>	Monash University   VIC	22 May
<a href="#">Senior Research Scientist - Methane Mitigation</a>	CSIRO   QLD	30 May
<a href="#">Associate Professor/Professor in Natural Resource Economics</a>	University of Tasmania   TAS	15 June
<a href="#">Research Fellow, Biomedical Engineering</a>	RMIT University   VIC	20 May

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