

# R&D

REVIEW

## AUSTRALIAN

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ISSN 1320-8977  
MAY 2007

*Linking Australian Science,  
Technology and Business*

## Call to restore 'public good' science

By Jenifer North

The **Productivity Commission** has challenged the over-emphasis on short-term, commercially focused research in Australian science policy. Its *Public Support for Science and Innovation* report suggests restoring the balance back towards longer-term, 'public good' research, especially in Cooperative Research Centres (CRCs) and universities.

The Commission concluded that public support for science and innovation has, by and large, provided widespread and important benefits for Australians. Nevertheless, there is room for considerable improvement in key areas of the innovation system, including ineffective business programs, an excessive focus on the commercialisation stages of innovation, problems in scientific labour markets, inadequate evaluation methods and problematic funding models.

The Commission found that direct funding of **Australian Government** research agencies has been virtually static in real terms over the past 25 years, compared with relatively strong growth for other components of funding. This has meant that Australian Government support of government science has roughly halved as a share of GDP between 1981-82 and 2005-06. Part of the reason for this has been the growth of multisector funding (such as the CRC program), a component of which has been directed to Australian Government research agencies. Another contributing factor was the greater reliance on funding from sources outside the Australian Government, which may have substituted for direct government investment.

All other funding streams have increased over the long run, both in real terms and as a share of GDP. However, business funding has fallen as a share of GDP from its peak in the mid-1990s, with the alteration of elements of the R&D tax concession that were used as vehicles for gaining the maximum tax benefit, such as R&D syndication, feedstock and pilot plant provisions.

### Key findings

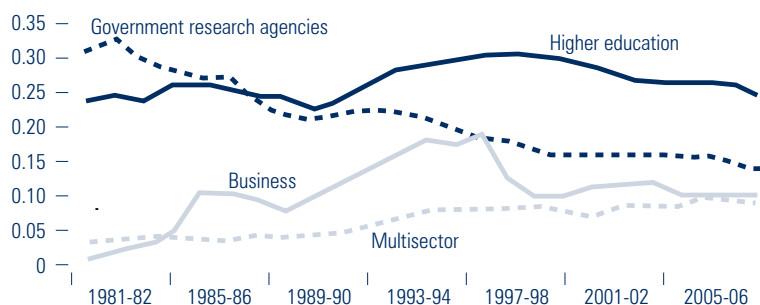
The Commission feels that the available evidence suggests the level of public support for science and innovation is neither notably inadequate nor excessive in terms of Australia's own

*Continued page 2*

### AUSTRALIAN GOVERNMENT SUPPORT FOR INNOVATION AND SCIENCE

By spending component, 1981-82 to 2005-06

Ratio to GDP (%)



### Who funds what type of research in the Australian research system?

Estimated shares (%) 2004-05

Type of research	Funding source					Total
	Aust. Govt	State & Local Govt	Business	Other	Overseas	
<b>Priorities of spending within each funding source</b>						
Pure basic research	20.4	9.7	1.8	10.2	8.6	9.4
Strategic basic	24.8	22.9	5.0	27.5	14.6	14.2
Applied research	42.1	53.7	31.6	45.8	36.5	37.2
Experimental	12.7	13.7	61.6	16.5	40.3	39.1
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

### Allocation of research type by funding source

Pure basic research	77.4	5.5	9.8	4.0	3.3	100
Strategic basic	62.5	8.6	18.1	7.1	3.7	100
Applied research	40.4	7.7	43.8	4.5	3.5	100
Experimental	11.6	1.9	81.3	1.5	3.7	100
<b>Total</b>	<b>35.8</b>	<b>5.3</b>	<b>51.6</b>	<b>3.7</b>	<b>3.6</b>	<b>100</b>

science and innovation aspirations and needs. But there are risks associated with the continuing diversion of public funding to applied science and innovation activity at the expense of basic and strategic science and innovation.

The need for government to fund research to discharge its own functions and the existence of benefits from innovative activity that cannot be captured by the innovator provide strong rationales for the provision of public funding support for science and innovation. But some commonly given reasons are not soundly based.

Taking account of multiple sources of evidence, there are likely to be substantial aggregate economic, social and environmental benefits from publicly supported science and innovation, but quantitative estimates are unreliable.

**CRCs** – The Commission recommends that the original objectives of the CRC program should be reinstated, namely, the translation of research outputs into economic, social and environmental benefits, rather than focusing public support on the commercialisation of industrial research alone. It also suggests that the share of public funding should be aligned to the level of induced social benefits provided by each CRC, reducing some of the large rates of subsidy to business collaborators.

A complement to the CRC program with broader collaboration goals should be introduced that supports smaller, shorter and more flexible arrangements between groups of companies, either independently or in conjunction with universities and public-sector research agencies. As a pilot for further evaluation, this should be achieved through an enhancement of the **ARC Linkage** program.

**CSIRO** – The real level of public-appropriation funding for CSIRO should not be reduced. Aspects of its approach to priority setting and performance management may have wider applicability to other parts of Australia's innovation system.

**UNIVERSITIES** – The policy framework for universities should be focused on maximising the social return from public investment in R&D through the transfer, diffusion and utilisation of knowledge and technology. The pursuit of financial returns from the sale or licensing of intellectual property, and the creation of university spin-off companies, while important pathways in their own right, should not be to the detriment of this overarching objective.

Reductions in block funding levels would further limit the flexibility and discretion of higher education institutions to make

meaningful strategic choices. Consequently, Australian Government block funding should not be reduced, either in absolute terms or in relation to Australian Government competitive funding.

**RURAL R&D CORPORATIONS** – There are strong grounds for substantial public co-funding of RRDCs that provide spillover benefits beyond industry members, where that research would not proceed in the absence of support. But the present substantial co-funding of some industry-centred RRDCs should be scaled back.

**RESEARCH QUALITY FRAMEWORK** – The costs of implementing the RQF may well exceed the benefits. The UK and New Zealand experiences suggest that the benefits of the scheme would have to be substantial to offset the high administrative and compliance costs. The Commission suggests several changes in operation of the scheme to help reduce costs, including setting minimal safety nets and imposing substantial penalties for achieving low quality and impact grades.

**IMPEDIMENTS** – Several key impediments to the functioning of the innovation system should be addressed: major publicly-funded research infrastructure should be priced to maximise efficient utilisation and to avoid congestion; there should be national consistency in the application of privacy regulation and in ethical review of multi-centre research; and published papers and data from ARC and **NHMRC**-funded projects should be made progressively, yet expeditiously, freely and publicly available.

**PERFORMANCE** – Performance evaluation and reporting arrangements should be reviewed against the following criteria:

- outputs and intended outcomes should be defined in relation to the rationales for public support and to the community benefits expected from that support;
- evaluation should be developed in a cost-benefit framework, balancing greater precision against administrative and compliance costs;
- where undertaken, selective case studies of impacts should be placed in a supplementary rather than central evaluation role;
- assessment should be undertaken with adequate frequency – this might vary between different types of measure;
- assessment should be as independent and transparent as reasonably possible; and
- feedback mechanisms should be implemented to ensure that performance evaluation findings are drawn on to enhance the future benefits of public support for science and innovation.

**BUSINESS SUPPORT** – The 175% premium R&D tax concession should be maintained for small and large companies but access to the 125% R&D tax concession should be restricted to small companies. The definition of R&D contained in section 73B of the *Income Tax Assessment Act 1936* should be reviewed and, if practicable, amended to focus on activity that is more likely to involve high levels of spillovers. That definition alone should be uniformly applied to meet all corporate reporting requirements to reduce the complexity associated with current arrangements.

There is robust evidence indicating that the Commercial Ready program supports too many projects that would have proceeded without public funding assistance. Governance arrangements relating to business programs need to change. Options include: shifting responsibility for commissioning program evaluations to an independent third party or

**R&D**  
REVIEW  
AUSTRALIAN

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R&D Review, GPO Box 5357, Melbourne Vic 3001  
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*Australian R&D Review* is published 11 times a year and is available only by subscription at a cost of \$250 a year + GST.

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establishing an inter-departmental working group to supervise such evaluations; and requiring full public disclosure of the results and recommendations and a timely response on the action to be taken.

## REACTIONS

Support for the report has come from organisations including CSIRO and the **Academy of Science**.

CSIRO deputy chief executive **Dr Ron Sandland** says: “We are delighted that the Commission recognises CSIRO has developed a ‘rigorous, flexible and robust priority-setting research framework’.” He adds that the report found that recent changes in CSIRO’s science investment processes have improved its research focus and provide a framework for ensuring that the organisation does not perform research that the private sector would otherwise undertake.

The Academy of Science agrees with the Commission’s finding that career structures for Australia’s early to mid-career researchers require urgent attention. The Academy also is concerned about the related issue of Australia permanently losing many valuable post-doctoral scientists overseas and has suggested a ‘Boomerang Scheme’ to tempt Australians back to the country before they became too settled overseas.

However, Queensland’s Chief Scientist, **Dr Peter Andrews**, says the report is “completely lacking in aspiration – we are what we are and forever will be.” He says that contrary to the Commission’s assertions, there is ample evidence that public investment in R&D can move Australia towards a knowledge-intensive economy. But again, contrary to the Commission’s assertions, this will clearly require a substantial increase in our stocks of scientists, entrepreneurs and venture capitalists.

Business is also not happy with the report. **Heather Ridout**, chief executive of the Australian Industry Group, says the Commission R&D tax-concession proposals risk reducing the level of support, amounting to a potential reduction in business R&D investment at a time when it has never been more important to lift the R&D effort.

“There are elements of the report we support ... the leading concern for business, however, is that the R&D tax concession proposal by the Commission will not lead to greater business R&D intensity in an environment where globally competitive industry requires a quantum leap in innovation effort,” she says. “What Australia needs is a single program, accessible to all businesses, that encourages more firms to undertake R&D and to substantially lift their effort over time, and that rewards improved performance. Global competition necessitates that innovation must be the path to enhanced competitiveness. The Commission’s model is not one that will achieve this goal.”

**Science Industry Australia (SIA)**, the peak body for scientific goods and services in Australia, wants to keep an emphasis on commercialisation of research. It says that irrespective of the amount of investment allocated between ‘public good’ and ‘commercial’ science, the return on investment in science and innovation can only be maximised if newly developed innovation and IP is commercialised quickly and efficiently.

“Arguments over the proper balance and emphasis between funding outcomes are largely spurious, because we are doing such a poor job of commercialising innovation arising from R&D investment in universities in the first place,” says **Duncan Jones**, executive director of the SIA. “Many of the proposals for commercialisation put to our Australian science industry firms have not had even the most basic of checks performed on them in order that their commercial viability may be properly assessed by industry.”

► **More information:** [www.pc.gov.au](http://www.pc.gov.au), [www.science.org.au](http://www.science.org.au), [www.aigroup.asn.au](http://www.aigroup.asn.au), [www.aussmc.org](http://www.aussmc.org)

# Climate of fear

The **United Nations Intergovernmental Panel on Climate Change Fourth Assessment Report** has reaffirmed expert predictions of extensive economic and environmental damage to Australia in the near future, including declines in food and forest production.

The chapter on Australia and New Zealand concludes that the climate of the 21st century is virtually certain to be warmer, with changes in extreme events. The coordinating lead author, **CSIRO’s Kevin Hennessy**, says: “Heat waves and fires are virtually certain to increase in intensity and frequency. Floods, landslides, droughts and storm surges are very likely to become more frequent and intense, and snow and frost are very likely to become less frequent.”

**Professor Terry Hughes**, of the **Australian Research Council Centre for Excellence for Coral Reef Studies**, says the Great Barrier Reef is one of the nation’s great assets most at risk under climate change. The two main threats facing the reef are rising sea temperatures, which cause mass coral die-offs due to bleaching, and the gradual acidifying of the oceans from CO<sub>2</sub> in the atmosphere, which prevents corals from forming their limestone skeletons.

The Australian contributors to the water chapter suggest research priorities for water should include further impact assessments and exploration of adaptation strategies for projected changes in drought and floods, and analysis of implications for water security within an integrated catchment framework. This includes the effects on long-term groundwater levels, water quality, environmental flows and future requirements for hydroelectricity generation, irrigation and urban supply.

**Professor Lesley Hughes** of **Macquarie University** says the most vulnerable regions include the alpine regions, wet tropics and Kakadu World Heritage Areas, coral reefs, coastal and freshwater wetlands and regions such as south-west Western Australia, where there are a large number of narrow-ranged endemic species. Most species will probably not be able to adapt genetically to the climate changes expected, because the climate is changing too rapidly.

Infrastructure and supply effects will be substantial. The report found:

- infrastructure design criteria for extreme events are very likely to be exceeded more frequently;
- increased damage is likely for buildings, transport structures, energy and water services, and telecommunications;
- increased demand for emergency services is likely;
- insurance costs are very likely to rise in areas with increased risk; and
- increases in peak energy demand due to increased air-conditioner use are likely to exceed those for base load, so more peak generating capacity is likely to be needed beyond that for underlying economic growth, and the risk of blackouts is likely to increase.

There will be a substantial effect on people’s health. For example, the number of heat-related deaths is likely to rise from 1115 a year at present in Adelaide, Melbourne, Perth, Sydney and Brisbane to 2300 to 2500 a year by 2020, and 4300 to 6300 a year by 2050, including demographic change.

## Key findings for Australia and New Zealand

As a result of reduced precipitation and increased evaporation, water-security problems are projected to intensify by 2030 in southern and eastern Australia and, in New Zealand, in Northland and some eastern

regions. Substantial loss of biodiversity is projected to occur by 2020 in some ecologically-rich sites including the Great Barrier Reef and Queensland wet tropics. Other sites at risk include Kakadu wetlands, south-west Australia, sub-Antarctic islands and the alpine areas of both countries.

Coastal development and population growth in areas such as Cairns and south-east Queensland and NZ's Northland to Bay of Plenty are projected to exacerbate the risks of rising sea levels and increases in the severity and frequency of storms and coastal flooding by 2050.

Production from agriculture and forestry by 2030 is projected to decline over much of southern and eastern Australia, and over parts of eastern New Zealand, due to increased drought and fire. However, in New Zealand, initial benefits to agriculture and forestry are projected in western and southern areas and close to major rivers, due to a longer growing season, less frost and increased rainfall.

The region has substantial adaptive capacity due to well-developed economies and scientific and technical capabilities, but there are considerable constraints to implementation and major challenges from changes in extreme events.

► **More information:** [www.ipcc.ch](http://www.ipcc.ch), Dr Kevin Hennessy, 0400 572 613, Professor Terry Hughes, 0419 422 815, Professor Lesley Hughes 0415 527 275

## Climate goldrush continues

Following the April COAG meeting, the Prime Minister, **John Howard**, has announced that the **Australian Government** will establish a **National Centre for Climate Change Adaptation** that will cost \$26 million to establish, and will invest a further \$100 million to assist with its operations over the next five years. **CSIRO** will receive an additional \$44 million to deal with the science of the impact of climate change.

### South Africa alliance

Australia and South Africa will support three new projects involving research, modelling and the exchange of knowledge on managing greenhouse emissions and the impacts of climate change. These projects build on the Climate Change Partnership formalised last year between Australia and South Africa, which brings together businesses, industry, and the scientific communities of both countries to improve the understanding of and response to climate change. The projects are:

- Reducing Nitrous Oxide Emissions in the Agriculture Sector – Australian **Department of the Environment and Water Resources**, **University of Western Australia**, **Department of Agriculture and Food Western Australia** and South Africa's **University of Witwatersrand**.
- Climate Change and Biodiversity in Megadiverse Ecosystems – Australian Department of the Environment and Water Resources, **Western Australian Department of Environment and Conservation** and the South Africa **National Biodiversity Institute**; and

- Technical Workshop on the Establishment and Maintenance of a National Greenhouse Gas Inventory and Land-Based Accounting Framework — Australian Department of the Environment and Water Resources and the South African **Department of Environmental Affairs and Tourism**.

### Oceans at risk

Climate change is expected to have a considerable effect on Australia's marine life and marine ecosystems, with flow-on implications for the community, according to a **CSIRO** report for the Australian Government. The report, *Impacts of Climate Change on Australian Marine Life*, is the first major study in the Australian region to combine the research of climate modellers, ecologists and fisheries and aquaculture scientists.

According to the report's co-author, **CSIRO's Dr Alistair Hobday**, it provides a global lead in research into the potential effects climate change could have on specific marine ecosystems. The most affected marine groups are likely to be tropical coral reefs, cold water coral reefs, rocky reefs and kelps, plankton and species that live on or near the sea floor.

► **More information:** [www.pm.gov.au/](http://www.pm.gov.au/), Sarah Stock, 02 6277 7640, Dr Alistair Hobday, 03 6232 5310. Copies of the report are available at [www.greenhouse.gov.au/impacts/publications/marinelife.html](http://www.greenhouse.gov.au/impacts/publications/marinelife.html)

## Global maths protest

In an unprecedented move, the international mathematics community has rallied in support of their Australian colleagues and signed an open letter to Prime Minister **John Howard**, urging him to prevent the imminent collapse of Australia's national mathematical capability.

More than 110 of the world's leading mathematicians and almost 400 Australian academic mathematicians and statisticians, teachers, engineers and geophysicists have signed the open letter, calling on the Prime Minister to address the 'perilous path' of Australian mathematics and statistics as a matter of urgency.

The open letter comes three months after the release of a damning review of Australia's mathematical sciences, in which business leaders, top government agencies, universities and mathematicians warned that the system was near collapse.

► **More information:** Cathy Sage 0400 714 603, [www.review.ms.unimelb.edu.au/OpenLetter.html](http://www.review.ms.unimelb.edu.au/OpenLetter.html)

## Defence allies

A new five-year Strategic Research and Development Alliance agreement between the **Defence Science and Technology Organisation** and **BAE Systems Australia Ltd** is expected to boost defence science and technology in Australia in a number of focus areas. The agreement extends and upgrades a previous three-year Industry Alliance arrangement between the two organisations.

► **More information:** [www.dsto.defence.gov.au/news/5020/](http://www.dsto.defence.gov.au/news/5020/)

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By Dr Graeme Barnett  
CEO, BIOCHIP INNOVATIONS PTY LTD \*

# The business of science

**M**ore Australian scientists need business skills in their postgraduate training. In my experience, the lack of this training often hampers fund-raising for development of good ideas coming from innovative, publicly funded research.

Business training also better equips scientists to commercialise ideas more quickly, without risking home mortgaging or diluting equity through unreasonable venture-capital outcomes.

The 'scientist-business person' is not a contradiction. Business skills are simply another discipline to be learnt and honed with practice. The combination is powerful.

Our company, BioChip Innovations, is in the \$7 billion-a-year global market for DNA diagnostics. Our team of scientists and science-business professionals is preparing it to become a major player. Within 10 years the annual diagnostics market may exceed A\$100 billion. Various niches include infectious diseases of plants and animals, public health, crime-scene investigation and forensics, agriculture and fisheries, food and water quality and safety, the environment, bio-security and point-of-care testing.

It is a huge emerging market for innovative Australian science.

Our first diagnostic product, Influenza PrimRset™, is typical. It is a simple but unique set of reagents for genetic analysis of any strain of influenza virus. Current comprehensive analysis of influenza viruses take three weeks and costs thousands of dollars per sample. Our new test will provide equivalent data within three days at a small cost. It will also detect emergent genetic variants of influenza, providing early warning of previously-unknown strains.

Our silicon nanowire biochip in development detects extremely small quantities of DNA and we will use this to genetically analyse influenza-virus infections within three hours. These Australian scientific advances are based on a combination of business know-how and integration of our technology with technology from Singapore and South Korea.

Business-trained Australian scientists are well placed to recognise and exploit such strategic global partnerships – without costly capital from risk-averse venture capitalists.

Unfortunately few Australian VCs invest in early-stage biotech companies, and they are generally reluctant to invest in diagnostics, preferring companies developing new drugs. This is surprising when relative risks are compared. It takes 12 years and about \$1 billion to drive a new drug from discovery to market, and the failure rate is high. In contrast, a diagnostic test takes less than two years to market, and the failure risk is low.

Diagnostic companies, particularly those developing biochips and DNA tests, often involve complex engineering and science and sophisticated business models. The limited resources of Australian VC firms often hinder them from committing to the necessary long and costly due-diligence.

So Australian biotech companies commonly raise early

capital predominantly from angel investors and then list early on the stock exchange – often long before product concepts, revenues and profitability are realised. The unfortunate by-product of this process is a culture of measuring success only by capital raising, rather than actual performance.

Most angel investors offer less capital individually, but their contribution can give business-wise scientists a foundation for expansion. The effort required to identify angel investors is often well-rewarded, because fellow-Australians can provide a loyal local base for well-informed capital expansion via incremental advances and the recruitment of new investors from their personal networks.

Another trap in biotechnology start-ups is the pittance paid to science and biotechnology PhD graduates, who go through seven years of university training only to earn half the salary of an MBA. Recruiting and retaining high-quality graduates has always been difficult, but biotech salaries have to rise with the demand generated by full employment in Australia and the decline in numbers of science students.

Governments can play a more useful role by supporting start-up biotechnology companies through in-house business training of newly minted science PhDs. The community dividends to Australia could be enormous. Another novel role for government in Australia would be to help start-ups experience the risk of failure.

In Europe and North America, honest failure of biotechnology business start-ups is regarded as valuable experience for participants. Not so in Australia. People (including bureaucrats supervising the spending of public money) do not wish to be associated with any kind of business failure.

It is part of the risk-averse culture that hampers our development. Yet risk-taking is the crucible in which business success in others venture can be forged.

Australia's outputs in life science research are spectacular and very competitive. However Australia's government support for research and development has to date failed to marry research with successful commercialisation. For example, our 125 per cent tax concession for R&D is globally uncompetitive, and the process of applying for R&D grants has become needlessly adversarial. This disconnect labels Australia as a creative country in need of innovation.

Another concept not popular in Australian biotechnology investment is early abandonment of obvious failures. The ASX has many brain-dead companies on life support. Their key technology has failed, but has been infused with capital and grants while management and shareholders pray for miracles. Failure to recognise failure wastes cash and future business opportunities.

That is when a business-scientist, comfortable with creativity and innovation, and trained to recognise, analyse and act on success or failure, becomes crucial.

*\* BioChip Innovations Pty Ltd is a start-up that has drawn together Australian and Asian advances in diagnostics. Biochip Innovations comprises a small group of Australian scientists who have shunned much government-grant and venture-capital funding and chosen the difficult task of raising capital elsewhere. See [www.biochip.com.au](http://www.biochip.com.au)*



*Graeme Barnett: a risk-averse culture is hampering our development.*

## Creditable energy

A **Deakin University** researcher has urged the creation of an 'energy credits' trading scheme to operate alongside carbon credits trading.

In *The core of the global warming problem: energy*, a paper published in the *International Journal of Global Energy Issues*, **Dr Eric Hu** presents a case for using energy credits to address the problem of climate change. "The energy credit proposed can be defined as: if you emit extra carbon dioxide or conduct any other activities contributing to global warming, you need to send the energy out of the earth's atmosphere, which equals the energy trapped due to the extra carbon dioxide you emitted," Dr Hu says. "In the current emission or carbon market, carbon dioxide is proposed to be used directly as the 'currency' in trading, although it's political and technical acceptance is still in doubt.

"From a thermodynamic point of view, the cause of global warming is the heat or energy that accumulates in the earth and its atmosphere. ... You need to send the energy out of the earth's atmosphere, which is equal to the energy trapped due to the extra carbon dioxide you emitted. For sending the energy back into space, you could gain an energy credit."

One example would be to take a black asphalt road and resurface it with a pale-coloured surface, which would reflect energy back into space, and gain an energy credit.

► **More information:** [www.deakin.edu.au/news/media.php](http://www.deakin.edu.au/news/media.php)

## Alpine hothouse

Australian scientists are participating in a multi-nation research project to evaluate how global warming will affect cold-climate ecosystems in arctic and alpine regions around the world.

The Australian work focuses on experiments in Victoria's high country. Scientists hope to feed data from the Australian experiments into computer models that will help predict how cold-climate plants and animals will respond to rising temperatures – and whether or not they have the genetic capacity to adapt.

The experiments are a collaborative, multi-disciplinary effort

involving three specialist research groups from two universities – **La Trobe** and **Melbourne** – and **CSIRO**.

Early results from the Victorian research are being compared with data from similar experiments in the northern hemisphere's collaborative International Tundra Experiment (ITEX), which encompasses more than 11 countries including Sweden, Norway, Finland, Russia, Canada, Tibet and the US. By incorporating their Victorian research into this major ITEX project, Australian scientists have ensured that the project now sweeps both hemispheres, making it the world's first truly global experiment to replicate the effects of climate change in equivalent tundra across the globe.

The experiments started in 2003. The first results were reported to the 2006 international ITEX conference in Miami, and further results were reported to the recent 2007 conference held for the first time in Australia.

► **More information:** [www.latrobe.edu.au/news/2007/index\\_2007.html](http://www.latrobe.edu.au/news/2007/index_2007.html)

## Tanking up

The cost-effectiveness of household rainwater tanks will depend on their whole-of-life cost and how much water can be drawn from them over time, according to the **National Water Commission** (NWC).

"The Commission notes there are pitfalls in comparing rainwater tanks installed by individual households with large-scale water-supply options," the NWC's CEO and chairman, **Ken Matthews**, says. "Rainwater tanks remain a largely decentralised source of water, with costs and levels of reliability and service varying dramatically depending on location and individual household circumstances.

"Our report highlights that water from rainwater tanks can be used solely for outdoor garden use or can also be used in the home, and that a tank's yield is determined by both the volume and timing of run-off into the tank and the volume and timing of usage. In every case, the cost per kilolitre of tank water is greater than the price charged by water utilities.

"However, for many households with large connected roof areas (particularly in Brisbane, Sydney and Melbourne), the unit cost fell to within 20% of the top-tier price of mains water. This shows that installing a rainwater tank may cost a 'typical' property owner between \$500 and \$4000 over time, depending upon individual circumstances. It also reveals that cost isn't the only driver for householders installing rainwater tanks."

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

## Biodiesel booster

An agreement between the **University of Sydney** and Australia's largest biodiesel company could lead to a gradual revolution in the production of bio-fuel.

**Thomas Maschmeyer**, a Federation Fellow in the **School of Chemistry**, has completed a deal with the **Australian Biodiesel Group** worth \$850,000 over two years – with the university retaining IP.

The agreement will see Professor Maschmeyer improving methods of processing biodiesel – fuel made from animal or plant fats. Although not an issue for cars or smaller vans, there have been some reports of fuel-filter clogging in large

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truck engines. This might be due to the biodiesel being cycled constantly – heating up and cooling down – causing very small impurities to build up on the filters.

“We have found a chemical solution to this problem by identifying the impurities in the biodiesel and removing them by making use of their preferential interactions with certain surfaces,” Professor Maschmeyer says. “This is different to mechanical separation achieved by simple filtering.”

Biodiesel manufacturers also have difficulty with the ‘winter’ factor. In Australia, with its recent shortage of canola, it makes economic sense to develop tallow-based biodiesel. But in the cold, biodiesel made from tallow becomes cloudy and begins to harden and canola-derived biodiesel needs to be added to bring it up to specification. “We are working on making tallow behave the same way as vegetable oil and are making good progress,” Professor Maschmeyer says.

► **More information:** [www.usyd.edu.au/news/83.html?newscategoryid=2](http://www.usyd.edu.au/news/83.html?newscategoryid=2)

## Colour rays

University of Queensland (UQ) researchers have shown that stingrays, once thought to be colour-blind, may be capable of seeing in colour. They have shown that the blue-spotted



maskray, a common stingray in Moreton Bay, has all the physical components necessary for colour vision.

*Susan Theiss*, a Californian PhD student working on the project, said seeing in colour could help rays find mates, detect prey and avoid predators. Her team of supervisors started behavioural tests on shovelnose rays and reef sharks at UQ’s **Heron Island Research Station**, off Gladstone, in March.

The animals were being trained to associate a coloured light with food and tested to see if they could discriminate between the training colour and a light of different colour. Although rays have the apparatus to see colour, the tests should confirm if they can use that colour information.

Ms Theiss’s work has been published in the *Journal of Comparative Physiology*.

► **More information:** [www.uq.edu.au/news/index.html?article=11813](http://www.uq.edu.au/news/index.html?article=11813)

## Coral kill

Scientists have reported what is thought to be one of the world’s greatest mass death of corals ever recorded, as a result of the earthquake in Aceh, Indonesia, on 28 March 2005.

The survey by scientists from the **Wildlife Conservation Society – Indonesia Program** (WCS-IP) and the **Australian Research Council Centre of Excellence for Coral Reef Studies** (ARCCoERS) investigated the condition of coral reefs in Pulau Simeulue and Pulau Banyak off Aceh, Indonesia, in March 2007.

The surveys covered 35 sites along 600 kilometres of coastline, and have documented for the first time the effects of earthquake uplift on coral reefs. The entire island of Simeulue, with a perimeter of about 300km, was raised up to 1.2 metres following the earthquake, exposing most of the coral reefs

ringing the island. *Dr Stuart Campbell*, coordinator of WCS-IP, says: “This is a story of mass mortality on a scale rarely observed. In contrast to other threats like coral bleaching, none of the corals uplifted by the earthquake have survived.”

*Dr Andrew Baird* of ARCCoERS says: “Amazingly, the uplifted corals are so well preserved we could still identify each species, despite these colonies having been exposed for two years. Some species suffered up to 100% loss at some sites, and different species now dominate the shallow reef.

“This is a unique opportunity to document a process that occurs maybe once a century and promises to provide new insights into coral recovery processes that until now we could only explore on fossil reefs.”

► **More information:** [www.coralcoe.org.au/news.html](http://www.coralcoe.org.au/news.html)

## Tuna triumph

Australian aquaculture pioneer **Clean Seas Tuna Limited** has successfully induced reproductive maturation among male southern bluefin tuna (SBT) broodstock housed in the company’s land-based breeding facility at Arno Bay.

It is the first time in the world that reproductive maturation of SBT has been achieved under controlled conditions and is a major step towards achieving the company’s long-term goal of breeding and growing out SBT from its own broodstock, with the goal of duplicating the SBT wild catch, which is subject to a strict international quota system.

Clean Seas chairman *Hagen Stehr* says this was achieved using hormonal therapy developed in Europe to mimic the natural production of hormones by wild fish. The courtship behaviour and release of sperm by the captive SBT was documented using underwater video observations. The broodstock will continue to be monitored and the therapy potentially repeated, with the expectation of completing their reproductive maturation and producing viable (fertilised) eggs.

“We have replicated in our land-based breeding facility the complex and previously unknown natural breeding conditions of one of the wildest fish in the sea – only three months after commissioning the facility and moving our fish from the ocean,” Mr Stehr says. “The next step will be to stimulate the natural release of eggs from our female broodstock and their subsequent fertilisation, at which point we will be in a position to return domestically bred SBT fingerlings to our pens in the waters of Arno Bay, where they can be grown to order for the restaurants of the world.”

Mr Stehr said Clean Seas had the potential to duplicate Australia’s 5200-tonne southern bluefin tuna quota in a decade, without affecting wild tuna stocks.

► **More information:** **Hagen Stehr, 08 8682 2922, 0400 920 020**

## Gaol dogs

Two **University of Queensland** postgraduate students are investigating whether puppies in prison can help reform inmates and improve the working lives of prison staff.

*Claire Eddie* and *Georgia Sakrzewski* are following the progress of four pups delivered into the care of prisoners and staff at the low-security **Darling Downs Correctional Centre**. Eight prisoners are raising and training the puppies in basic obedience for 16 months to become assistance dogs. Assistance

dogs are companions for people with disabilities and are often able to help open doors and retrieve dropped objects.

Corrective Services introduced Pups In Prison last year in partnership with **Assistance Dogs Australia**, to help inmates develop patience, compassion, self-regulation, communication skills and cooperation. Similar programs have been trialled in NSW and the US, but Ms Eddie and Ms Sakrzewski say they believe they will be the first to measure the puppies' effect on prisoners and staff.

Ms Eddie says they are interested in changes to the prisoners' psychological wellbeing, criminal attitudes, loneliness and parenting skills, and also the job satisfaction and workplace morale of prison staff.

UQ's **Centre for Companion Animal Health** director **Professor Jacquie Rand** says she expects the puppies to help rehabilitate prisoners and hopes the program will be expanded to other open-security prisons. Homeless dogs that need retraining should also be trialled in a similar program, she says.

► **More information:** [www.uq.edu.au/news/index.html?article=11818](http://www.uq.edu.au/news/index.html?article=11818)

## Post-doc blues

The careers of Australia's talented mid-career scientists are a focus of concern for the nation's peak science body, the **Australian Academy of Science**. Australia's looming skills shortage can only be addressed if career paths are improved to attract talented scientists to research and teaching, and most importantly, to keep them there, the academy says.

Some of Australia's leading scientists across 20 scientific disciplines met at the Shine Dome, at the Academy's Canberra headquarters, and agreed that the careers of many young Australian scientists are in a holding pattern. The lack of suitable, secure positions, with remuneration on a par with what can be obtained overseas, is keeping our best talent overseas.

This creates a cycle of fewer people studying the fundamental science subjects, finding a career in research, or becoming science and mathematics teachers to train and inspire the next generation.

The solution is the creation of schemes to offer security and pay parity for scientists who have completed one or two post-doctoral fellowships.

The group also suggested a scheme (the 'Boomerang Scheme') to tempt Australians back to the country before they become too settled overseas. The scheme would involve substantial start-up funds, a salary equivalent to Australian peers, and job security. In addition, the scheme may also be used to attract top scientists from around the world to Australia.

► **More information:** **Professor Sue Serjeantson, 02 6201 9400, [es@science.org.au](mailto:es@science.org.au)**

## Future footy fans

AFL club members in the future may never attend a football match and yet still feel they are important part of the club, a **Deakin University** academic has predicted.

**Associate Professor Dr Heath McDonald**, from the **Deakin Business School**, believes the structure of football membership is likely to change in the future as popular AFL clubs grapple with changing member motivation and behaviour and growing

demand. Dr McDonald's prediction follows an annual survey of more than 41,000 members across 15 AFL clubs, which found that most clubs were doing a great job in satisfying their members.

Collingwood did not participate in the 2006 study.

"The two biggest factors influencing member satisfaction were ticketing issues and the members' feelings of involvement with the club," Dr McDonald says. "The clubs which rated highest with their members in 2006 were **Adelaide**, the **Western Bulldogs**, **West Coast**, **Sydney** and **Melbourne**."

"Overall the AFL membership schemes are well managed and satisfy the members effectively. This is in the face of increasing service expectations amongst members, limited club resources for membership management and radical changes to the way in which the public consumes football."

► **More information:** **Dr Heath McDonald, 03 9244 5540, 0417 547 658, [hmcd@deakin.edu.au](mailto:hmcd@deakin.edu.au)**

## Telomerase breakthrough

Research into cancer, anti-cancer treatments and ageing has been advanced through the identification of the composition of human telomerase – an enzyme integral to 85% of all cancers.

Cancer researchers around the world have studied telomerase since its discovery 18 years ago, but they were working somewhat in the dark. The actual protein composition was unknown, scientists believing it contained any mixture of 32 proteins.

A study headed by **Dr Scott Cohen** of the **Children's Medical Research Institute** (CMRI) reveals that telomerase contains just two proteins. The study is published in the journal *Science*.

**Dr Roger Reddel**, acting director of CMRI and an international cancer research expert, believes the identification 'switches on a light' for basic cell biology and cancer research. "Telomerase is the target of an extensive global effort to develop anti-cancer treatments," he says. "This discovery sharpens the focus of these efforts and no doubt will speed up the process of delivering successful treatment."

► **More information:** [www.cmri.com.au/cmri.php?page=1019](http://www.cmri.com.au/cmri.php?page=1019)

## Alcohol kills young

Alcohol alone causes more than a quarter of all deaths of 15 to 29-year-olds in developed countries, according to a **Deakin University** study recently published in the *Lancet*.

Psychology professor **John Toumbourou** says that it is time for Australian governments and the community to get serious about the growing problem of teenage alcohol abuse. "The problem of alcohol abuse among young people in Australia is one of the most extreme relative to comparable developed countries," he says.

He believes that Australian policies are promoting the problem. "In Australia, there is a lot of resistance to increasing the taxes on alcohol or to restricting alcohol's availability," he says. "However, [these] are proven to be among the best ways of limiting its appeal to young people."

The researchers found that death, injury and illness caused by substance use are among the top 10 contributors to the global disease burden.

► **More information:** [www.deakin.edu.au/news/media.php](http://www.deakin.edu.au/news/media.php)

By Dr R A Leng AO

EMERITUS PROFESSOR, UNIVERSITY OF NEW ENGLAND

# The morality of biofuels

Escalating energy costs and the growing fear of climate change have encouraged a headlong rush to renewable energy. Biofuel from biomass is emerging as a preferred source of liquid energy for transport – but the huge areas of agricultural land that are being, or will be, diverted from food production pose questions about the morality of industrial-scale biofuels development.

These industrial biofuels are mainly ethanol from starch and sugar crops and oil from oilseed crops such as canola and oil palm. In the background, cellulosic alcohol production is receiving close attention as biotechnology research attempts to develop new ways to convert complex structural carbohydrates to soluble sugars for conversion to ethanol.

Diversion of land from food to biofuels production is already driving up the price of food: Mexican maize prices have doubled in the past year, forcing the government to put a ceiling on tortilla prices. Sugar prices have also doubled, while construction of distilleries in the US and South America is only now taking off. Virtually all countries are now considering biofuels production from various crop sources. In general, these will be grown on land that previously grew food or else is newly cleared forest country. And these fuels will be produced by industrial processes that lower the net energy yield. Subsidised agribusiness has bought into biofuels with expectations of high profits.

The industrial production of biofuels threatens to create conflict over food for humans, feed for animals and feedstocks for liquid energy sources.

In 2006, about 17 per cent of the US corn crop was converted to ethanol and supplied two per cent of the nation's auto fuel. The Earth Policy Institute predicts ethanol production will claim 50 per cent, or 140 million metric tonnes (mmt), of US corn in 2008, with 79 new ethanol plants due to come on-line in the next two years. This will double ethanol capacity at a time when world grain stocks are at their lowest level in 25 years and falling.

By 2020, alcohol production could remove conservatively 400mmt of grain from world food/feed markets, either directly or by diversion of land from food crops. If maize was the sole source of the feedstock, President Bush's call for the US to produce 35 billion gallons of renewable fuel by 2017 would require about 320mmt of maize – more than the present annual production.

The world trade in all grains is about 240mmt, of which about 80 to 90mmt are exported from the US. The acquisition of grain by the ethanol industry in the US will thus have a big effect on world grain prices and availability. Present world wheat and coarse grains reserves are about 280mmt, down from 450mmt in six years. However, world demand for grain is increasing. India in particular has emerged as a huge importer of grain this year, having used up its 23mmt stockpile in just five years to import 4mmt in 2006. China is also a net importer. World grain consumption has exceeded production in five of the past six years. Global per capita grain availability is also declining.

Some of the grain reserves diverted to ethanol production will be offset by increased production from South America – but this is being achieved through agricultural industrialisation, which is displacing small farmers and increasing poverty. Higher production in South America also often depends on clearing forest country, which adds to global warming, and the 'new' land quickly loses its initial high fertility.

Climate also poses a major threat to world food supplies. The Consultative Group on International Agricultural Research (CGIAR) has warned that global warming will shrink South Asia's wheat area by half. New models of the effects of global warming predict increasing aridity in many of the food bowls and reduced water availability for irrigated agriculture. Recent studies are showing that increased carbon dioxide in the atmosphere may stimulate plant growth but it also increases soil microbe activity, which decreases carbon levels in soil. Higher temperatures can have adverse effects on plant growth: rice yields decline by 10 per cent for every 1°C increase in night-time temperature. Add the higher cost of fertilisers, which is already discouraging their use, leading to lower yields and output, which will shrink the yield of rice further.

The signs are clear. There is a growing scarcity of staples and high global food prices will result. The CGIAR has warned of a possible return to large-scale famines in developing countries, even without the additional impost of biofuels on the world food supply. Heading off the refugee wave that could result will be an economic burden to developed countries.

It is hard to avoid concluding that the livelihood of billions of people in developing countries, and the standard of living and security in developed countries, will be severely affected as global food production falls and land is diverted to biofuels production.

Contrary to the 'clean energy' claims of their proponents, biofuels are wreaking ecological and climatic devastation. Eighty per cent of Brazil's greenhouse gas emissions arise from deforestation of the Amazon basin, mainly to grow sugar cane for ethanol. Malaysian and Indonesian rainforests are being destroyed for oil-palm plantations. As forest cover is removed, carbon sinks in the biomass and the soil depreciate with time; it is almost certain this will alter rainfall patterns, which could decrease at the same rate.

The effects of all this will be more pronounced in the developing countries, where famine now seems inevitable, particularly when added to the effects of drought induced by global warming. The world food balance is already precarious. What will happen when the next disaster or monsoon failure occurs in a country with high population densities?

The cost to developed countries of the ensuing global destabilisation will be a high price to pay for the minor benefits of producing industrial biofuels, which cannot meet more than a small percentage of the world's energy needs.

*Ron Leng: biofuels are wreaking ecological and climatic devastation.*



## No sex please

The **Internet Corporation for Assigned Names and Numbers** (ICANN) has decided to reject an application for the establishment of an .XXX internet domain for adult content. ICANN is the international body responsible for overseeing global internet domain names.

“The **Australian Government** has a longstanding policy to ensure that Australians using the internet are able to do so in a safe and secure way,” the Minister for Communications, Information Technology and the Arts, **Senator Helen Coonan**, said when welcoming the decision. “The Australian Government has consistently expressed opposition to the creation of an .XXX domain. ICANN’s decision to block it is a positive outcome and will complement Australian Government measures designed to limit the volume of offensive material online and unsolicited exposure to it.”

The Australian Online Content Scheme introduced by the Government in 2000 bans X and RC-rated content from being hosted in Australia. The scheme gives the **Australian Communications and Media Authority** (ACMA) the power to investigate complaints and issue takedown notices for offensive material. Internet service providers and internet content hosts are also regulated through enforceable industry codes of practice developed by the Internet Industry Association and registered with ACMA.

► **More information:** [www.minister.dcita.gov.au/media/media\\_releases/](http://www.minister.dcita.gov.au/media/media_releases/)

## High-speed mobiles

**Optus** has announced that it is bringing high-speed data services to its mobile network using HSDPA. The upgrade is well under way, with more than 600 sites in Sydney and Melbourne to be ready for service by May. All Optus 3G sites across Australia will also be upgraded to HSDPA by the end of May. Once complete, Optus will cover 55% of the Australian population with high-speed wireless broadband services.

Optus will begin extending its existing 3G HSDPA coverage to 96% of the Australian population in June and plans to continue over a three-year period.

**Henry Calvert**, acting director Optus Products & Delivery, said Optus had invested more than \$10 billion in the construction of fixed, mobile and satellite networks. “Optus customers will experience download speeds averaging 500Kbps to 1.5Mbps and network capability of up to 3.6Mbps initially, with the potential to rise up to 14.4Mbps.”

► **More information:** **Luisa Ford, 02 9342 504**

## Datacasting trial

The **Australian Digital Suppliers Industry Forum** (ADSIF) supports the decision by the **Australian Communications and Media Authority** (ACMA) to extend a datacasting trial using two available UHF channels in Sydney.

“In a recent submission, the ADSIF proposed an extension of the trial, so we are particularly pleased to see this positive outcome for industry,” says **Ross Henderson**, chair of the ADSIF Steering Committee. “ACMA’s datacasting trial is enabling some additional program choice and a program guide channel for

Sydney digital television viewers.”

ADSIF has argued that more program choice and an electronic program guide are two important factors that will encourage people to use digital television before the analogue system is turned off between 2010 and 2012.

► **More information:** [www.aeema.asn.au/Default.aspx?ArticleID=77](http://www.aeema.asn.au/Default.aspx?ArticleID=77)

## Online flu fighter

A new online simulation to help GPs prepare their practice for a pandemic influenza outbreak has been launched by a research team at the **Australian National University**. The Pandemic Influenza Simulation Exercise for General Practice takes GPs and their staff through a pandemic influenza situation, providing insight into how a pandemic could affect the operation of their practice.

**Dr Christopher Pearce**, a Melbourne GP who led the development of the internet exercise, says it is an easy and effective tool to plan for the inevitable pandemic. He says GPs will be forced to work very differently in the face of an outbreak – taking in-car consultations so non-flu patients are not exposed to the virus in the waiting room, and doing more home-visit care and telephone consultations.

“GPs are prepared to work through disaster situations, but doing an exercise like this one gives them an opportunity to think about the best-practice response in an unusual situation, like what you would do when half your staff are at home caring for sick relatives,” he says.

The module was based on emergency services planning processes and can be completed in the surgery with other members of staff in a short amount of time.

► **More information:** [www.agpns.org](http://www.agpns.org)

## Remote care

**Scope** is one of the 16 successful applicants under the first round of funding for the Clever Networks Innovative Services Delivery project. “People with disabilities and their families living in remote areas will soon be connected to specialist care, thanks to a project named Scope Connect, developed by Scope in partnership with **Database Consultants Australia**,” the Minister of Communications, Information Technology and the Arts, **Senator Helen Coonan** says.

Scope was established in 1948 as a not-for-profit organisation providing disability services in Victoria for children and adults with physical and multiple disabilities. Scope will receive \$1.4 million from the **Australian Government** and will contribute \$1.4 million itself.

“Scope Connect addresses the issues of isolation and the ability of therapists to be able to respond with immediate advice or assessment,” Senator Coonan says. “Using broadband in an innovative way, this project will benefit therapists, clients and their families in remote and rural areas – linking communities with vital information, resources and support systems.”

“Using broadband and wireless broadband, Scope Connect will provide new computer equipment and instant online access for Scope staff in rural and remote areas of Victoria. This will allow them to access client records and medical histories and ensure immediate, quality care and services.”

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

By Dr Max Whitten AM FAA\*  
FORMER CHIEF, CSIRO ENTOMOLOGY

# Pollination: the free ride may be over

Incidental and unpaid pollination services from feral and managed honeybee hives are worth more than \$2 billion a year to Australian agriculture. However, recent experiences in the US, New Zealand and Europe indicate these 'free' but valuable services may soon cease, taking with them 11,000 rural jobs, according to the Centre for International Economics.

Like the US and NZ, Australian has many crops that require or benefit from insect pollination. Honeybees account for 90 to 100 per cent of the yield in crops such as almond, apple, avocado, blueberry, cherry, cucumber, macadamia, rockmelon, sunflower, watermelon and zucchini. Crops such as canola and cotton can gain yield increases of more than 15 per cent with honeybee pollination.

Experts such as CSIRO's Denis Anderson claim it is not a matter of if but when the bee mite *Varroa destructor* invades Australia. This will destroy feral hives and eliminate many amateur and poorly-managed hives. The \$65 million honey crop will be affected; but that damage is small compared with the loss of crops dependent on pollination.

In the US, the number of managed hives fell by half in the past 20 years because of pesticides and changes in farming practices. The decline was hastened by the spread of *Varroa*; and is now in virtual free-fall due to a new problem called colony collapse disorder (CCD). Its cause is unknown, but stress seems to be implicated, due to increased hive movements and extended pollination services from fewer hives. The bees are simply vanishing. No single pathogen has been identified. There are indications that CCD is now present in Europe.

The US almond crop is worth US\$2.5 billion a year. Fees for pollination services have risen from \$54 in 2004 to \$150 in 2006, and could reach \$250 to \$500 as hive numbers decline.

In NZ's North Island, *Varroa* has eliminated feral bees and poorly managed hives and the saga is being repeated in the South Island. Numbers of registered beekeepers have slumped from 4500 to 2700. The NZ\$1 billion kiwifruit crop alone uses 60,000 of the rapidly diminishing 300,000 hives, and pollination fees doubled in 2006. NZ's Ministry of Agriculture and Fisheries estimates losses due to *Varroa* up to 2035 will be NZ\$514 million, mainly in the pastoral sector.

Honeybees came to Australia in the 1820s, to provide honey and recreate elements of the rustic atmosphere of the 'old country'. Within a few years, natural swarming created feral colonies that spread along the eastern seaboard and Tasmania. Today, Australia has 500,000 managed hives and far more feral hives. Billions of dollars worth of crops depend on them. The signs are this could change for the worse – especially if Australia repeats the NZ mistake of doing no research to prevent it.

Australia is well equipped in some ways to cope with the challenge. In others we face serious problems. The commercial beekeeper depends on access to native flora as the major

nectar and pollen sources. Land clearing and ideologically driven policies designed to exclude migratory beekeepers from national parks are diminishing the resource base that underpins commercial beekeeping. A sustained honey crop is essential to meet the pollination service needs of primary producers, more so with the loss of incidental pollination.

The recent sale of the only national quarantine facility by the Federal Government will seriously diminish safe import options for genetic stock that can cope with new pests and diseases. As honey production contracts, so do funds for honeybee research, while beekeepers continue to quit the industry.

Apathy, ignorance and indifference to the plight of commercial beekeeping are rampant amongst research providers, funding agencies and in rural industries that enjoy the 'free ride' of pollination.

Normally, it is the research providers, funding agencies and industry urging unresponsive politicians to listen to urgent pleas for help. This time, the politicians are expressing the concerns



while researchers, funding agencies and industry are dragging the chain. The House of Representatives Agriculture, Fisheries and Forestry Committee rang alarm bells about pollination in its report on rural skills, training and research in February 2007. The committee is now conducting a specific enquiry into the honeybee industry, with submissions due by 25 May 2007.

To avert a serious loss in pollination in the cropping sector we need to greatly strengthen the research capabilities, collaboration and funding for the main researchers – CSIRO, state departments of agriculture and universities – as well as seeing to training needs.

One way to achieve the above objectives would be to establish an Australian Honeybee and Pollination Research and Training Network (AHPRTN) modelled on successful public-good CRCs such as the Weeds CRC – lately axed because it was too focused on public good! This would cost about \$2 million a year. However, that is a small price to pay to ensure the continued preservation of industry services worth \$2 billion. If we do not act soon, overseas experience teaches that the 'free pollination ride' is sure to end.

*\*Max Whitten is Adjunct Professor in the Department of Integrative Biology at the University of Queensland and was formerly chief of CSIRO Entomology and chairman of the Honeybee R&D Council.*

*Max Whitten:  
As honey  
production  
contracts,  
so do funds  
for honeybee  
research.*

## Chemical precinct

A state-of-the-art Resources and Chemistry Precinct at **Curtin University of Technology** in Bentley, WA, will provide facilities for education and research in resources and chemistry, and will foster strong partnerships between key government agencies, university and industry bodies. It has already attracted the support of the **Chemistry Centre** (WA), which will relocate to the site, and **BHP Billiton**, which is providing \$5 million in support. The first stage of the precinct is expected to be operational by January 2009.

Students will benefit from industry input into course content, regular guest lectures, project supervision by industry professionals, improved opportunities for relevant work experience and direct contact with potential employers. Through the BHP Billiton-Curtin alliance, the precinct will also be committed to the development of strong regional links in chemistry and resources and other relevant education and research, to improve education and employment opportunities across the state.

► **More information:** Julia Nicol, 08 9266 7711, 0409 202 134

## Uniwater afloat

The **University of Melbourne** and **Monash University** have joined forces to form **Uniwater**, each putting in more than \$1 million over three years. Uniwater's research will focus on two geographic locations – Melbourne and the Goulburn Valley, Victoria's food bowl and part of the Goulburn-Murray river system. It has four strategic objectives:

- maximising environmental return on investment in repair of rivers, groundwater and catchments;
- realising the potential of irrigated and dryland agriculture using less water;
- providing a reliable and sustainable water supply to Australia's growing cities, and
- developing water policies and institutions within a federal framework.

The director of Uniwater is **Professor John Langford**, who has headed the University of Melbourne's **Melbourne Water Research Centre**.

The **Victorian Government** is to fund two projects at **Deakin University**. **Dr Eric Hu**, an associate professor in mechanical engineering, will head a \$350,000 project to transform wastewater into high-quality drinking water. He will adapt a technology known as adsorption, more commonly used in airconditioning and chilling water, for desalinating water. A pilot plant will treat water, ranging in salt concentration from brackish to seawater, to produce drinking-quality water using one-third to half the energy consumption of normal desalination technology.

Deakin also received \$213,000 to investigate community attitudes to water-saving and recycling across south-west Victoria over three years. Supported by **Wannon Water**, **Alcoa** and the **Victorian Water Trust**, the project will research community attitudes to water-saving and recycling and trial the effectiveness of water conservation models. The project manager is **Dr Anne Wallis**.

► **More information:** Uniwater – Christina Buckridge, 03 8344 6158, Deakin – Mandi O'Garretty, 03 5227 2776

## Climate focus

The **University of Newcastle** is to establish a **Centre for Climate Change Impact Management** (C3IM) to undertake research on the issue of climate change and its effect on water availability. C3IM's director, **Professor Garry Willgoose**, says the centre's work will identify a new generation of management and policy tools that assess the security of urban and rural water supplies.

"Understanding the magnitude of predicted climate change, the environmental impact of a changing climate, and optimal management of water resources are the key issues C3IM will address," he says. "By bringing together researchers with expertise in hydrology, ecology, climatology and paleoclimatology, we will achieve an integrated examination of the environmental response to climate change."

► **More information:** Garry Willgoose, 02 4921 6050

## Melbourne Model

The **University of Melbourne** is to introduce a new curriculum model in response to a well-established international trend in higher education found in North America, Europe and increasingly in Asia.

The model introduces six new undergraduate degrees with both breadth and depth – in Arts, Biomedicine, Commerce, Environments, Music and Science – followed by employment, a professional graduate degree, or a research degree such as a PhD.

The Melbourne model also brings the graduate-school experience to Australia, providing more intensive and professionally relevant degrees. In 2008 a number of professional degrees will move to graduate level – including law, architecture, forestry, secondary teaching and nursing. This list will grow in coming years to include medicine, dentistry, physiotherapy and engineering, among others.

A \$100 million Melbourne Scholarship program will benefit more than 8000 students over three years. Scholarships will be awarded to Australian and international students in undergraduate, professional graduate and research higher degree programs.

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

## IT futures

In response to the exponential growth of business-to-business services and the accompanying need for skilled workers, the **University of Sydney's School of Information Technologies** has joined forces with **IBM** to develop a new postgraduate unit of study in its Master of IT and Master of IT Management courses.

The Services Sciences, Management and Engineering unit is designed to provide students with a multidisciplinary overview of the services sector, particularly IT-enabled services.

The course is the first academic discipline of its kind to be introduced in an Australian university, and only the second in the Asia-Pacific region.

To give students a practical perspective on services management, executives from IBM worldwide will be invited to present guest lectures.

► **More information:** Richard North, 02 9351 3720

## Tick for GM

The **Australian Academy of Technological Sciences and Engineering (ATSE)** has endorsed the responsible use of gene technologies to produce genetically modified plants for use in Australian agriculture.

In a recently published *Academy Statement*, ATSE states that GM plants already contribute to more efficient cotton production and enhanced environmental outcomes for the cotton industry and the communities it serves. It says that GM plants will contribute to the international competitiveness of Australian farming, the viability of regional economies, the wellbeing of Australian consumers and the health of ecosystems and the environment.

ATSE says although gene technology is not a panacea for agriculture, it is an important enabling technology that has already proven its place globally, with 91 million hectares of GM crops grown in 2005.

ATSE emphasises that it is important to consider the wider context in which gene technology may be used. The adoption of GM cotton in Australia has reduced pesticide use, and the adoption of herbicide-tolerant (HT) cotton allows the use of more benign weed management than was previously used in the conventional cotton production system. ATSE says there is a need for more effective dialogue between scientists and the mainstream environmental movements to establish common ground and identify areas for future research.

It supports a strong and robust public debate as an important component of the introduction of any significantly new technology into society.

► **More information:** [www.atse.org.au/index.php?sectionid=963](http://www.atse.org.au/index.php?sectionid=963)

## Starving tumours

Drug discovery company **Bionomics Limited** has presented the latest preclinical data for its cancer drug candidate, BNC105, at the 2007 Annual **American Association for Cancer Research** Conference.

Dr Gabriel Kremmidiotis, Bionomics' vice-president of discovery research, presented the latest preclinical findings, revealing that BNC105 has greater capability to regress tumours than initially expected. The mouse studies showed that following two cycles of BNC105 treatment 14% of mice carrying human breast cancer became tumour-free.

"Although we have previously seen BNC105 stopping tumour growth or causing tumour regression, in our latest dose-optimisation experiments we saw for the first time that BNC105 caused some tumours to completely disappear," Dr Kremmidiotis said.

BNC105 is a new type of drug called a vascular disruption agent (VDA) that acts to rapidly shut down the blood supply within a tumour. It thereby 'starves' the tumour of the oxygen and nutrients it needs to survive.

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

## HIV attacker

**Biotron Limited** has initiated a phase I clinical trial of BIT225, its lead drug for treatment of HIV. The phase I study is designed to evaluate the safety and pharmacokinetic properties of BIT225

in humans after a single dose. BIT225 represents a novel, first-in-class approach to the treatment of HIV. BIT225 specifically targets HIV in reservoir cells and represents an opportunity to attack HIV at its source in the body.

Current HIV therapies have little or no effect on HIV in the underlying reservoir of infected cells where the virus hides from the immune system. In addition, BIT225 has demonstrated good antiviral activity in surrogate models of Hepatitis C virus ('HCV') infection. This human safety trial of BIT225 will support trials of the drug in both HIV and HCV-infected patients, to begin on conclusion of the phase I study.

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

## Leukaemia trial

**ChemGenex Pharmaceuticals** has treated the first patient in a new phase II/III clinical study (CML-203) designed to evaluate the efficacy of Ceflatonin® (homoharringtonine or HHT) in patients with chronic myeloid leukemia (CML) who have failed or were intolerant to treatment with two or more prior tyrosine kinase inhibitors (TKIs).

The new study is designed to complement the ongoing registration-directed clinical trial in CML patients with the T315I point mutation, and will recruit CML patients from chronic, accelerated and blast-phase disease states.

CML patients routinely receive treatment with imatinib mesylate (Gleevec®) and dasatinib (Sprycel®), TKIs that are approved in the US and Europe. In addition, other TKIs are available as experimental therapies. Patients who are resistant or intolerant to the approved TKIs have limited treatment options. The CML-203 study is designed to evaluate whether Ceflatonin can provide clinical benefit to such patients.

The first patient was enrolled into CML-203 at the **MD Anderson Cancer Center** in Houston, Texas, and ChemGenex is expanding the study to an estimated 15 centres through the US and Europe. It is expected that 50 to 75 patients will be enrolled into CML-203.

► **More information:** [www.chemgenex.com/wt/home/index](http://www.chemgenex.com/wt/home/index)

## Needle free

Medical technologies group **Norwood Abbey Ltd** advises further progress in the needle-free injection system project being undertaken at the **BioInstrumentation Laboratory** at **Massachusetts Institute of Technology (MIT)** under the direction of **Professor Ian Hunter**.

Norwood advises that researchers at MIT have achieved an immune response in a trial to test the suitability and efficacy of its needle-free devices to deliver vaccines. All animals injected with the vaccine using the Norwood needle-free device showed the expected immune response. The Hepatitis B surface antigen was chosen as representative of typical vaccines.

Achievement of an immune response indicates that vaccines can be successfully injected with Norwood's needle-free device. The original aim of the project was to develop a low-cost and silent needle-free injection device to deliver vaccines to a targeted depth. Norwood believes that the success of this first trial will help attract prospective partners in the delivery of pharmaceuticals, biologicals and especially vaccines.

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

## Scam alert

The **Australian Bankers' Association** (ABA) is warning Australian businesses of money-transfer email scams targeting export businesses.

The fraudulent emails often look as though they are sent from Ghana or Nigeria and are aimed at businesses that could send goods overseas such as electrical appliances, office equipment, building supplies or computers.

An example of the scam is an Australian building supplies company being contacted by email by a Reverend working for a Ghanaian company, to supply a quote for a large order of building materials for the construction of an orphanage in Ghana. The fraudster accepts the quote from the Australian company, without any negotiation, and notes that freight costs need to be paid to transport the goods to Ghana. He suggests they contact a Ghanaian freight company to seek a quote.

The alleged Ghanaian freight company sends back an email, which notes the freight costs will be \$5000. The fraudster supplies his credit card details to the Australian building supplies company, which charges his card for \$5000 for the freight cost. The fraudster then asks the Australian building supplies company to send \$5000 via **Western Union** to the alleged Ghanaian freight company, as he claims he cannot complete this transaction himself. The Australian company transfers the \$5000 via Western Union and at the same time the fraudster arranges for the credit card transaction to be reversed.

The outcome is that the Australian building supplies company is defrauded of \$5000, the fraudster does not have to pay the \$5000 credit card bill, the alleged freight company has received the funds and no order for building supplies is ever placed.

David Bell, chief executive of the ABA, says: "If you have been targeted by this scam, contact your bank immediately. Banks can complete a fraud investigation, but it is usually not possible to retrieve any money from these criminals based overseas, which means that businesses may lose money as a result of this type of fraud."

► **More information:** [www.bankers.asn.au/default.aspx?ArticleID=1073](http://www.bankers.asn.au/default.aspx?ArticleID=1073)

## Cutting energy

A world-leading program to encourage Australia's biggest energy users to improve their energy efficiency has received strong support from industry. To date, 211 corporations, accounting for 60% of Australia's total business energy use, have registered for the program, according to the Industry, Tourism and Resources Minister, **Ian Macfarlane**.

"I'm encouraged by the number of companies that have registered in the Energy Efficiency Opportunities program, and that these companies account for such a major proportion of Australia's energy use," he says.

The **Australian Government's Energy Efficiency Opportunities Act** came into force on 1 July 2006. Under the act, companies with an annual use of more than half a petajoule (PJ) of energy per year are required to register with the **Industry Department's Energy Efficiency Opportunities program** and conduct rigorous energy-use assessments.

"As these businesses are big users of energy, any reduction

in their energy use or increased energy efficiency will make a significant contribution to cuts in Australia's greenhouse gas emissions," Mr Macfarlane says. "Half a petajoule of energy is equivalent to the amount of energy used by 10,000 households a year, so these businesses are big users."

► **More information:** **Claire Wilkinson (02) 6277 7580, 0419 840452**

## Scars of success

**Giaconda Ltd** has published a research paper on the role of anti-mycobacterial therapy in profound healing of ulcerating Crohn's Disease in the peer-reviewed *Digestive and Liver Disease Journal*. Myoconda®, the company's lead product, is the patented commercial version of the anti-MAP therapy discussed in the research paper.

The paper, *Anti-mycobacterial therapy in Crohn's Disease heals mucosa with longitudinal scars*, reports on 39 patients who have received anti-MAP treatment for six months to nine years. A copy of the abstract is available online at [www.sciencedirect.com](http://www.sciencedirect.com).

Scarring is an essential part of the healing process in ulcerating Crohn's Disease. Twenty-two out of 39 patients (56.4%) healed with unusual scarring and 15 patients demonstrated a marked reduction in inflammation (38.5%). Of these 15 patients, 12 demonstrated longitudinal scarring (80%) and six (40%) displayed restoration of normal mucosa. Of these six patients, two who had received more than three years of treatment displayed receding scars that became imperceptible as complete healing was achieved.

The presence of scarring fading to normal mucosa on anti-MAP therapy implies a more profound healing than that reported with standard anti-inflammatory and immunosuppressant drugs.

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

## Rhino deterrent

**Biota Holdings Limited** has announced the successful completion of the second stage of its Phase I human safety and tolerability study of BTA798, a potent inhibitor of human rhinovirus (HRV), the major cause of the common cold. The drug has been shown to be safe and well tolerated at all doses. Biota intends to advance the development of the drug to Phase II trials.

Commenting on the trial results, Biota's chief executive officer, **Peter Cook**, says: "A safe and effective treatment for HRV would [assist] high-risk sufferers of asthma, chronic obstructive pulmonary disease and cystic fibrosis, and patients with compromised immune systems for whom the common cold can trigger events leading to serious illness and hospitalisation."

The trial involved a total of 32 healthy volunteers and studied the effects of two dose levels, once or twice daily. The study was double-blind and used placebo controls. All single and multiple doses. The clinical trial design and the product's data package were approved before the trial by an independent ethics committee (IEC) and the **Medicines and Healthcare Products Regulatory Agency** (MHRA) in the UK. The trial was conducted in the UK by a specialist contract research organisation.

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

## Pigs out

New Zealand patients living with type I diabetes could have the opportunity to trial a revolutionary pig cell therapy to overcome their disease, while Australian diabetes I sufferers will be missing out.

The **Australian Government** placed a moratorium on pig cell therapy, also called xenotransplantation, in 2004, preventing this type of therapeutic approach from being trialled in Australia. In New Zealand, however, the government recommended that xenotransplantation should proceed on a case-by-case basis.

A pig cell therapy approach for diabetes has been approved by the New Zealand regulator **MedSafe**, enabling Australian company **Living Cell Technologies** (LCT) to conduct a clinical trial of its DiabeCell® diabetes product in New Zealand. LCT is applying for the final step of approval from New Zealand's **Regional Ethics Committee**.

DiabeCell® is a porcine islet cell product for the treatment of insulin-dependent diabetes. The pig cells are embedded in a capsule of alginate seaweed and injected into the body without any immunosuppression. DiabeCell® produces insulin to help regulate blood glucose levels appropriate to the amount of glucose detected in the bloodstream of the diabetic recipient.

LCT's application is to conduct the clinical trial of its DiabeCell® product on eight longstanding Type 1 (insulin-dependent) diabetics. The clinical trial is expected to take about 12 months and will then be followed by a larger pivotal trial.

► **More information:** [www.lct.com.au/news/94.php](http://www.lct.com.au/news/94.php)

## Liver promise

**Progen Pharmaceuticals Limited** has announced the final stage I results of its phase II trial of PI-88 in patients who had previously undergone surgical removal of liver cancer. The 48-week data demonstrated that 160mg of PI-88 showed an improvement in disease-free rate, the primary endpoint, of 25% and prolonged the time to tumour recurrence (disease-free survival) from 27 to 48 weeks, or by 78%, building on the 30-week results announced in December.

The first stage of the randomised, two-stage multi-centre phase II trial was designed to determine the appropriate dosage and possible efficacy of PI-88 in reducing tumour recurrence in liver-cancer patients who had previously undergone surgical removal of the cancer. Patients in this stage of the phase II trial were randomly assigned to one of three groups to receive either the standard of care (with no PI-88 treatment), 160mg of PI-88, or 250mg of PI-88, over 36 weeks with a 12-week follow-up period.

The 250 mg dose of PI-88 reduced the disease-free rate by approximately 19% compared with the control group, from 50% to 41% at 48 weeks, and was inseparable from the control group as to disease-free survival.

"These phase II data support the conclusion that PI-88 has the potential to extend the disease-free survival time of patients with post-resection liver cancer, who have few if any treatment options and a high likelihood of disease recurrence," says **Professor Pei-Jer Chen**, director of the **Medical Research Department of the National Taiwan University Hospital**, and the trial's principal investigator.

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

## Clearing the air

**Pharmaxis** has enrolled its first patient in its international phase III clinical trial evaluating Bronchitol in cystic fibrosis sufferers. The phase III trial is being conducted in 40 hospitals across Australia, the UK and Ireland, and is the final clinical step before Pharmaxis seeks approval to market Bronchitol for cystic fibrosis in the European Union, Australia and elsewhere.

The trial design has been constructed following consultation with the European and Australian regulatory agencies and will assess the effectiveness and safety of Bronchitol in treating cystic fibrosis.

The phase III clinical trial is designed to include a 26-week efficacy treatment period, followed by a 26-week safety extension period. The efficacy component of the trial is a randomized, double-blind investigation of Bronchitol twice daily in approximately 250 patients with cystic fibrosis. The trial is enrolling cystic fibrosis patients aged six years and above. Participants will be assessed for improvements in lung function, infectious episodes and quality of life.

Pharmaxis is developing Bronchitol as a treatment to improve mucus clearance in the lungs of patients with cystic fibrosis, bronchiectasis and chronic obstructive pulmonary diseases. Bronchitol is a patented, inhalable dry powder formulation of mannitol that can be administered by a hand-held pocket-sized device. The **US Food and Drug Administration** has granted Bronchitol fast-track status and it is designated as an orphan drug in the US and Europe.

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

## Eye-deal

**pSivida Limited** has signed an exclusive worldwide collaborative research and licence agreement with **Pfizer Inc.** for pSivida's controlled drug delivery technologies, including the Medidur™ technology, in ophthalmic applications. Medidur™ is a tiny, injectable device designed for the sustained release of drugs and is being studied for the treatment of diabetic macular edema (DME), the leading cause of blindness for Americans under the age of 65.

Under the terms of the agreement, pSivida will receive up to \$191 million in development and sales-related milestones. The two companies will work together on a joint research program aimed at developing ophthalmic products using pSivida's sustained drug-delivery technology. In addition to milestone payments, Pfizer will fund the cost of the joint research program. Pfizer will have an exclusive licence to market all products developed as part of this research collaboration in ophthalmic applications and will pay pSivida a royalty on sales. Pfizer may terminate the agreement on 60 days notice without cause.

In addition, Pfizer has agreed to invest \$6.1 million in ordinary shares of pSivida on entering into the licence agreement, the proceeds of which will be held in escrow until they can be used (together with other cash available to pSivida) to redeem an outstanding convertible note.

Medidur™, in combination with fluocinolone acetonide, is in phase III clinical trials with **Alimera Sciences Inc.**, a speciality pharmaceutical company focused on the ophthalmic industry.

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

## Plaque scrubber

**CSL Limited** has announced results from a study published in the *Journal of the American Medical Association* that suggest infusions of a new drug, CSL-111, to acutely raise HDL ('good' cholesterol) levels, may reduce the amount of plaque in the coronary arteries of patients with a recent episode of acute coronary syndrome (ACS).

CSL advised that the Effect of Reconstituted HDL on Atherosclerosis – Safety and Efficacy (ERASE) trial was a phase II, randomised, blinded, placebo-controlled study conducted at 17 sites throughout Canada and coordinated by the **Montreal Heart Institute**.

The trial examined whether four infusions of CSL-111, given at weekly intervals to patients with a recent episode of ACS, could reduce the volume of plaque in the coronary arteries. ACS is the term used to describe unstable angina and myocardial infarction (heart attack). Ten to 15 per cent of patients still experience a serious cardiovascular problem in the 12 months following an episode of ACS.

Assessment of the arteries was performed using intravascular ultrasound (IVUS) and quantitative coronary angiography (QCA) before and two to three weeks after the treatment.

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

## Biotech call

**Senator Kim Carr**, shadow Minister for Industry, Innovation, Science and Research, has called on the **Australian Government** to undertake a public review of the biotech sector. This follows a meeting with the peak organisation for the sector, **AusBiotech**, to talk about the opportunities for biotechnology in Australia.

Labor says the Government needs to be thinking about biotechnology in the broader context of R&D and innovation.

"The upcoming budget provides an opportunity for the Howard Government to make a serious commitment to internationalising Australian R&D for the benefit not only of the biotechnology sector, but all R&D-intensive industries," Senator Carr says. "As part of this, the Government must make a decision on whether it will relax the beneficial ownership rules for the R&D tax concession.

"It is simply not good enough for **Ian Macfarlane** to speculate about it. The Government is in a position to act, and it should do so – one way or the other."

The Government is about to begin another evaluation of the National Biotechnology Strategy and **Biotechnology Australia**, for which funding is due to lapse at the end of June 2008.

► **More information:** [www.labor.com.au/media/0407/msind130.php](http://www.labor.com.au/media/0407/msind130.php)

## Gene test

**Genetic Technologies Limited** (GTG), a DNA-testing laboratory, has signed a strategic alliance with **UTEK Corporation**, a US-based speciality finance company focused on technology transfer. Under the alliance, UTEK will assist GTG to identify genetic analysis IP developed by US-based research entities which may be of interest to GTG's Melbourne-based genetic testing business.

The initial focus of this relationship will be in the area of non-coding DNA analysis and it is expected that GTG will grant

these research entities a licence to its non-coding patents as part of any consideration payable.

Through its strategic alliance agreements, UTEK assists companies to enhance their new-product pipeline through the acquisition of proprietary intellectual capital from universities and laboratory research centres.

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

## Optimum protein

**EvoGenix Limited's** partner **GlaxoSmithKline** (GSK) has confirmed the successful completion of the first project between the two companies. Achievement of the target set for the project triggers a milestone payment to EvoGenix by GSK. Financial terms were not disclosed.

Under the agreement, EvoGenix used its protein optimisation technology, **EvoGene™**, to develop improved versions of a protein product from the GSK pharmaceutical pipeline. The protein variants generated had improvements in affinity that exceeded the 20-fold goal specified in the collaboration agreement.

EvoGenix announced completion of its work on the project in October last year. Subsequent evaluation and confirmation of the results by GSK has now been finalised successfully. GSK will be responsible for further development of the product, with EvoGenix eligible to receive additional milestone payments as the product progresses through the pipeline. EvoGenix is also set to earn royalties on product sales should it be approved and launched.

► **More information:** [www.evogenix.com/news.htm](http://www.evogenix.com/news.htm)

## 100 heart pumps

**Ventracor** has announced the 100th implant of the **VentrAssist™** left ventricular assist device (LVAD). The surgical procedure was performed by a team led by **Professor Lars Wiklund** at the **Sahlgrenska University Hospital** in Gothenburg in Sweden.

"We are honoured to be the team to implant the 100th VentrAssist™, and to join the growing number of distinguished surgeons and cardiologists worldwide using this exciting Australian technology to help heart-failure patients and their families," Professor Wiklund says.

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

## Safer sunlight

**Clinuvel Pharmaceuticals Limited** has received approval from the Swiss regulatory agency **Swissmedic** to commence a phase III trial of its photo-protective drug CUV1647 in erythropoietic protoporphyria (EPP). Approval has also been granted by the medical ethics committee of a Zurich hospital, one of the sites where this multicentre trial will be conducted.

EPP is a rare genetic disorder in which there is a metabolic impairment that results in absolute sun intolerance. The primary objective of the trial is to determine whether CUV1647 reduces the number and severity of phototoxic skin reactions (burning pain in the skin following light exposure) in patients with EPP. It is expected that between 50 and 70 patients will participate.

► **More information:** [www.epitan.com.au/IRM/content/investors\\_news.htm](http://www.epitan.com.au/IRM/content/investors_news.htm)

## More climate antics

Continuing the exponential growth in climate change R&D across Australia, the following initiatives have been announced.

**QUEENSLAND**'s climate change experts have joined forces with two of Britain's leading institutions. In London, Queensland Premier **Peter Beattie** signed an Agreement for International Research Cooperation between the new **Queensland Climate Change Centre of Excellence (QCCCE)** in Brisbane and the **Walker Institute for Climate System Research**, at the **University of Reading**, UK. The objective of the collaboration is to support international research activities into climate and agricultural and hydrological systems. Several initial joint projects are already on the table with funding from the **Queensland Department of Natural Resources and Water**, which runs the QCCCE budget.

Mr Beattie also formalised links between the QCCCE and the UK **Hadley Centre for Climate Change**, through an agreement fostering joint research and development into climate applications, systems analysis and modelling. "The joint activity proposed for the QCCCE and Hadley Centre will also strengthen links with other leading climate research groups in Europe and the US, including the **US National Oceanic and Atmospheric Administration's Earth System Research Laboratory** and the **Cooperative Institute for Research in Environmental Sciences/Climate Diagnostics Centre at Colorado University**," he said.

**WEST AUSTRALIA** The **State Government** has committed an extra \$8.6 million over the next five years to research climate change and its link to extreme weather events across Western Australia. The funding will also be used to identify WA regions most affected by climate change and to provide information so the state can better adapt to the effects of climate change.

An allocation of \$4 million will support stage three of the Indian Ocean Climate Initiative (IOCI), a climate research partnership between the State Government, **CSIRO** and the **Bureau of Meteorology**. Stage three expands earlier strategic research on the south-west and will include new research on the north-west and the development of future regional climate scenarios. A further \$4.625 million has been committed to identify regions and sectors in WA most vulnerable to the effects of climate change and to develop adaptation programs.

WA Premier **Alan Carpenter** says the IOCI's climate research has already played a major role in government decision-making. "It was IOCI research that revealed a 15% decline in winter rainfall in the state's south-west over the past 30 years," he says. "This research recognised that lower rainfall could be an ongoing feature of the south-west and was a key factor in our decision to build the Perth desalination plant, which now supplies 17% of Perth's drinking water."

**VICTORIA** The **State Government** is providing 'clean-coal' grants to help research into capturing and storing greenhouse emissions. The \$9.43 million package of grants – funded through the Energy Technology Innovation Strategy – will see research institutions and Latrobe Valley generators working on 10 projects valued at more than \$20 million.

The grants include:

- \$2.06 million to the **Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC)** for a project to test

pre-combustion carbon dioxide capture technologies in power generation. The grant is part of a \$4.1 million project aimed at substantially reducing the cost of pre-combustion CO<sub>2</sub> capture technologies and to look at other techniques that are likely to prove cheaper in the long term. The research will involve **CO2CRC**, **HRL Developments, Process Group, Innovative Carbon Technologies** and the universities of **Monash** and **Melbourne**;

- \$2.5 million to **Loy Yang Power** and **CO2CRC** in a \$5.6m project to research technology options in the post-combustion capture of CO<sub>2</sub> from the Loy Yang A and Hazelwood power stations. The research will be undertaken by Loy Yang Power, **CO2CRC**, **CSIRO**, **International Power's Hazelwood Power Station, Process Group, Innovative Carbon Technologies** and **Melbourne** and **Monash** universities.
- \$1.3 million to **Monash University** for a \$2.6 million project with its partners to look at oxy-fuel combustion, which has the potential for brown-coal-fired power stations to reach near-zero emissions and also capture emissions for underground storage. The research will also involve **International Power Hazelwood** and **Loy Yang B, Loy Yang Power, TRUenergy** and **HRL Pty Ltd** and has the additional potential benefit of converting the water in brown coal into a quality suitable for use in power generation.
- ▶ **More information:** [www.walker-institute.ac.uk](http://www.walker-institute.ac.uk), [www.metoffice.gov.uk](http://www.metoffice.gov.uk), [www.ioci.org.au/](http://www.ioci.org.au/), [www.dpi.vic.gov.au/energy](http://www.dpi.vic.gov.au/energy)

## Live brains

**Queensland** has become one of only a handful of locations around the world, and the first in the Southern Hemisphere, to acquire new technology that enables scientists to analyse 'live' brains. The Minister for State Development, **John Mickel**, visited the **Queensland Brain Institute (QBI)** at the **University of Queensland** to launch a state-of-the-art 16.4Tesla (700 MHz) magnetic resonance imaging (MRI) spectrometer for advanced brain imaging.

Mr Mickel said the spectrometer, which allows scientists to develop sophisticated images of the brain down to the cellular level, was purchased with more than \$5 million in **Queensland Government Smart State** funding.

The QBI's director, **Professor Perry Bartlett**, says scientists are using the equipment to look at molecules they believe will help with the regrowth of damaged nerve cells following trauma such as spinal cord injury.

"If this proves successful in animal models we could conceivably go to trials within the next 18 months to two years," he says.

- ▶ **More information:** **Professor Perry Bartlett 07 3346 9560**

## SA biosecurity

A new training facility at **Gilles Plains TAFE** will give South Australia a national industry edge in the critical and emerging area of biosecurity, according to the state's Further Education Minister, **Paul Caica**.

"This training centre features the only dedicated teaching laboratory in Australia built to strict industry standards for the containment of contaminants, including those that are airborne," he says. "This will provide the first simulated industry working environment for the training of technicians skilled in biosecurity protocols and the assessment of biological risk."

Although students will not be learning with any toxins or harmful material at the centre, they will have first-hand, practical experience of

the thorough procedures and equipment required in a real industry setting. Mr Caica says the centre will also make available for the first time in SA full-time training in veterinary nursing, to meet the growing need for skills in the veterinary and animal industry sectors.

Funding for the redeveloped **Veterinary and Applied Science Centre (VASC)** has been provided under the National Training Infrastructure program, with \$10 million provided by the **Australian Government** and \$5 million by the **SA Government**.

► **More information:** [www.ministers.sa.gov.au/news.php?id=1439](http://www.ministers.sa.gov.au/news.php?id=1439)

## Sustainable Victoria

Victoria's Minister for Energy and Resources, **Peter Batchelor**, has announced more than \$8 million for four major research and development projects in the Sustainable Energy Research and Development grants program.

The successful projects are:

- a \$6 million grant for a \$12 million project headed by the **University of Melbourne** to develop and increase the efficiency of organic solar cells as an alternative to silicon-based cells in the generation of solar power. The project could lead to the establishment of a centre of excellence in Victoria in research in this area. The grant partners include **Monash University**, **CSIRO**, **Securrency** (including **Innovia Films**), **BP Solar**, **Merck**, **Bluescope Steel** and **NanoVic**;
- a \$1.2 million grant for a \$2.92 million project led by the University of Melbourne to look at the development of a more efficient hydrogen-fuelled car engine and also the storage of hydrogen. The project team includes **Ford Motor Company of Australia**, **Haskel Australia Pty Ltd** and the universities of **North Florida**, **California (Berkeley)** and **Delaware**;
- a \$650,000 grant for a \$1.3 million project led by Monash University to research the recycling of waste plastics for the production of diesel fuel. Monash University will work with **Ozmotech Pty Ltd** to investigate the formation of aromatic compounds in the production of diesel and the stringent standards for their use in the fuel; and
- a \$250,000 grant for a \$500,000 project led by the **Australian Sustainable Industry Research Centre Ltd (ASIRC)**, based in the Latrobe Valley, to investigate the energy efficiency of solvent-based fuel derived from recycling industrial liquid wastes. This research by ASIRC and **Geocycle Pty Ltd** will seek to reduce the amount of industrial liquid wastes going to landfill, and also partially substitute the fossil-fuel requirements of the cement and other energy-intensive industries.

The projects are due to be completed by July 2010.

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

## \$25m water allies

Queensland Premier **Peter Beattie** says the signing of an MOU between the **Queensland Government**, **CSIRO**, the **University of Queensland** and **Griffith University** has created the Urban Water Security Research Alliance.

"The Government is investing \$25 million in this five-year alliance, which will be the largest urban water-research program in Australia and could more than double the water-recycling capacity of Australia's capital cities," he says. "This work will look at best-practice engagement and management of recycling and help develop a

coordinated system of water management for South-East Queensland (SEQ), by addressing the total water cycle from upstream catchments to Moreton Bay. In the short term, the alliance's goal is to build reliability and safety in recycled water systems providing up to 90GL per annum to SEQ.

"In the long term, the alliance will work towards delivering water security by recycling wastewater and stormwater through the innovative treatment, storage and use of aquifers to provide up to 20% of the total water supply."

Mr Beattie says the operational activities of the alliance will be managed by a committee of seven members. CSIRO will employ a program director to manage the day-to-day activities of the program, with the officer to be hosted by the **Queensland Water Commission**.

► **More information:** 07 3224 4500, [www.griffith.edu.au/](http://www.griffith.edu.au/)

## Tissue boost

One of the world's most advanced research facilities for tissue engineering, the **Australian Tissue Engineering Centre (ATEC)**, has been opened in Melbourne. The \$12 million centre will provide preclinical research and testing facilities for cell therapies to tackle chronic and degenerative diseases like leukaemia, diabetes, heart attack and stroke.

The **Victorian Government** has provided \$5.2 million towards the centre through its Science, Technology and Innovation (STI) Infrastructure Grants program.

ATEC Limited is the result of collaboration between the **Bernard O'Brien Institute of Microsurgery**, the **Australian Stem Cell Centre Limited**, the **University of Melbourne** and **St Vincent's Hospital**.

► **More information:** <http://www.dpc.vic.gov.au/>

## Korea in synch

The **Australian Synchrotron** and the **Pohang Accelerator Laboratory (PAL)** in South Korea have signed an MOU to promote scientific collaboration.

PAL director **Professor In Soo Ko** says he is keen to promote partnerships between Korean and Australian scientists: "Korea hopes to strengthen its science relationship with Australia and build a strong synchrotron network in the Asian region. The bond between PAL and the Australian Synchrotron will benefit both nations."

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

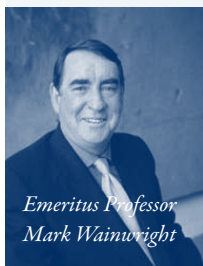
## Aquatic renovation

Queensland's Minister for Primary Industries and Fisheries, **Tim Mulberin**, says planning is under way for a \$4 million redevelopment of the **Bribie Island Aquaculture Research Centre**.

"Fisheries scientists from the **Southern Fisheries Centre** at Deception Bay will be relocated to the revamped facility," he says. "The new and improved facilities will allow important research such as pest fish control strategies and also stocking strategies for Murray cod, silver perch and eel-tailed catfish."

"The new building will have room to house up to 64 tanks with up to 10,000 litres and 30 glass aquaria, two temperature-controlled experimental rooms, a wet laboratory, a cold room and walk-in freezer, a quarantine area and other features to ensure strict biosecurity is maintained between projects on site."

► **More information:** 07 3239 6530



*Emeritus Professor  
Mark Wainwright*



*Maria  
Kordjamshidi*



*Dr John Keniry*



*Dr Tim Entwistle*

## Plant honour

The title of New South Wales Government Botanist has been awarded to **Dr Tim Entwistle**, who is executive director of the Botanic Gardens Trust. The title dates back to 1816, when Allan Cunningham was appointed 'King's Botanist', but has evolved throughout the years to 'Colonial Botanist' and 'Chief Botanist' before being discontinued in 1985.

## Cool VC

One of the world's leading Antarctic researchers has been appointed as Pro Vice-Chancellor (Research) at the University of Tasmania. **Professor Johanna Laybourn-Parry** will take up the position, which administers all UTAS research programs, in August. She is executive dean of Natural Sciences at Keele University in the UK.

## Energetic

University of New South Wales PhD student **Maria Kordjamshidi** has won the Australian Institute of Energy's national award for the best Alternative Energy Pathways Project for her research into energy-rating schemes for houses. The accolade is Maria's second major award. In early 2006 she won the best project award in the Energy in Society category of the NSW-ACT Postgraduate Student Energy Awards.

## Curtin call

**Professor Andris Stelbovics**, deputy vice-chancellor research at Murdoch University, has been appointed executive dean of the Division of Science and Engineering at Curtin University of Technology. Professor Stelbovics' academic background is in theoretical physics, with a special interest in scattering theory and the modelling of atomic collisions. He joined Murdoch in 1984 as a lecturer and also worked as head of department, head of discipline and as joint director of the Centre for Atomic, Molecular and Surface Physics. In 2003 he was appointed deputy vice-chancellor research.

## Good Fellows all

The Australian Academy of Science has elected sixteen new Fellows: **Professor David Albert Cooper**, National Centre in HIV Epidemiology and Clinical Research;

**Professor Ian William Dawes**, School of Biotechnology and Biomolecular Sciences, University of New South Wales; **Dr John Joseph Finnigan**, CSIRO Centre for Complex System Science; **Professor Min Gu**, Faculty of Engineering and Industrial Sciences, Swinburne University of Technology; **Professor Richard Paul Harvey**, Victor Chang Cardiac Research Institute; **Professor David John Hill**, Department of Information Engineering, Australian National University; **Professor John Joseph Hopwood**, Women's and Children's Hospital, Adelaide; **Professor**

**Ian Douglas Hume**, School of Biological Sciences, University of Sydney; **Professor David Ernest James**, Garvan Institute of Medical Research; **Professor Peter Andrew Lay**, School of Chemistry, University of Sydney; **Professor Douglas Robert MacFarlane**, School of Chemistry, Monash University; **Dr Rana Ellen Munns**, CSIRO Plant Industry; **Professor Stephen James Simpson**, School of Biological Sciences, University of Sydney; **Professor Scott William Sloan**, Department of Civil, Surveying and Environmental Engineering, University of Newcastle; **Professor Gordon George Wallace**, Intelligent Polymer Research Institute, University of Wollongong; and **Professor Alan Hepburn Welsh**, Centre for Mathematics and its Applications, Australian National University. **Professor Elizabeth Blackburn**, University of California San Francisco, and **Professor Michael Powell**, University of Cambridge, have been elected Corresponding Members.

## Biotech import

Biopharmaceutical company Peptech Limited has appointed **Dr Lincoln Chee** as a non-executive director. Dr Chee has extensive medical experience, is an active investor in biotechnology companies and is an adviser to life science investment firms. He is managing director of Quality HealthCare Medical Services, Hong Kong's leading healthcare group.

## Sheep boss

**Dr John Keniry** has been appointed as chairman of the board of the Cooperative Research Centre for Sheep Industry Innovation, which replaces the existing Australian Sheep Industry CRC. Dr Keniry has served as chairman or director of numerous agribusiness and mining ventures in Australia and New Zealand, and on the boards of government organisations at state and federal level. He has a background in meat production research through roles on the Pig R&D Corporation and as Chairman of the Pork CRC. He also chaired the CRC for International Food Manufacture and Packaging Science.

## Chemical chief

**Dr Marion Healy** has been appointed the new director of the Australian Government's industrial chemical safety regulator, the National Industrial Chemicals Notification and Assessment Scheme. Until recently Dr Healy was the chief scientist for Food Standards Australia and New Zealand.

## Top vet

**Dr Robert Rahaley** is the new chief veterinary officer for South Australia. Dr Rahaley, a veterinary pathologist, graduated from Melbourne University Veterinary School in 1972 and gained his Master's degree from the same university in 1975.

## FEAST host

**Dr. Mark Matthews** is the new executive director of the Forum for European-Australian Science and Technology Cooperation. He has held positions at the Science and Technology Policy Research Unit (SPRU) at the University of Sussex, the School of Management, University of Bath, and the Warwick Manufacturing Group at the University of Warwick. He is also an Adjunct Associate Professor in the Department of Engineering at the Australian National University. His government advisory committee work includes membership of the Research Quality Framework Metrics Working Group in 2006 and the Safeguarding Australia expert sub-committee of the Australian Government's National Collaborative Research Infrastructure Strategy in 2005

## Deakin clinician

**Associate Professor Ross Carne**, a Victorian neurologist, has been appointed Director of Clinical Studies at Deakin University's new medical school. Associate Professor Carne has worked in Melbourne and Geelong as a neurologist and epileptologist, dealing with patients with a range of conditions including epilepsy, stroke, multiple sclerosis and Parkinson's disease.

## Safety first

**Graham Peachey**, Food Science Australia and New Zealand's chief executive officer, has been appointed to the CEO position of the Australian Maritime Safety Authority (AMSA). Mr Peachey follows Clive Davidson, whose term has expired after serving as the CEO of AMSA for nine years.

## Deputy VC

**Mary Foley** has been elected the new deputy chancellor of the University of Western Sydney. Ms Foley is a longstanding member of the University Board of Trustees and serves on several committees, including as the chair of the Strategy and Resources Committee.

Ms Foley is chief executive officer of St Vincents and Mater Health, Sydney. She is also a member of the board of the Garvan Institute of Medical Research and the board of the Victor Chang Cardiac Research Institute.

## Hon Doc

The University of New South Wales' former vice-chancellor, **Emeritus Professor Mark Wainwright**, has been awarded an Honorary Doctorate of Science for his eminent and distinguished service to the university. He was appointed a lecturer in the School of Chemical Technology in the then Faculty of Applied Science in 1974 and eventually became dean of Engineering and Vice-Chancellor (Research) before being appointed as Vice-Chancellor in July 2004.

## Grains boost

An additional investment of \$21 million over five years has been made to the **Australian Centre for Plant Functional Genomics** (ACPFPG) that specialises in developing crop plants that cope with extreme environmental conditions, including drought, salinity and frost. The new funds are provided by the **Australian Research Council** (\$11 million) and the **Grains Research and Development Corporation** (\$10 million).

The award was announced by the Minister for Education, **Julie Bishop**, and the Parliamentary Secretary to the Minister for Agriculture, **Sussan Ley**.

“Environmental stresses such as drought, salinity and frost are a major cause of loss of cereal crop yield and quality throughout the world,” Ms Bishop says. “It is hoped that research conducted by the ACPFG will uncover novel characteristics that Australian breeders can use to develop wheat and barley varieties with increased stress resistance, and that will lead to economic benefits.”

The ACPFG was established in 2002 as a research-based company with an initial five-year cash investment of \$27 million from the ARC, the GRDC and the **South Australian Government**.

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

## Unnatural drying

Research will be stepped up into the causes and magnitude of climate change in Western Australia following the release of a report showing that observed temperature increases and winter rainfall decline in south-west WA are unlikely to be due to natural climate variability alone.

According to the **Indian Ocean Climate Initiative** (IOCI), there is increased confidence that the region's climate is likely to continue to become warmer and drier, due to the increase in greenhouse gases. Results show that by 2030 there is likely to be a rise in temperatures in all seasons and a decrease in winter rainfall. Rainfall may decline by as much as 20% relative to the 1960–1990 level, with the number of winter rain days decreasing by as much as 17%. Run-off in south-west WA catchments consequently decreased by between five and 40%. By about 2085, these changes may further increase, with rainfall declining by between five and 34% and the number of winter rain days decreasing by as much as 30%.

The next stage of IOCI will be a much bigger research effort to investigate other aspects of WA's climate, particularly in the economically important north-west. Running to 2011, it aims to improve understanding of the contribution to climate change in the region from factors such as the Asian Brown Cloud, and improve our understanding of tropical cyclones in the north-west.

IOCI is a partnership of the **State Government of Western Australia**, **CSIRO**, and the **Bureau of Meteorology**.

► **More information:** **Dr Bryson Bates, 08 9333 6554**

## Tougher on water

The **National Water Initiative** (NWI) and its scrutiny by the **National Water Commission** need strengthening to achieve national water reform, according to the **Australian Academy**

of **Technological Sciences and Engineering** (ATSE). In its submission to the commission's first biennial review of the NWI, ATSE says that the NWI is hampered by varying levels of commitment from states and territories. This needs to be addressed by developing more incentives and sanctions.

Arguing in favour of integrated catchment planning and management, ATSE also calls for better strategic water planning, suggesting a stronger focus to encourage state and territory governments to implement strategies to drive integrated water, sewage and energy planning and to give greater focus and priority to rural reform.

► **More information:** **Bill Mackey, 03 9340 1206, [www.atse.org.au](http://www.atse.org.au)**

## One Geology

**Geoscience Australia** is to join similar organisations from more than 40 countries to embark on an ambitious geological mapping program. Representing Australia, **Dr Lesley Wyborn** from Geoscience Australia and **Dr Simon Cox** from **CSIRO Exploration and Mining** joined representatives from 53 national and international organisations at a workshop in Brighton, UK, to investigate ways of creating dynamic digital geological map data for the world.

The project, titled OneGeology, will provide internet access to the most up-to-date, worldwide geological map data at a scale of 1:1 million as part of the 2008 International Year of the Planet Earth program. The data will be made available via a new geological exchange language known as GeoSciML.

“Each country will make its 1:1M geological map data available using web service technologies for distribution through the OneGeology portal using Google Earth and other dynamic map browsers,” Dr Wyborn says. “OneGeology also will transfer valuable information on web services to the developing world, accelerating the process of bringing people in less-developed countries into the digital age.”

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

## Vote for R&D levy

The Australian dairy levy which funds R&D projects will remain at 1%, in line with the wishes of 66% of those who voted in the first dairy industry levy poll. The Minister for Agriculture, **Peter McGauran**, who approved the rate, says the poll reflects dairy farmers' belief that R&D is critical to the success of their industry. **Dairy Australia** is to continue to fund projects, with the Government matching it up to about \$15 million a year.

“Now that this investment in R&D has been secured, I urge dairy farmers to prepare for drought recovery so that they can take advantage of the predicted autumn rains,” Mr McGauran says. “The dairy industry is a great Australian agricultural success story. In 1980 it exported nearly \$870 million worth of dairy products, less than a quarter of our total dairy production. Today it sells half its total production overseas and exports have risen to \$2.7 billion.”

► **More information:** **Ben Houston, 02 6277 7520**

## Landmark signing

**CSIRO** has signed a letter of intent to commercialise new mining automation technology with **Joy Global Inc**, one

of the world's largest mining-equipment manufacturers. The deal is expected to result in a licensing agreement for the commercialisation of CSIRO's underground longwall automation technologies.

In underground longwall coal mining, a large shearing machine with rotating cutting heads is driven back and forth across the coalface to remove a massive slice of coal. This form of mining accounts for 90% of underground coal production in Australia, or 70 million tonnes a year. CSIRO has developed an automated technology to locate and guide the coal-cutting equipment that allows people to move away from hazardous areas. A pre-commercial prototype has been operating at Xstrata's Beltana longwall mine.

► **More information: Bob Chamberlain, 07 3327 4469**

## Sun lovers

Three new agreements have been signed between the **University of NSW** and some of the fastest growing solar-cell manufacturers in Asia, including **Suntech Power**, the company formed by UNSW graduate **Dr Zhengrong Shi**. The new deals were signed by **NewSouth Innovations**, the technology transfer arm of UNSW, and involved **E-Ton Solar Tech Co** in Taiwan, **CEEG Nanjing PV Tech** in China and **Suntech Power** in China.

The \$1.7million licensing agreement signed with E-Ton Solar Tech includes a collaborative research program to develop two of UNSW's latest high-efficiency solar-cell technologies for commercial production. E-Ton is a rapidly growing solar-cell manufacturer specialising in high-performance products. By combining its existing technology with UNSW's research, E-Ton hopes to ensure it stays at the cutting edge of solar-cell manufacturing.

The second deal is a \$1.4 million licensing agreement with CEEG Nanjing PV Tech which includes a collaborative research program to adapt UNSW's world-record-holding PERL solar-cell technology to suit large-scale commercial production.

The third deal with Suntech is a research agreement that focuses on developing an innovative way of forming metal contacts to improve solar-cell efficiency.

► **More information: Professor Stuart Wenham, 02 9385 5171**

## Sampling for energy

Sampling technology developed by the **CRC for Landscape Environments and Mineral Exploration** (CRC LEME) and **Geoscience Australia** will form the basis of a national regolith sampling program to assess the country's onshore energy potential. The **NGSA (National Geochemical Survey of Australia)** project forms part of a Commonwealth initiative to acquire new data to attract investment in onshore petroleum, geothermal energy and uranium exploration. The sampling program aims to collect surface and near-surface transported regolith materials at about 1600 sites covering the majority of the continent.

**Dr Patrice de Caritat**, principal LEME research scientist and project leader, says results from a pilot project leave no doubt that "we are seeing a geochemical expression of bedrock even in areas deeply buried under sediments, aeolian blankets or just weathered materials". The NGSA's main purpose is to acquire actual uranium and thorium concentration measurements.

"The level and distribution of these concentrations can assist in establishing new uranium-rich provinces and, together with other elements, help define areas containing hot granites, a potential source of geothermal energy.

► **More information: LEME Head Office, 08 6436 8695**

## Go ahead

There are no insurmountable technological, engineering or environmental barriers to Australia sustaining a population of 30 million by 2050, according to a report by the **Academy of Technological Sciences and Engineering** (ATSE). But ATSE sounds a warning, saying its findings assume thorough analysis and planning and strong leadership, especially by governments.

The two-year ATSE study was commissioned by the **Scanlon Foundation**, which believes that the future prosperity of Australia, underpinned by population growth, will depend on its ability to maintain social cohesion in a society with even more cultural diversity than it has successfully accommodated historically. Specifically, the ATSE's study findings conclude:

- there are no inherent physical, resource or technological barriers;
- long-term planning is imperative to ensure timely and orderly provision of needed infrastructure; and
- leadership from governments is essential in setting clear policy directions.

ATSE notes that Australia has suffered substantial environmental damage in the past and might again in the future if land, water and air are not better managed. But it recognises that increases in many environmental impacts are not necessarily related to population size but arise from how we plan, manage and develop towns and cities, regions, catchments and natural resources.

► **More information: Bill Mackey, 03 9340 1206**

## Calling innovators

Young Australians with innovative ideas to improve the competitiveness of rural industries are invited to apply for grants of up to \$10,000. The national awards program, the **Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry**, provides grants for scientific research and work to develop better on-farm technology and practices.

The awards are open to people aged 18 to 35. In 2007, 18 are on offer, 10 of them industry-based and one from each state and territory. The awards are sponsored by the Government and the rural R&D corporations. Applications close Friday 15 June.

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

## Carbon criticism

**Senator Lyn Allison** has criticised the **Australian Government's** \$200 million forest plan targeting Indonesia, saying the money would be better spent in Australia to reinstate sacked environmental scientists and to support farmers. "The first thing the Government should do if it has a spare \$200 million is reinstate the CRC which was axed last year," she says. "This plan takes no carbon from the atmosphere. It does not reduce the rate of carbon pollution. It is fiddling at the fringes."

► **More information: [inquiries@democrats.org.au](mailto:inquiries@democrats.org.au)**

Communication Officer (part-time)

CSIRO Sustainable Ecosystems, Townsville 6 May

Research Scientist – Wireless Technologies

CSIRO ICT Centre, Marsfield, NSW 6 May

Senior Computational Scientist

CSIRO Mathematical and Information Sciences, Clayton, Vic 11 May

Director – Phase 2 and 4

University of Wollongong, Graduate School of Medicine 12 May

Director – Phase 3

University of Wollongong, Graduate School of Medicine 12 May

Postdoctoral Research Fellow – Photonic Crystal Fibre and ratings Fabrication Research

University of Sydney, School of Chemistry 13 May

Chair – Biochemistry

Massey University, Institute of Molecular BioSciences 13 May

Professor of Epidemiology

Griffith University, Epidemiology 16 May

Associate Professor/Professor of Surgery

Griffith University, Surgery 16 May

Postdoctoral Fellow – Ecologist

CSIRO Entomology, Indooroopilly, QLD 18 May

Senior Lecturer in Cell or Molecular Biology

University of Wollongong, Faculty of Science 20 May

Clinical Medical Education Fellow  
(2 positions) (part-time)

University of Auckland, Undergraduate Medicine 30 May

Postdoctoral Fellow – Mathematical-Computational Physicist

CSIRO Minerals, Lucas Heights, NSW 31 May

Lecturer/Senior Lecturer/Associate Professor – Civil Engineering

University of Auckland, Department of Civil and Environmental Engineering 31 May

OCE Postdoctoral Fellowships – Advanced Biomaterials Synthesis by Plasma Processing

CSIRO Industrial Physics, Lindfield, NSW 31 May

OCE Postdoctoral Fellowship Modelling of Nanoscale Heat Transfer

CSIRO Industrial Physics, Lindfield, NSW 31 May

Lecturer/Senior Lecturer/Associate Professor in Mechatronics and Manufacturing

Massey University, Institute of Technology & Engineering 31 July

## Excluding salt by including primitive genes

By Gio Braidotti

A previously untapped way of improving salt tolerance in durum and bread wheat has been discovered by a CSIRO team led by Dr Rana Munns, which used DNA markers to transfer the trait from a primitive progenitor into modern cultivars. The same markers also resulted in the discovery of two genes – Nax1 and Nax2 – each capable of providing growers with an estimated 10 to 20 per cent yield advantage in saline soils.

Despite the spectacular gene find, Dr Munns, is not a typical ‘gene jockey’ but a physiologist, who combines a knowledge of physiology with the use of biotechnology and laboratory and paddock-based testing for desirable agronomic traits. With the salinity project, the goal was to bring durum up to the same level of salt tolerance as bread wheat.

“If you grow bread wheat and durum side by side, under the same growth conditions, in some years the durum crop is severely reduced even though bread wheat is coping,” Dr Munns says. “That effect was shown to be due to the build-up of salt in the soil. It turns out that bread wheat has a salt-exclusion mechanism in the roots but durum does not. So I set out to transfer that mechanism into durum, since it sells for a premium and generally provides better returns for growers.”

There was, however, one overwhelming obstacle. Bread wheat possesses three genomes (called A, B, and D) due to hybridisations between three ancestral species. The salt tolerance of bread wheat is due to the D genome ... the very genome that durum lacks. That meant the wheat trait could not be crossed into durum and another source of salt tolerance had to be found on the A or B genomes.

“We looked at all the current durum cultivars in the world and there isn’t any salt-exclusion mechanism in any of them,” Dr Munns says. “So we worked with durum breeder Ray Hare at the Australian Winter Cereals Collection in Tamworth, and tested old landraces that originated from saline areas of the Middle East.”

In a singular stroke of good luck, one ‘landrace’ proved highly unusual. In fact, it turned out not be a landrace at all. Line 149 proved to be the work of a plant breeder who crossed a landrace with very primitive wheat (*T. monococcum*) in a bid to capture rust-resistance genes. The unconventional ancestry meant Line 149 possesses additional genes that may not be present in modern wheat cultivars.

“The rust-resistance gene he was targeting is positioned close to Nax1, so when we crossed Line 149 to transfer the salt-tolerance trait into a commercial durum cultivar, Tamaroi, we actually brought in the rust resistance gene as well,” Dr Munns says.

Unfortunately, the original 2005 crosses also produced a glitch familiar to conventional breeders: “The cross brought in

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Dr Rana Munns  
CSIRO PLANT INDUSTRY

unwanted genes that adversely affected yields during field trials by impacting the number of tillers.”

More recently, the team succeeded in using molecular markers to introduce a smaller chunk of *T. monococcum* DNA into Tamaroi, which delivers the Nax genes without the yield penalty.

The use of molecular markers has also meant the trait transfer was achieved without resorting to gene modification (GM) techniques, which are subject to extra costs and regulatory requirements. Consequently, the researchers were quickly able to bulk-up seed and the new line is scheduled for testing in farmers’

paddocks during the 2007 season.

Ongoing breeding efforts could see the Nax genes incorporated into durum and bread wheat as a base trait, like rust resistance. Of the two genes, Dr Munns favours Nax1, since in addition to excluding sodium the gene also helps the plant take up potassium, an advantage in heavily leached soils typical of coastal areas.

There is, however, one further benefit that Dr Munns is keen to pursue in the future. It relates to a paddock-based similarity between coping with saline soils and drought. “Salt

imposes an osmotic effect that makes it harder for the roots to take up water. For the plant, that situation is similar to the soil being dry. That means that anything that helps make better use of water also assists in coping with salt. Conversely, as soils dry out, salt becomes more concentrated. So anything that helps overcome the drought problem stands to help a plant better cope with salinity.”

Dr Munns is therefore keen to see the Nax genes combined with drought-tolerance traits being developed in the same building by a team led by Dr Tony Condon. Both researchers expect that the combination may amount to better yields under conditions that constitute a major production constraint for many Australian growers.



*Rana Munns and durum wheat: better yields in adverse conditions.*

For details of events or to list an event go to  
[www.sciencealert.com.au/events](http://www.sciencealert.com.au/events)

**International Conference on Biotechnology Engineering**  
 8 to 10 May, Kuala Lumpur

**II International Giardia and Cryptosporidium Conference**  
 13 to 18 May, Morelia-Michoacán, México

**Spatial Sciences Institute International Biennial Conference 2007**  
 14 to 18 May, Hobart

**World Environmental and Water Resources Congress 2007**  
 15 to 19 May, Florida

**Products from Plants: from crops and forests to zero-waste biorefining**  
 15 to 17 May, Athens

**Australia's Uranium conference**  
 15 to 16 May, Adelaide

**Cooperative Research Centres Association Conference**  
 16 to 18 May, Perth

**MinNd International Forum On Children 2007**  
 18 to 21 May, Randwick, NSW

**Nickel/Cobalt, Copper and Uranium International Conference**  
 21 to 25 May, Perth

**5th Australian Stream Management Conference**  
 21 to 25 May, Albury

**Urban Salt Conference**  
 22 to 23 May, Homebush Bay, NSW

**Blowing Agents and Foaming Processes 2007**  
 22 to 23 May, Frankfurt

**Cleantech 2007**  
 23 to 24 May, California

**Amsterdam Conference on the Human Dimensions of Global Environmental Change**  
 24 to 26 May, Amsterdam

**The Australian and New Zealand Association of Neurologists Annual Scientific Meeting 2007**  
 24 to 25 May, Alice Springs

**WasteTech 2007**  
 29 May to 1 June, Moscow

**International Green Build & Renewable Energy Exhibition and Conference**  
 1 to 3 June, Sydney

**World Environment Day**  
 5 June, worldwide

**Urban Water Policy**  
 6 to 7 June, Brisbane

**Industry to Industry Showcase of Rail CRC Research Implementation**  
 7 June, Brisbane

**Seed Ecology II 2007**  
 9 to 13 June, Perth

**21st Pacific Science Congress**  
 12 to 18 June, Okinawa

**International Behavioral Neuroscience Society**  
 12 to 16 June, Rio de Janeiro

**Nanopolymers 2007**  
 12 to 13 June, Berlin

**23rd International Applied Geochemistry Symposium**  
 14 to 19 June, Oviedo, Spain

**Biodetection Technologies 2007**  
 14 to 15 June, Atlanta

**World Hydrogen Energy Conference**  
 15 to 19 June, Brisbane

**Genomics in Business 2007**  
 17 to 19 June, Amsterdam

**3rd International Green Energy Conference**  
 18 to 20 June, Västerås, Sweden

**Photovoltaics Summit 2007**  
 18 to 20 June, California

**International Conference on Engineering and City Development**  
 18 to 19 June, Israel

**Contamination CleanUp 07**  
 24 to 28 June, Adelaide

**COIN/ACOF 2007: The 6th International Conference on the Optical Internet**  
 24 to 27 June, University of Melbourne

**32nd Australian Conference on Optical Fibre Technology**  
 24 to 27 June, University of Melbourne

**4th International Conference on Geotechnical Earthquake Engineering**  
 25 to 28 June, Thessaloniki

**32nd International Symposium on Remote Sensing of the Environment**  
 25 to 29 June, San Jose

**Breccias Symposium**  
 26 to 27 June, Townsville

**Sustainable Development in the Coatings Industry**  
 26 June, Hampton, UK

**4th International Conference on The Impact of Environmental Factors on Health**  
 27 to 29 June, Malta

**European Science Museum Tour 2007**  
 30 June to 21 July, locations throughout Europe

**CHEMED 2007**  
 1 to 4 July, University of Auckland

**8th Biennial Engineering Mathematics & Applications Conference**  
 1 to 4 July, University of Tasmania

**3rd International Energy, Exergy and Environment Symposium**  
 1 to 5 July, Évora, Portugal

**Astronomical Society of Australia Annual Scientific Meeting**  
 1 to 5 July, Macquarie University

**ESF-EMBO Symposium Biological Surfaces and Interfaces**  
 1 to 6 July, Costa Brava

**23rd International Conference on Yeast Genetics and Molecular Biology**  
 2 to 6 July, Melbourne

**International Conference of Applied and Engineering Mathematics**  
 2 to 4 July, London

**Annual Conference of the Australian Association of Mathematics Teachers**  
 2 to 6 July, Hobart

**European Sustainable Energy Forum**  
 2 to 6 July, Lucerne

**HARMO 11 Conference**  
 2 to 5 July, Cambridge, UK

**Materials Australia and the Australian Ceramic Society Biennial International Conference**  
 4 to 6 July, Sydney

**World Conference on Science and Technology Education**  
 8 to 12 July, Perth

**18th International Conference on General Relativity and Gravitation & 7th Edoardo Amaldi Conference**  
 8 to 14 July, Sydney

**Australian Society for Parasitology Annual Conference**  
 8 to 11 July, Canberra

**2007 World Conference on Science and Technology Education**  
 8 to 12 July, Perth

**Conference on Greenhouse Gases: Mitigation and Utilization**  
 8 to 12 July, Kingston, Ontario

**ICSV 14**  
 9 to 12 July, Cairns

**Annual Scientific Meeting & Exhibition of the Australian Society for Microbiology**  
 9 to 13 July, Adelaide

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**11th Congress of International Society for Rock Mechanics**  
 9 to 12 July, Lisbon

**Australian Marine Sciences Association Conference**  
 9 to 13 July, Melbourne

**2007 ASM & Exhibition of the Australian Society for Microbiology**  
 9 to 13 July, Adelaide

**14th International Congress on Sound and Vibration**  
 9 to 12 July, Cairns

**Biodiversity Extinction Crisis Conference**  
 10 to 12 July, University of New South Wales

**Inaugural regional meeting for the Australasian section of the Society for Conservation Biology**  
 10 to 13 July, University of New South Wales

**1st International Conference on The Art of Resisting Extreme Natural Forces**  
 11 to 13 July, New Forest, UK

**International Brain Research Organisation (IBRO) 7th World Conference of Neuroscience**  
 12 to 17 July, Melbourne

**19th International Symposium on Glycoconjugates**  
 15 to 20 July, Cairns

**6th International Congress on Industrial and Applied Mathematics**  
 16 to 20 July, Zurich

**Royal Entomological Society Symposium on Aquatic Insects**  
 16 to 18 July, Edinburgh

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