AUSTRALIAN R&D REVIEW

ISSN 1320-8977
NOVEMBER 2010

Linking Australian Science, Technology and Business

INSIDE

Push into space

At the end of September 2010, a *Decadal Plan for Australian Space Science -Building a National Presence in Space* launched by the **Australian Academy of Science** (AAS) outlined a ten year strategy to study our solar system, including its planets, the observation of earth from orbit (remote sensing), planetary geology and atmospheres, climate change, and the development of life. However, despite the breadth of the proposed research and its potential benefits for the Australian community, it received little public attention.

The strategy paper was prepared by the **National Committee for Space Science** (NCSS) and complements a report in 2009 on the opportunities that could arise from earth observation from space. It attempts to also provide a scientific link to neighbouring areas of research, geosciences and the science of the more distant universe, astronomy. For both of these areas decadal plans are already in place and the NCSS plan notes the significant synergies between these fields of research and potential overlaps in the use of research infrastructure.

The context of the NCSS plan is a traditionally strong position for Australian space science, which began in the 1950s through individual efforts but is also founded in the nation's unique geography, with its natural focus on Australasia and Antarctica, especially via observations of Earth from space.

Across the nation, over 160 full-time professionals work in space science, and most of these are concerned with space physics/weather and space technology. There is also a significant commitment by the business community (Box 1).

However, it is only now that Australia is developing a strategic plan or a government program in space, despite crucial discoveries and capabilities having direct relevance for Australia (Box 2). It follows on from the 2008 draft version of the NCSS plan, and in its wake a significant shift in the focus of government funding towards space science in the 2009 Budget. This brought a new **Super Science Initiative**, in which space science was included as a national priority area, a $40 million **Australian Space Research Program** and a **Space Policy Unit**.

The new vigor of the nation's effort in this area was also highlighted by several initiatives this month,

...continued page 16

Box 1: Businesses in Australia concerned with space science include:

Mimix Broadband – produces advanced microwave and wireless microelectronic components;
British Aerospace (BAe) supporting radars and other space science-relevant work for government and industrial clients;
Optus as part of Asia's **SingTel Group**, has designed nine and currently operates five satellites from Australian facilities.
Cisco, **Ball Aerospace**, **Kintner Aerospace**, **EOS** and other corporations have offices in Australia for space-related business.

Box 2: Topics of direct interest and relevance to Australia include:

– the ozone hole over Australasia and Antarctica;
– the greenhouse effects and global warming on Earth and Venus;
– the dynamic Sun and solar wind, and their effects on Earth;
– operational GPS navigation, timing, and geodetic services;
– Earth observation (eg weather, environment, disaster monitoring, and national security) and communication satellites;
– space weather effects on GPS, radio communications, spacecraft operations, geomagnetic prospecting, and other critical systems:
– rapid coalescence, evolution, geology, and hydrology of the Earth, Moon, Mars, asteroids, and meteorites in the early solar system;
– rapid emergence of life on Earth and perhaps the solar system; and
– nuclear fusion as the Sun's energy source, with relevance to our needs, and evidence for finite-mass neutrinos.

Educated news

Missionary negotiations

Innovation Minister ***Senator Kim Carr*** has released details of new draft mission-based compacts and invited comments from the university sector. Designed as a holistic, strategic framework defining the relationship between a university and the **Australian Government**, the compacts will lay out the university's particular mission, and how it will fulfil that mission in support of the Government's reform objectives.

Current arrangements with universities were negotiated at the end of 2009 as interim measures until new compacts, to be negotiated in early 2011, come into effect for 2011-2013. The new compacts, which will also be available to the public, will include additional performance funding arrangements based on agreed teaching and learning targets. These would comprise facilitation funding of $94.2 million annually, provided from 2011 to achieve targets set out in the compacts, and reward funding of $136.6 million annually from 2012. Over the three year period this could amount to $550 million additional funding.

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

Back to base

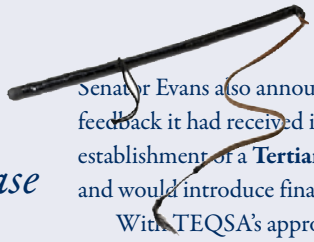
The Australian Government has also commissioned a review of university base funding levels and cluster funding, which was recommended by the **Bradley Review of Higher Education** in 2009. The appointed expert panel will be led by former South Australian Minister for Education and Tourism, ***Dr Jane Lomax-Smith***.

Minister for Tertiary Education, ***Senator Chris Evans*** said that demand driven funding for teaching and learning would commence in 2012. He also pointed out that the review will build on new injections of capital and recurrent funding announced in the 2009 Budget, which includes lifting caps on undergraduate university places for domestic students and a new indexation approach. Added to this are investments worth several billion dollars in infrastructure support, provided through the **Education Investment Fund**.

The announcement was welcomed by the **Group of Eight** (Go8) universities, although its executive director ***Michael Gallagher*** said the terms of reference should permit consideration of differential government funding rates and price point differences across the system.

"Given the broader student population to be catered for it will be essential that enabling funding is included in the review, not as a top-up but as an integral element in the funding base." He also urged the Government to address the current funding inadequacies in the 2011 budget, as any money flowing from review recommendations would not come into effect before the academic year 2013.

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



Fast shooters hold back

Senator Evans also announced that the Government would consider feedback it had received in October to draft legislation on the establishment of a **Tertiary Education Quality and Standards Agency**, and would introduce final legislation in the autumn sittings of 2011.

With TEQSA's approach, education providers with performance issues will be subject to close scrutiny, requirements for improvement, and ultimately sanction, Senator Evans said.

Early in November, Go8's chair ***Professor Alan Robson*** had criticised the proposed legislation as involving "very intrusive arrangements". The Go8 released a document *The Accountability for Quality Agenda in Higher Education*, in which the Go8 calls for an open discussion ahead of the legislation, also by taking a look at similar developments abroad. "A threshold issue is whether TEQSA should have the legal power to set standards. How can legislation be prepared without any prior discussion of the meaning of standards, their coverage and ownership?", Professor Robson said.

The deferral to 2011/2012 was welcomed by university bodies. **Universities Australia** (UA) chair ***Professor Peter Coaldrake*** and **Australian Technology Network of Universities'** (ATN) chair ***Professor Ross Milbourne*** said that while supportive of TEQSA as a national regulator, the legislation was complex and should not be rushed.

▶ **More information: www.go8.edu.au; www.deewr.gov.au; www.atn.edu.au; www.universitiesaustralia.edu.au**

Clever spending continues

In October, the **Australian Bureau of Statistics** (ABS) provided a summary of statistics on Australian R&D spending in 2008-09 across all sectors, including business, government, higher education and private non-profit organisations. A detailed report of business and government spending was already provided in the ARDR October edition. Here are some key points across all sectors:

In 2008-09, Australian gross expenditure on R&D (GERD) rose by

R&D AUSTRALIAN REVIEW Elwinmedia

EDITOR
Dr Gerd Winter
08 8370 2778
editor@elwinmedia.com

DESIGN
Elwinmedia

WWW
www.ardr.com.au

ADVERTISING AND SUBSCRIPTION ENQUIRIES
R&D Review, PO Box 3442, Rundle Mall SA 5000
Phone/Fax 08 8370 2778

Australian R&D Review is published 11 times a year and is available only by subscription.

CONTACT info@elwinmedia.com or visit www.ardr.com.au

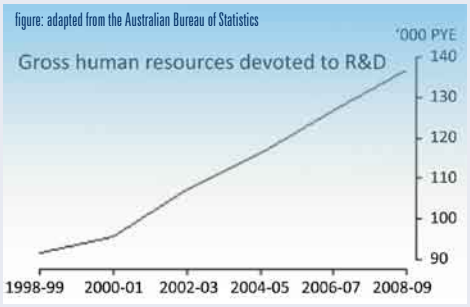
27% from 2006-07, to a total of $27.7 billion. This continues a trend that saw GERD triple since 1998-99. GERD as a proportion of GDP is now 2.21%, closing in to the OECD average of 2.33%. The growth was driven by strong increases in R&D spending by business (up 33%) and the higher education sector (up 24%), the largest contributors to GERD with $16.9 billion and $6.7 billion, respectively. This was accompanied by strong increases in funding of R&D by the business sector (up $4.4 billion to $16.8 billion) and Commonwealth (up $1.3 billion to $8.4 billion).

While the mining sector had the largest increase in R&D spending (up $1.5 billion), 'education and training' remained the largest contributor to GERD with over $6.8 billion provided mainly through the higher education sector.

In a comparison of states, WA and NSW reported the strongest increases in GERD, while Queensland continues to trail the other states with just 1.59% of its GSP spend on R&D. This compares to GERD/GSP ratios ranging between 2.05 and 2.70 in other states (NSW, SA, WA, Vic)*.

With the overall spending on R&D, there is also a strong increasing trend in the number of person years of effort (PYE) devoted to R&D, which now totals over 136 thousand, a rise of 8% over the previous year. This increase occurred predominately in the business sector, there notably driven by a strong rise in the PYE of technicians and other staff (up 2,74 and 2,18 PYE, respectively).

figure: adapted from the Australian Bureau of Statistics



However, researchers did account for more than two thirds (67%) of gross human resources devoted to R&D with most time spent on research still in the higher education sector.

▶ More information: www.abs.gov.au ;*no data were available for NT and Tasmania; the ACT was not included

Party invitation

Innovation Minister ***Senator Kim Carr*** has opened the 14th round of the **Cooperative Research Centres Program**, in which researchers and end-users form innovative research ventures.

This round will focus on the area of clean manufacturing, social innovation and sustainable regional communities.

▶ More information: www.alp.org.au/federal-government/news/new-cooperative-research-centres-will-make-austral/

Healthy winners

The **NHMRC** has awarded $408 million to 745 projects under its **NHMRC Project Grants** scheme. An additional $38.8 million were provided through **NHMRC Equipment Grants** ($9 million), supporting institutions to buy larger items of equipment, and **Infrastructure Grants** ($29.9 million), supporting the overhead infrastructure costs of NHMRC accredited independent medical research institutes.

The **Universities of Sydney** and **Melbourne**, and **Monash University** attracted each almost twice as much funding, each around $52 million for between 90 and 94 projects, as the next most successful **Universities of Queensland** and **Adelaide**, with each receiving around $28 million and $22 million, respectively. Of the independent research institutes, **Baker IDI** came out tops, with over $15 million in funding followed by the **Walter Eliza Hall Institute** and the **Queensland Institute of Medical Research** with over $8 million.

The NHMRC also awarded 296 NHMRC awards and fellowships, worth in total $125.7 million. They include 121 Training (Post-doctoral) Fellowships ($35.6 million); 62 Career Development Awards ($24.1 million); 17 Practitioner Fellowships ($7.3 million); 86 Research Fellowships ($57.4 million): and 10 Translating Research Into Practice Fellowships ($1.3 million)

▶ More information: www.nhmrc.gov.au

Native protection

IP Australia has launched the **Dream Shield** project, an information kit designed as a resource for indigenous business owners to protect valuable IP. According to Innovation Minister ***Senator Kim Carr***, the importance IP protection is not widely understood in the Indigenous business sector. The kit combines the legal expertise of IP Australia with the real-life experience of Indigenous entrepreneurs.

Alison Page, Dream Shield spokesperson and Indigenous designer described the key message as breathtakingly simple, but profoundly important. "Look at what will make your business special – like a brand, design or invention – and make an informed decision about how you can protect it."

▶ More information: www.ipaustralia.gov.au

Discovery Australis

Nurturing plans

The **Australian Academy of Science** and the **Go8** have both welcomed a proposal by the **ARC** to create new Discovery Awards for early career researchers and to simplify its Discovery Project fellowships schemes.

The ARC has outlined the proposed new award scheme in a discussion paper, in which the agency reviewed the impact of the **Discovery Projects grant scheme**.

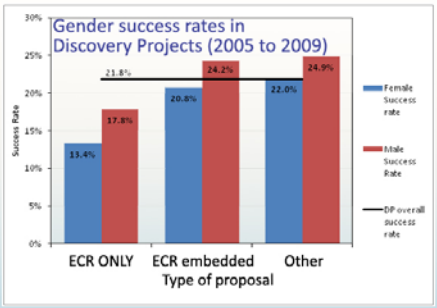
The scheme was implemented in 2001 as the main component of the ARC **Discovery program**, which in turn forms, together with **Linkage Grants,** the **ARC National Competitive Grants program**.

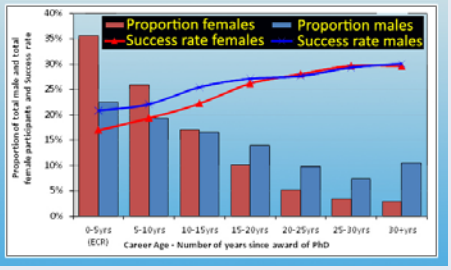
In its review, the ARC also assessed how the Discovery Projects grant scheme relates to other components of the Discovery program, the **Future Fellowships**, the **Australian Laureate Fellowships**, and the **Discovery Indigenous Researchers Development scheme**.

The ARC found considerable

image: www.squidoo.com

figure: adapted from Australian Research Council





overlap between these components of the Discovery Program as researchers apply for multiple grants and fellowships at the same time to increase their chances.

Discovery Projects are highly competitive, with a success rate over the past nine years of only around 24%. However, two groups of researchers have fared particularly poorly under the scheme – researchers in their early phase of career (ECRs), and women. The ARC has found that despite a special support mechanism in place, over the period only 18.4% of proposals in which all applicants identified themselves as ECR (ECR-only) received grant funding.

This compared to 25.5% of all other applications, including those proposals where ECRs applied as part of a team of more senior researchers (ECR-embedded). As researchers noticed the disadvantage, ERC-only applications declined relative to ECR embedded proposals.

The ARC analysis also revealed that females in ECR-only grants were less successful (16.5%) than their male counterparts (19.9%). The agency says this poor outcome may contribute to the low retention rates found for more senior female scientists.

The agency proposes a new element within the Discovery Program, which would provide each year 200 so called ECR awards. These would be separately assessed to Discovery Projects and the selection would place less weight on track record, weighting 50% for the project, 20% for research record, and 30% for institutional commitment.

ECRs still would be able to apply for Discovery Projects grants, although without the special considerations they currently receive under the scheme.

▶ **More information: www.arc.gov.au/ncgp/dp/dp_consultation.htm;**

Discovery splash

The ARC has also announced new outcomes of its **ARC National Competitive Grants Program**, investing $376 million in 1126 research projects commencing 2011. The funding will provide grants for 931 projects under the **Discovery Projects** scheme, worth over $318 million. Over 90% of successful projects address **National Research Priority Areas**, with an overall success rate across five disciplines of 22%.

State wise the success rate differed significantly, with the ACT having the highest (over 28%) and South Australia and Tasmania the lowest (over 18%). Across all states, NSW took the lead with 309 projects funded (over $100 million funding), followed by Victoria (257 projects, over $91 million).

Of the universities, the **University of Melbourne** recorded the highest number of successful projects (107 projects) and the highest volume of funding (over $37 million), followed by the Universities of **Sydney** (102 projects, $33 million) and **Queensland** (94 projects, $33.3 million).

Over $56 million were provided for 186 **Linkage Projects**, which form long-term strategic research alliances between higher education organisations and other organisations, and include **Australian Postdoctoral Fellowships** (Industry) and **Linkage Industry Fellowships** (LIF). The success rate under this scheme was over 46%, with the **University of New South Wales** having by far the highest number of projects approved (30), followed by the University of Queensland (16).

Linkage Projects also leverage considerable cash and in-kind contributions by partner organisations, this time around amounting to $117.2 million or $2.1 for every dollar invested by the ARC.

Looking at international collaborations, there is a persistent bias towards English speaking countries. Of the 135 projects with international participation, the US (25 projects) and the UK (23 project) were the predominant partners. Germany (13 project) and China (11) ranked distant third and fourth as collaborative partners.

The ARC also approved 9 projects under the Discovery Indigenous Researchers Development scheme, funded with over $2 million.

Splash for fellows

The ARC also awarded $143 million for 200 Future Fellowships. The scheme was implemented in 2009, providing a total of $844 million for 1000 five year long fellowships.

▶ **More information: www.arc.gov.au/ncgp/default.htm**

Enabling news

Enabling experts...

In February 2010, the **Australian Government** released a $38.2 million **National Enabling Technologies Strategy (NETS).** As reported in the ARDR March 2010 edition*, the strategy will develop a framework for the responsible development of enabling technologies by addressing issues such as balancing risk and reward through appropriate policy and regulatory frameworks, better engaging with the public on how enabling technologies can be used for a better future, and the planning (foresighting) for the advent of new technologies in the future.

Innovation Minister ***Senator Kim Carr*** has now announced the 8 members of an **Expert Forum** and 13 members of a **Stakeholder Advisory Council** (SAC), which both will advise the Government on the implementation of the plan.

The Expert Forum of technology will identify new and converging technologies and highlight any potential implications for Australia. It will be chaired by ***Professor Ron Johnston***, the founder and executive director of the **Australian Centre for Innovation Ltd**.

SAC's role will be to advise on the full range of enabling technologies by bringing together key Australian business, union, non-government, industry, science and research representatives.

▶ **More information: http://minister.innovation.gov.au/Carr/Pages/default.aspx;**
***'Enabling technology', ARDR March 2010**

... and appreciated enablers

In October, the **Department of Innovation, Industry, Science and Research** released the findings of a 2010 survey into public attitudes towards biotechnologies, including genetic modification, cloning,

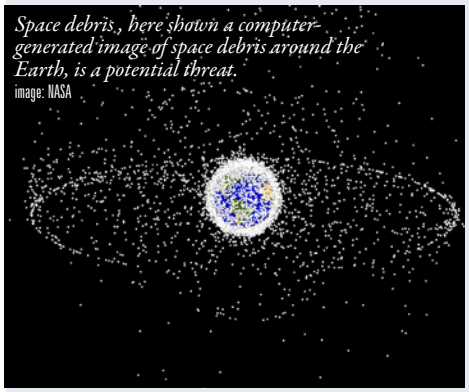
stem cell research and organisms used to clean up pollution. ***Dr Craig Cormick*** from the National Enabling Technologies Strategy said that of all technologies the use of stem cells was found to have the highest acceptance in the public (92%), while support for GM food dropped slightly and remained among the least well-supported biotechnologies. In 2009-10 support for GM food was at 67%, after it had risen to 77% in 2005. However, according to Dr Cormick half of those opposed would have support GM in case of long-term evidence that GM foods were safe, and 45% would change their opposition if foods were properly labelled.

▶ More information: **www.innovation.gov.au/nets-pace-research**

Buddies forever

Buddies in space...

The US and Australia have entered a new phase in their cooperation in space with a *Joint Statement on Bilateral Cooperation in the Civil Use of GPS and Civil Space Activities*, signed by both countries in early November.



Space debris, here shown a computer-generated image of space debris around the Earth, is a potential threat.
image: NASA

The agreement was developed through the new **Australian Space Policy office**, which was established within the **Department of Innovation, Industry, Science and Research** in 2009.

The statement has at its core a space corporation framework agreement to support the development of skill and knowledge, as well as transfer the sharing of research and information, capabilities development. The framework will also address the monitoring and managing of the space environment including the potential threat of satellite collisions and space debris.

Innovation Minister ***Senator Kim Carr*** said the agreement would "explore opportunities for fair and open global trade and commerce in commercial space systems, ground-based capabilities and related activities. It will also provide opportunities for early discussions on new systems and future civil space related missions under development."

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

...and in the sun

The **US-Australia Solar Research Collaboration**, which was announced during the visit of US Secretary of State, Hilary Clinton, will address one of the great barriers in the uptake of solar technologies: cost.

The **Australian Government** has committed $50 million from the **Renewable Energy Future Fund** to support this new initiative. It will be managed by the **Australian Solar Institute** (ASI) and promote advanced solar technology projects such as dual junction photovoltaic devices, hot-carrier solar cells and high temperature receivers. The initiative will also support exchange programs and new research scholarships with a focus on achievable solar energy solutions.

▶ More information: **www.alp.org.au/federal-government/news/us-and-australia-join-forces-on-solar-power/**

Topping up the drip

More than $160 million in new venture capital will be available to the Australian sector through four new funds. Each set up with $20 million by the **Australian Government**'s **Innovation Investment Fund** they will leverage at least matching amounts from private investors, which include **Looksmart**, **SEEK**, **QRxPharma**, Pharmaxis and **Alchemia**.

The fund managers **Carnegie Venture Capital**, MRCF, **Southern Cross Venture Partners** and **Start-up Australia Ventures** will target their investments as 'seed' or early stage funding towards Australian companies with high-growth potential, while each fund will focus on different areas of innovation, ranging from medical research to internet and new media technologies.

Innovation Australia chair ***David Miles*** welcomed the $80 million Government contribution, which he said followed Innovation Australia's recommendations. The Innovation Investment Fund had been vital for the establishment and success of a number of funds, he said. "They have enabled Australia to go from a virtually non-existent venture capital industry two decades ago to one that has several active managers with a proven track record and numerous successes."

▶ More information: **http://minister.innovation.gov.au**

Choices of excellence

The **Australian Government** has announced a further 11 NHMRC **Centres of Research Excellence** (CREs), which will share in $27 million over 5 years and add to the four CREs announced in August/September.

The CRE scheme replaced in 2009 the previous **Centres for Clinical Research Excellence Scheme** and the **Capacity Building Grants in Population Health and Health Services Research**, encompassing the research areas covered in the previous schemes, while also including the areas of Electromagnetic Energy Research and Research in Asbestos Related Diseases. The objective of the CREs is to build capacity, support research that will lead to improved community health outcomes, and ensure effective translation of research outcomes primarily into practice.

Selected CREs include:

- *NHMRC Asia Pacific Centre for Innovative Dengue Prevention* (**University of Queensland**) – $2,497,175;
- *Centre for Translational Neuroscience: A modular platform for translating discovery into health outcomes* (**University of Melbourne**) – $2,500,000;
- *Centre for Research Excellence in Sun and Health* (**Queensland University of Technology**) – $2,379,750;
- *Centre for Research Excellence in Critical Infectious Diseases* (**University of Sydney**) – $2,499,688);
- *Centre for Informing Policy in Health with Evidence from Research, CIPHER* (**University of Western Sydney**) – $2,496,375;

Announced prior to the election:

- *National Centre for Asbestos Related Diseases* (**University of Western Australia**) – $4,500,000;
- *The Centre for Research in Childhood Early Respiratory Disease* (**University of Western Australia**) – $ 2,495,250;
- *National Centre of Research Excellence to Improve Management of Peripheral Arterial Disease* (**James Cook University** – $2,499,250.

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

Corporate warming

The 100 largest companies listed on the **Australian Stock Exchange** (ASX100) compare with global leaders in board engagement on climate change issues, despite prevailing policy uncertainty. However, they lag

their international counterparts on established reduction targets.

The 2010 survey by the **Carbon Disclosure Project** (CDP) **Australia and New Zealand** found that 94% of ASX100 companies dealt at the board or executive level with climate change, compared to 94% in Europe 300 and 84% of the Global 500 (84%).

At the time, only 47% of ASX100 reported they had established emissions reduction targets, and only 24% of the next 100 largest ASX companies, which compares to 81% of the Europe 300 and 70% of the Global 500. This reflects the lack of policy certainty in Australia said the **Investor Group on Climate Change** (IGCC), which together with **Goldman Sachs**, **Catholic Super** and the **NSW Government**, sponsored the *CDP Australia and New Zealand 2010*.

Despite the lack of clear reduction targets, 73% of the ASX200 companies made improvements in energy efficiency over the course of the year, which the surveyed companies attributed to the *Energy Efficiency Opportunities Act 2006* and the cost savings of reducing energy usage. According to ***Andrew Gray*** from Goldman Sachs, boardroom and executive level engagement on climate change will drive value for investors over the long-term as companies make the transition to a low-carbon economy. "Value drivers include how strategically companies think about carbon risks and how they can adapt their business strategies for a low-carbon economy, which includes seizing new product and service opportunities," Andrew Gray said.

▶ **More information: www.igcc.org.au/Resources/Documents/CDP%202010.pdf**

Global storage splash

The **Global Carbon Capture and Storage Institute** has awarded its first grants worth almost $18 million for six projects located in Australia, the US, Romania and the Netherlands.

The two Australian projects selected from a pool of over 50 submissions include:

- The **CarbonNet project** (Latrobe Valley, Victoria) will receive $2.3 million to advance a commercial modelling for a hub concept, and a further $220,000 towards an initial framing study into the measurement, monitoring and validation of stored CO_2.
- The **Callide Oxyfuel Project** (South East Queensland), which has signed a Letter of Intent to discuss funding of a $1.83 million work program in the second stage of its CO_2 capture demonstration project at the **Callide A Power Station**. This would include an injection test of CO_2 into a potential storage site in the Northern Denison Trough and other locations in south east Queensland.

Founded in 2008 by the **Australian Government**, the Global CSS Institute became an independent legal body in July 2009 involving more than 80 organisations worldwide. Its objective is to accelerate the deployment of large scale projects demonstrating CSS. According to chief executive officer ***Nick Otter***, key to its uptake will be the dissemination of valuable know-how. To this effect, the institute has recently launched a digital knowledge platform as a central repository for project experience and other CSS information. Knowledge is also to be shared through avenues such as workshops and meetings.

Callide Oxyfuel project
image: Australian Coal Association

▶ **More information: http://minister.ret.gov.au/Pages/Welcome.aspx**

Now the world is feeding us?

Australia's $102 billion food and grocery industry shares 26% of the Australian manufacturing sector and is traditionally a net exporter. A new report by the **Australian Food and Grocery Council** (AFGC) and **KPMG** shows, however, that the industry is under pressure from rising imports and falling exports.

Australian food: too much import, not enough export?

According to the *State of the Industry 2010* report, the complex industry is now for the first time in many years a net importer as its international net trade position fell dramatically from a $4.5 billion surplus in 2004-05 to a $1.8 billion deficit in 2009-10. The real value of industry exports decreased by 15% to $21.5 billion, as did imports, though at a slower pace, falling by 8.9% to 23.3 billion. The report says that this general contraction was in line with the impact of the Global Financial Crisis on world markets.

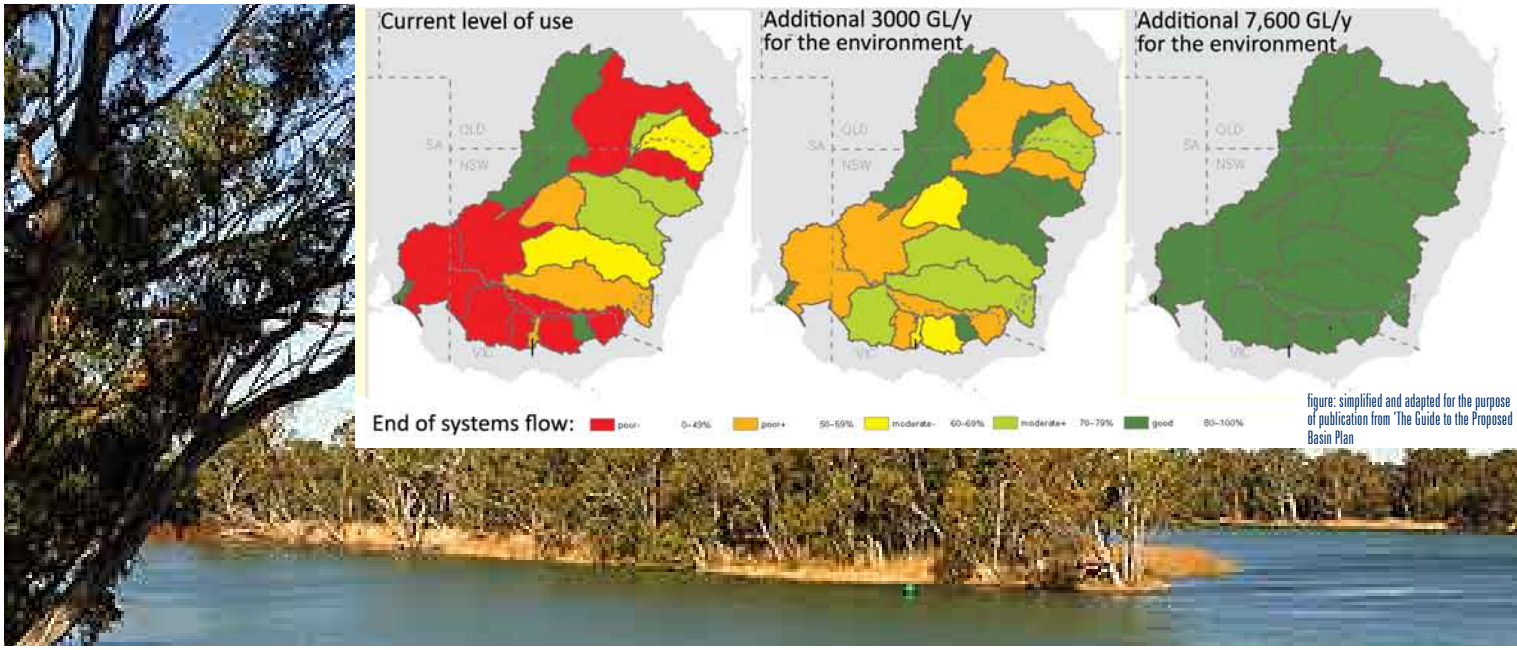
AFGC chief executive ***Kate Carnell*** said that the increasing cost of energy and the surging dollar were factors, but she also warned of proposed cuts in water allocation for food production in the Murray-Darling Basin could negatively impact on future exports.

The report, however, also found a very low level of R&D investment by the industry, at 0.43% of annual turnover. According to KMPG partner ***Mark Epper***, "this highlights the need for increased awareness and utilisation of existing R&D concessions and grants.

▶ **More information: www.afgc.org.au/state-of-the-industry-2010.html**

A plan for troubled water

On 8 October, the **Murray-Darling Basin Authority** released the long awaited discussion paper on a plan to secure the health of the Murray-Darling Basin, the *Guide to the Proposed Basin Plan*. The heated reactions to the paper, which proposes significant reductions in water allocated for consumption, reflect the significant impact proposed water recoveries could have on industries in the basin.



In broadest terms, the proposal is criticised for not having adequately balanced a 'triple bottom line' of environmental, social and economic outcomes. The public backlash led to the announcement by the Australian Government of a Parliamentary inquiry into the proposal, to be conducted by the new Parliamentary committee for Regional Australia. The inquiry will focus on the human impact of the proposed changes.

The MDBA itself estimates that its proposed reduced water allocations will reduce current gross value in irrigated agriculture production by at least 13%, translating into a permanent reduction of the Basin's gross regional product of 1.1%, and could cost across the basin some 800 full-time jobs. However, MDBA chair ***Mike Taylor*** did emphasise that the proposals were "not a done deal", but presented an opportunity "for Australians to contribute to one of the most significant water reforms in our history".

The final plan will require intensive consultations and negotiations, and is not expected to be finalised before 2012. Also, major significant water reforms, such as the **National Water Initiative** and the Government's $12 billion **Water for the Future** program, which includes the 'buy back' of water and a $5.6 billion program to improve water efficiency, will support the implementation of a final plan.

Throughout the document, the MDBA emphasises that its proposal is based on the very specific requirements set out in the **Water Act 2007**. The MDBA says this "was supported by both sides of Federal Parliament" and was amended in 2008, again with bipartisan support.

The Water Act requires mandatory decisions by the MDBA, which includes determining the environmental needs for water. It also requires the MDBA to establish new limits on water that can be taken out from the Basin, so called long-term average sustainable diversion limits (SDLs), which "must not compromise key environmental areas".

The MDBA proposes reducing the water available for consumption, including water taken by farm dams and by forestry by 3,000 to 4,000 gigalitre per year (GL/y), which represents 22-29% of current diversions. This would mean a reduction in the current diversion limit of surface water from 13,700 GL/y to 9,700-10,700 GL/y, increasing the amount of water available to the environment from currently 58% of all inflows to 67-70%. According to the MDBA, this is taking into account the water required to meet the health of individual tributaries, the water needs for the overall health of the Basin, and the different level of development in different catchments and the different hydrological features of the catchments.

The plan also proposes reductions in the extraction of groundwater of between 99 GL/y and 227 GL/y across the basin.

The new proposed SDLs address 29 surface water and 78 SDL groundwater areas, but would only come into affect when

... continued page 17

Biotech: safe bet for public investments

In October, Lateral Economics released a report commissioned by Research Australia to evaluate the economic benefits of health and medical research to the Australian society. This complemented previous analysis by Access Economics in 2003 and 2008, which suggested exceptional returns from Australian health and medical research in the form of reduced mortality and morbidity in the population.

Lateral Economics concludes that investments in health and medical research are indeed likely to generate positive, possibly even "exceptional" returns for Australia, a finding it based on a more conservative cost-benefit analysis than the health benefit - cost analysis previously undertaken by Access Economics. Their wellness-based analysis had estimated that the average dollar invested in Australian health R&D would return health benefits of $2.17, whereby men were found to benefit significantly more than women.

Lateral Economics undertook an 'indicative analysis' in which it compared costs with revenues from successful goods and services sold in the marketplace. However, it states that this type of analysis may not capture the considerable benefits achieved through better health outcomes (wellness-benefits). Still, even these conservative estimates resulted in a likely positive return, with a revenue/costs ratio of 1.05. Lateral Economics writes "that this ratio still exceeds unity means that the fruits of Australian R&D would be making a positive contribution to Australian GDP".

Over the past two decades, significant policy initiatives and reviews have changed Australia's policy attitude towards health related R&D. This includes the positive R&D agenda driven by Labor's Industry Minister John Button in the 80s and 90s, and the Wills Review in 1999 into the state of health and medical research in Australia, which then was followed by the 2004 Grant report into Australia's investments in health and medical research. Two further reports, the 2008 Cutler review *Venturous Australia* on Australia's innovation system, and the 2008 review by the Pharmaceutical Industries Strategy group formed the basis of the Government's 2009 reform agenda for Australia's innovation system, *Powering Ideas*.

The 'Virtuous Cycle' concept envisaged in the Wills review and effectively adapted by the NHMRC, illustrates how society can benefit from a strong public investment particularly in health and medical research, and successive Governments have devoted increasing resources it.

Over the past decade, the NHMRC, Australia's peak funding body and accounting for roughly one sixth of Australia's health and medical research expenditure saw its budget increased by around 14% each year. Overall, expenditure in health and medical research increased between 1993-04 and 2006-07 by 3.8% more than the 8.71% average growth of health spending. Particularly business and Higher Education showed strong trend growth, with 7% and 4%, respectively, above the average growth in spending on health.

NHMRC's adaptation of the Virtous Cycle concept by the Wills report (adapted from Lateral Economics)

As a result Australia's spending on health related R&D as a share of GDP is high by OECD standards. However, Lateral Economics raises concern that expansion in research can be undermined in times of fiscal austerity. Advocates for health research should not have to fight an uphill battle, the report states.

Lateral Economics argues that because of the exceptional returns there should be a commitment by policy makers to double expenditure in this research field (in real terms) over... ...the next decade, requiring an annual average increase of 8%. It also points out that spending has to adapt to a changing nature of disease burden and should particularly focus on local health challenges and on the translation of research outcomes into practice.

▶ More information: http://researchaustralia.org

By Rebecca James
CHIEF EXECUTIVE OFFICER, RESEARCH AUSTRALIA

A rationale for targeted intervention

The AusBiotech Conference in Melbourne provided the platform for the launch of a report by Lateral Economics entitled "The Economic Value of Australia's Investment in Health and Medical Research." Commissioned by Research Australia, the report confirms the considerable impact of Australian health and medical research on building a stronger economy.

Lateral Economics CEO Nicholas Gruen noted that economic reform is all about building the political constituency to bear short term costs in order to build a more productive economy in the long term. "This message has been front and centre when it comes to removing past interventions like tariffs, state monopolies, and agricultural price supports. But economic reformers have been much more equivocal about building economic institutions even where they accept the in principle case for doing so. Yet that's what must be done in R&D. Supporting R&D is costly and therefore inevitably subjected to the usual short term political pressures."

The Lateral Economics report indicates that if health and medical research spending were to at least keep pace with historical spending on health over the decade and a half to 2021-22 then revenues of $73.7 billion could be generated, while health benefits could approach $150 billion (based on Access Economics' estimate of $2.17 in health benefits for every health and medical research dollar spent). An extra $125 million would be available for medical research if the Government had maintained its historical share of the recently announced $7.4 billion in new health spending.

An extra $125 million would be available for medical research if the Government had maintained its historical share of the recently announced $7.4 billion in new health spending.

The report identifies the need to place the research and biopharmaceuticals sector on a firmer footing if these gains are to be realized. Unless health and medical research maintains its share of increases in health expenditure, there is a risk that this vital field of activity could lose out in cyclical downturns, at times when decisions are made to significantly increase resources devoted to health, or due to shifts in political priorities.

Peter Roberts, business writer with the Australian Financial Review agrees that the potential for Australian biopharmaceutical industry would be strengthened by a national strategy or industry plan that would provide framework for future growth. Australia has benefited through previous industry policies in areas such as the automotive and textile industries, but there appears to be no commitment to a policy that would tackle issues in the biotech sector.

Investing in health and medical research is not only productive of income and wealth. It also promotes the health and wellbeing of the population — making such investments doubly beneficial and leading to higher-than-average rates of return.

...the potential for Australian biopharmaceutical industry would be strengthened by a national strategy or industry plan that would provide framework for future growth.

Given the strong economic case for health and medical research in driving economic and social gains the sector supports a policy focus that will speed up the process, and boost the "translation" of research, to market, clinic and customer.

The Lateral Economics report outlines the rationale for government support programs that provide targeted and precise interventions to build capacity in specific sectors of the economy where the social and economic benefits are clear.

The fast pace of innovation and change in an increasingly smaller world presents vast opportunities, particularly within the fast growing Asian region. Australian biotechnology has the potential to grow and prosper, with the right mix of commitments from the research, government, investors and business communities.

Ocean news

Wonders of the sea...

In August, the **Census of Marine Life**, one of the largest scientific collaborations ever undertaken, published in *PloS ONE** a comprehensive inventory of species, their distribution and diversity in key global areas, setting a baseline against which future changes could be revealed. In October, this was followed by a highlights report *First Census of Marine Life 2010: Highlights of a Decade of Discovery*, which summarised a decade of research documented in over 2,600 academic papers. Additional releases in October included maps and three landmark books. "We prevailed over early doubts that a Census was possible, as well as daunting extremes of nature," commented AIMS chief executive officer ***Dr Ian Poiner***, who chairs the **Census Steering Committee**.


image: Gary Cranitch, Queensland Museum

A jellyfish from the Great Barrier Reef off Lizard Island.

The project demonstrates a changing ocean, with a richer than expected diversity of species found to move and distribute between oceans more than previously thought. Overall, there is a decline in diversity, although some species were found to recover.

Central to the census is a global marine life database, the **Ocean Biogeographic Information System** (OBIS), which includes a directory of names and addresses of known ocean species and establishes a reference base against which humanity can monitor 21st century change. It also delineates the vast areas of ocean that have never been explored.

The report upped the estimate of known marine species from 230,000 to 250,000 species, with more than 6,000 potentially new. Many of the species were rare species (scarce but not endangered). The study also compiled genetic data ('barcodes') of 35,000 species, which overall expanded the list of identified species, and allowed the study of relations between distinct marine life.

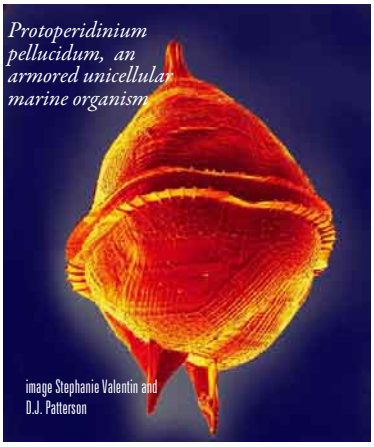

Protoperidinium pellucidum, an armored unicellular marine organism

image Stephanie Valentin and D.J. Patterson

While there are still no reliable estimates available, the total number of species in the ocean could amount to at least a million, the report states. Tens to hundreds of millions of microbes represent the most abundant marine life form, found in most extreme conditions and accounting for up to 90% of marine biomass.

Large animals at the top of the food chain are in decline, but the picture of smaller life forms is less well defined. Food-producing phytoplankton also appear to be in decline near the surface. However, there are new discoveries of mats of bacteria and hundreds of kilometres of corals on the deep ocean floor.

▶ More information: **http://imos.org.au/newsitem.html?&no_cache=1&tx_ttnews[tt_news]=303&tx_ttnews[backPid]=1&cHash=d4e079e70ab0bbfcc996089161499dd7;**

...but where is the krill gone?

The **Australian Antarctic Division** has reported results from its **Continuous Plankton Recorder** project, which recorded over the past 20 years plankton of the Southern Ocean, and has produced the first Zooplankton Atlas documenting 50 of the most common zooplanktons in the Southern Ocean. Towed by a marine ship the recorder filtered over time declining amounts of krill, either because of a decline in total numbers or due to a change in plankton distribution, as in some cases the researchers recorded increased numbers of zooplankton and even massive blooms of other plankton species. They speculate that changes in sea-ice and ocean temperature already affect the Antarctic food web.

image: So Kawaguchi

A separate study by the **Australian Antarctic Division** warns that in future embryos of Antarctic krill could be killed as parts of the ocean acidify absorbing increasing levels of atmospheric CO_2.

Krill biologist ***Dr So Kawaguchi*** said that by the end of the century CO_2 levels at deeper levels of the oceans, to which krill eggs sink before they hatch, could rise to 1400 parts per million (ppm) as colder waters take up CO_2 more readily. In laboratory experiments Dr Kawaguchi found that krill embryos stopped hatching in tanks when they were exposed to 2000 ppm of CO_2. He warns of the possible impact ocean acidification could have on populations of vertically migrating animals like krill, with flow on effects for the entire Southern Ocean ecosystem.

▶ More information: **www.antarctica.gov.au/media/news/2010/krill-face-deadly-cost-of-ocean-acidification**

New era of cooperation

The role of oceans for local and regional climate is the focus of studies by the **Australian Integrated Marine Observing System** (IMOS), which brings together ocean and climate scientists from research institutions across the nation. Established under the C**ollaborative Research Infrastructure Strategy** (NCRIS), IMOS operates as a matrix of 'Nodes' and 'Facilities' across the country, making its research data freely available to the public through a webportal, the **IMOS Ocean Portal**.

IMOS is part of a new era of cooperation between scientific disciplines that have not traditionally worked together, according to CSIRO researcher and IMOS node leader ***Dr Susan Wijffels***.

In October, the **Bluewater and Climate Science Node** was launched in Hobart, which also marked the start of an open ocean observing array, a new approach to probe deeper into the oceans employing new technology worth $22 million. The research will include CSIRO's autonomous profiling floats, which measure temperature and salinity from 2000 meter depth to the surface every 10 days, while sending a constant stream of data. Satellite tags will be used to monitor seals, which are particularly sensitive to the changes in the distribution and abundance of prey due to climatic variations. And as a third leg of the operation, the **Southern Ocean Flux Station** (SOFS) will build a climate record in the Southern Ocean, approximately 350 nautical miles southwest of Tasmania. SOFS is contributing to the **Southern Ocean Time Series** (SOTS) site, which measures surface and deep ocean properties to better understand the

transfer of heat, moisture, energy and CO_2 from the atmosphere to the upper atmosphere.

▶ More information: www.csiro.au/news/Going-high-tech-to-probe-deeper-into-oceans.html

...long time coming

Australian researchers from the **University of Tasmania**, the **12IUCN–CI Biodiversity Assessment Unit in Victoria** and the **Western Australian Museum** have taken part in the most comprehensive assessment of the world's vertebrates to date, published in October in *Science**. Using data for 25,000 species listed on **The IUCN Red List of Threatened Species**™, a widely accepted standard for assessing species global risk of extinction, they investigated the status of the world's vertebrates and how it has changed over time. Key findings demonstrate one-fifth of the world's vertebrates are now threatened with extinction.

On average, 50 species of mammals, birds and amphibians move closer to extinction each year. Most deteriorations in status are reversible, but in 16% of cases they have resulted in extinction. This is despite global conservation efforts, which are still insufficient to offset the main drivers of biodiversity loss, the authors write.

The Golden Toad of Monteverde, Costa Rica was among the first casualties of amphibian declines. Formerly abundant, it was last seen in 1989.
Image: US Fisheries and Wildlife Service

In their absence, though, the impacts of agricultural expansion, logging, over-exploitation, and invasive alien species would cause the rate of deterioration to be at least one-fifth as much again. The authors stress that their results are still "grossly underestimating" the actual impact of conservation efforts.

Threatened vertebrates occur mainly in tropical regions with global patterns of increase in overall extinction risk most marked in Southeast Asia. Although these regions are overall rich in species diversity, the number of threatened species is disproportionate, particularly when species are restricted to certain areas which are under pressure through human activities such as deforestation and fisheries. The impact of climate change remains, however, unclear.

Proportionally, amphibians are more threatened than either birds or mammals, the study found. An infectious disease of amphibians, the invasive fungal pathogen *Batrachochytrium dendrobatidis* emerged in recent years as perhaps the most virulent threat affecting vertebrates. Other threats include the Devil Facial Tumour Disease, a killer of the Tasmanian devil.

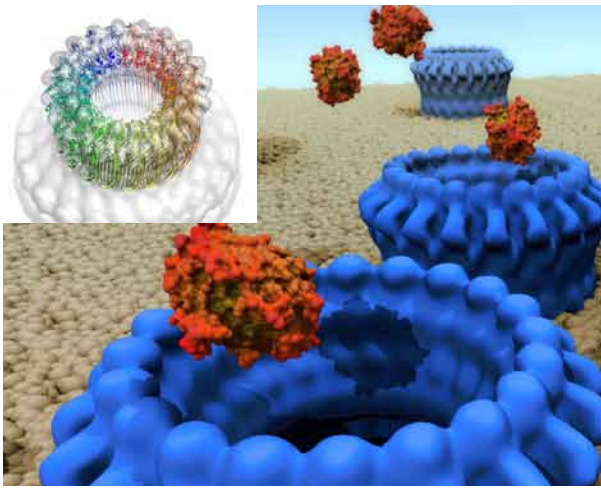
The authors conclude that while 2010 biodiversity targets have not been reached, conservation efforts have not been a failure. Particularly for the conservation of marine species, appropriate legislation could deliver quick successes.

▶ More information: www.iucn.org; *www.sciencexpress.org / 26 October 2010 / Page 1 / 10.1126/science.1194442

Perforating mechanism

International research led by groups at **Monash University** and the **Peter MacCallum Cancer Centre** has published in *Nature* data on the structure and function of perforin, a cytolytic protein used by certain immune cells to kill abnormal cells in the body.

Perforin punching pores through a cell membrane, allowing granzyme toxins to move into and destroy the cell. The insert shows a perforin pore model created from (transparent) crystal structure analysis.
image: Mike Kuiper, VPAC) ; insert: Helen Saibil, Birkbeck College



Typical targets of perforin action are cancer cells or cells infected with a virus, identified by killer cells or cytotoxic T-cells as the infected cells present on their surface parts of the virus as 'non-self antigen'. When released by immune cells, perforin 'punches' holes into the outer cell membrane of the target cell, which by itself can trigger cell death. However, so called apoptosis usually requires that the immune cells deliver toxic enymes, such as Granzyme B, through the punched holes.

Perforins are highly conserved throughout evolution, but how they work has been a 'black box'. "That's what we've cracked," as ***Professor Joe Trapani,*** from Peter Mac's Cancer Immunology Program, put it. It was an extremely difficult task given the toxicity of the protein.

In a detailed structural analysis they confirmed a mechanism similar to that employed by toxins from bacteria such as anthrax, listeria and streptococcus. "The molecular structure has survived for close to two billion years, we think," Professor Trapani said.

Perforin is a central element of the body's immune defence and its improper function has been implicated in increased malignancies, but also in a number of autoimmune diseases. The **British Welcome Trust** is currently investing $1 million for the group to study potential inhibitors that could be used to counter tissue rejection. At the same time, ways of boosting perforin could help in cancer protection and as a therapy for a number of diseases.

▶ More information: www.scienceinpublic.com/blog/media-releases/perforin; *

Sexy diversity

One of the most widely reported stories in October was the discovery that populations of a Tasmanian lizard, which live either under colder highland or warmer lower lowland conditions, differ in how the sex of their offspring is determined.

In vertebrates, sex determination is based on either inherited genetic factors or the temperature experienced during embryonic development. In reptiles, both systems can co-occur within families of species and, as was shown in 2007 by teams at the **University of Canberra** and the **Australian National University**, in a reptile high temperatures can even cause males that are determined genotypically, to then reverse and adopt a female phenotype*.

Now researchers from the **University of Tasmania**, the UK and the Netherlands reported in *Nature*** that in the Tasmanian spotted skink *Niveoscincus ocellatus* different populations of one species use both sex-determining mechanisms depending on the environment and climatic conditions they have adapted to. Similar to the hatching of eggs in reptiles, these live-bearing lizards, which give birth once a year around January or February, respond to the surrounding climate by giving birth earlier in sunnier and warmer conditions.

When equal numbers of pregnant females from both high- and low-land populations were each split and exposed to sun that either mimicked a warmer low-land period or a colder high-land period, they found that in highland populations the ratio of females to males did not change and was driven solely by genetic factors. In low land populations, however, skinks responded to longer periods of sun basking by giving birth to more females than males, and vice versa, more males than females under cold conditions.

The researchers speculate that in low land populations producing more female offspring in a warm period is of selective advantage, as the earlier birth gives females more time to grow and reach maturity, overall benefiting reproductive success. Indeed, in lowland populations the chance of females being mature at a certain age depends significantly on the time of birth in a season, but not in highland populations. There the activity season is much shorter and maturity is reached later, cancelling the early birth advantage. In addition, the more extreme weather could, under a temperature-dependent mechanism, produce extreme sex ratios. Hence, in the highland sex is determined solely on genes.

Climate change could affect sex ratios of lowland populations with higher average temperatures producing more females than males.

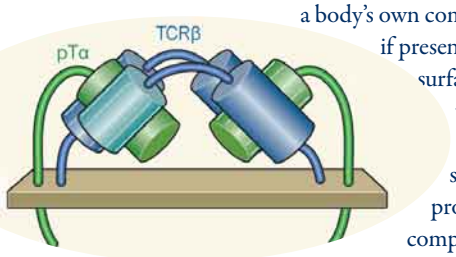
The researchers established a model based on the collected field data, and found, extrapolating over a period of thousands of years, a good correlation with temperature differences as the cause of diverging sex determination mechanisms.

▶ More information: ***Quinn et al. (2007) Science 316: 411; **Pen et al (2010) Nature doi:10.1038/nature09512**

Checkpoint Charlie for TCR beta

In a recent paper in *Nature**, accompanied by a commentary in the same issue**, Australian researchers from **Monash** and **Melbourne Universities** published the outcome of six years of collaborative work, describing a novel early quality control mechanism for the development of T-lymphocytes or T-cells.

These white blood cells are essential for the proper function of our immune system, as they identify foreign components, such as derived from microbes. Crucial in this process is the T-cell antigen receptor protein (TCR) made of a TCR alpha and beta chain. Both of these chains have constant as well as variable segments, the latter important in recognising antigen. Displayed on T-cells they can discriminate a foreign particle from a body's own components, if presented on the surface of cells together with a body specific marker protein. This complex process triggers two TCRs to form a dimer, whereupon cell signals elicit a variety of immune responses.



Two pre TCR alpha combine with two TCR beta chains

image: adapted from Bernard Malissen & Herve Luche, Nature, 467, 793

T-cells develop this capacity as they mature in the thymus from progenitor cells called thymocytes, which express a preform of the TCR alpha protein (pre-TCR alpha) that does not contain variable parts and is absent in the mature T-cell.

By revealing its structure, the researchers found a pivotal function of the pre-TCR, which is to regulate the quality of the T-cell receptor in mature T-cells. Pre-TCR alpha is always present in the thymocyte, while the TCR beta chain is formed as the cell matures. Only when these beta chains are formed correctly will pre-TCR chains combine with it to form a dimer. This is a crucial checkpoint as dimer formation triggers cell signals that save the maturing T cells from programmed cell death.

This novel first quality control does not depend on the ability to recognise antigen, which then occurs at a second quality control step, when the pre-TCR alpha chain is replaced with mature TCR alpha.

▶ More information: **http://newsroom.melbourne.edu/news/n-392; *Pang et al (2010) Nature,467: 844-848; ** Malissen & Luche (2010) 467: 793-4**

Wet smokescreen

True in the south...

Recent wet weather events in Australia may appear to contradict warnings by climate experts that as a consequence of a changing climate, Australia's southern regions will become drier. However, a recent synthesis report of the first phase of the **South Eastern Australian Climate Initiative** (SEACI)* suggests otherwise. It concludes that in the longer term there remains an increased risk of below-average rainfall in south-eastern Australia, with climate change a contributing factor.

Stormclouds near Griffith
image: Gregory Heath

For 13 years, a drought unparalleled in recorded history was largely constrained to the nation's southern regions with lower year to year rainfall variability. In the southern Murray Darling Basin (MDB) area rainfall has declined by 13% over the period, compared to long term averages. This has led to a 44% reduced annual streamflow, a decline that is around 25% higher than in the previous most severe drought periods.

While other factors are also contributing, such as natural climate variability, the report could link rising temperatures and associated changes in the large-scale circulation of the atmosphere to reduced rainfall and runoff over the 13 year period. This was shown in a climate modelling study, where factors associated with changes in large-scale circulation could not be explained without the contribution of greenhouse gases from human activities.

The report predicts a shift in the overall climate of south-eastern Australia similar to what has been experienced in rainfall and runoff in south-west Western Australia since the 1970s, and which has also been linked to global warming among other factors.

"It is prudent to plan for conditions that are likely to be drier than the long-term historical average," the report states. However, as observed reductions in rainfall and streamflow were larger than could be explained by climate change alone, the second phase of SEACI will focus on the relative contribution of climate change compared to other relevant factors. This aims to improve projections of the impacts of climate change

on water resources and to advance seasonal forecasting of climate and streamflow.

▶ **More information: www.csiro.au/news/Study-indicates-a-changing-climate-in-the-south-east.html; *SEACI is collaborative project by the Australian Department of Climate Change and Energy Efficiency, the Victorian Government Department of Sustainability and Environment, the Managing Climate Variability R&D Program, and the Murray-Darling Basin Authority. The research was undertaken by CSIRO and the Bureau of Meteorology.**

...but not in the north

Work by a team of CSIRO researchers suggests that in South-East Queensland (SEQ) climate variability rather than climate change was the cause of recent drought and the unprecedented low water storage levels in that region.

The researchers studied the possible influence of climate change compared to that of naturally occuring La Niña and El Niño events, as well as the longer lasting Interdecadal Pacific Oscillation (IPO) on rainfall patterns in SEQ. One of the wetter regions in Australia, SEQ is close to the world's most intensive rainfall-band in the Western Pacific, which is powered by the warmest ocean surface temperature on the globe. La Niña events push this band eastward, which decreases rainfall in SEQ, while at times of El Niño the band moves westwards increasing the chance of rain in this region. This recurring pattern is overlaid with the **Interdecadal Pacific Oscillation** (IPO), which changes in similar fashion but over a much longer time frame. When the IPO is in a phase similar to La Niña, it strengthens the rain producing influence of SEQ, while it weakens that influence when in a phase similar to El Niño. The researchers found a strong correlation between these natural oscillations and the rainfall patterns in the region.

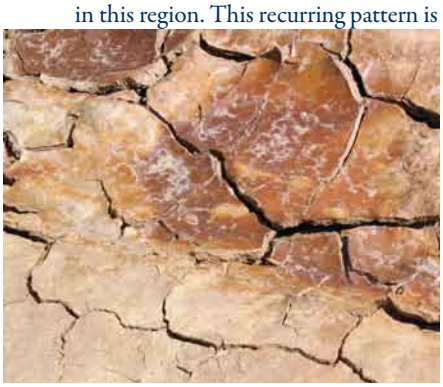


Image: CSIRO

Yet, when assessing the role of climate change by using the same models used by the **Intergovernmental Panel of Climate Change** the results were not consistent with the recent drought in SEQ and therefore less likely to have had a major influence.

As of 2010, the IPO appears to have phased in with La Niña, and could bring higher rainfall to SEQ for the next 10 to 20 years.

▶ **More information: www.csiro.au/news/SEQ-Drought.html**

Hot starvation

International marine scientists have linked massive bleaching events in Southeast Asian and Indian Ocean coral reefs to climate change. It was caused by large pool of 'super-hot' water streaming into the eastern Indian Ocean, with locally recorded water exceeding temperatures of 34 °C, over 4 °C above than the long term average. As the heat-shocked corals shed symbiotic algae, they bleached and were threatened of starvation.

Dr Andrew Baird from the **ACR Centre of Excellence for Coral Reef Studies** at **James Cook University** said that among researchers there is a high confidence that successive ocean warming episodes exceeding the normal tolerance range of warm-water corals are driven by human-induced global warming. This recent episode is the worst coral die-off since 1998, he said. Since May this year, around 80% of Acropora colonies and 50% of colonies from other species have died.

Extending from the Seychelles in the west to Sulawesi and the Philippines in the east, the bleaching event has also hit the richest marine biodiversity zone on the planet, the 'Amazon Rainforest' of the seas, known as the Coral Triangle (CT), which is bounded by Indonesia, Malaysia and the Philippines.

Dr Baird highlighted the potential fall-out for the livelihood of tens of millions of people living in affected regions, such as in Aceh and Sumatera, where it could impact on the regional economy and political stability.

▶ **More information: www.coralcoe.org.au/**

MISCELLANEOUS PROJECTS

G'day Sunshine

artist impression of the CSIRO Brayton Cycle Solar Field
Image: CSIRO

The **CSIRO Energy Centre in Newcastle**, NSW has installed the first panels - 450 large mirrors, called heliostats - of Australia's largest solar-thermal energy system. The **Australian Solar Institute** (ASI) is investing $5 million in the collaboration between the **CSIRO Energy Transformed Flagship** and the **Australian National University** (ANU) which will build the largest solar tower in the world that utilises a solar driven Brayton Cycle system.

By contrast to most solar thermal power stations, which require water to operate a steam turbine, CSIRO's Solar Brayton technology produces electricity using only sun and air. The project will operate a total of 450 heliostats to concentrate and reflect sun rays onto a 30 metre high solar tower, where they are used to heat compressed air to a temperature of over 900 degrees Celsius. Alternatively, natural gas can be used to heat the air, which as it expands then powers a 200 kilowatt turbine.

Primarily a research project, a field of this size could generate enough electricity to power nearly 100 homes.

▶ **More information: www.csiro.au**

Linking top and bottom

The Australian **Office of the Chief Scientist** and international collaborators, including the **Potsdam Institute for Climate Impact Research** in Germany, will create a web-based interactive tool that could empower citizens, businesses and governments around the globe to explore the impacts of climate change in their own region and how these effects are related to different emissions trajectories. The tool will also allow geographic comparisons revealing how local choices affect other parts of the world. Australia's Chief Scientist ***Professor Penny Sackett*** said the initiative had the potential to link top-down global knowledge and national policy with bottom-up local knowledge and community action networks in a positive and productive way.

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

Kris Gale
MANAGING DIRECTOR, MICHAEL JOHNSON ASSOCIATES

If it's rolling the wrong way, stop the ball!

If we start the innovation ball rolling now, we will all go downhill, says Kris Gale

I read with great interest the article in the October 2010 issue of the ADRD by Mark Horsburgh, President-Elect, Licensing Executives Society of Australia and New Zealand (LESANZ). Entitled 'Senate : keep the innovation ball rolling!', Dr Horsburgh urged the Senate to pass the R&D Tax Credit (the Credit) legislation to provide some much needed support for innovation. He noted that the global financial and banking crises, along with the closure of the Commercial Ready grants scheme, had conspired to severely hamper funding options for innovation critical to the future of technology start-ups and other industry sectors. To ease the pain, he called for the immediate passage of the Credit legislation.

Whilst agreeing with Dr Horsburgh's assessment of the difficult environment facing innovation funding in Australia, I cannot support his call for the passing of the Bill. Perhaps one shortcoming of his analysis was a failure to fully consider the likely impact of the ending of the current R&D Tax Concession (the Concession) at the same time that the Credit would commence.

Many commentators, of which I am one, believe that the introduction of the Credit in its proposed form would result in a significant reduction of support for all Australian companies when compared to that currently offered by the Concession. This decline in support would be across the board including the SMEs that the Government contends will be the major beneficiaries of the changes. As a result, we would run the risk of harming corporate R&D in the same way that the severe cuts to the Concession in 1996 saw Business Expenditure on R&D (BERD) slide dramatically downhill for the next 5 years.

On 25 November, the Government's R&D Tax credit legislation, first announced in the 2009 Budget, was deferred after it had already passed the House of Representatives. Innovation Minister Senator Kim Carr accused the opposition of obstructionist tactics, depriving "thousands of businesses of vital funds".

The Liberal Party also issued a statement demanding the Government withdraw its agenda of changing the system retrospectively and release all of the Government's modelling of the impacts of this policy.

Over the course of this year, the ARDR had several contributions on this issue *Horsburgh, ARDR Oct 2010; Gale ARDR Apr 2010.*

WHY INTRODUCE THE CREDIT AT ALL?

Dr Horsburgh expresses his concern that if the Bill is now not passed, "...we could risk receiving completely different legislation, or even none at all." The fact is that we have good legislation currently in place, namely the Concession. Studies suggest that it has been a significant contributor to Australia's improving BERD performance. So it is not the case that we will be left with nothing if the Bill doesn't pass. The Concession will continue to operate.

However, the 2008 Cutler Report, '*Venturous Australia*', and the Government rightly concluded that the Concession needed a revamp. In the words of our submission to Cutler, it had become underpowered and overcomplicated. The Government responded to the Cutler recommendations with the announcement of the Credit in the May 2009 Budget.

The Credit seeks to introduce an increase in the base rate of support for all companies in comparison to the Concession. For SMEs (less than $20 million turnover), support will double from 7.5 cents in the dollar to 15 cents. For larger companies, the support jumps from 7.5 cents to 10 cents. In addition, local R&D can be claimed even if the IP is owned offshore. To pay for these increases, the Government is closing the costly and complicated 175% incremental concessions. So far, so good.

> I support the widespread view that the effective level of support for all Australian companies, irrespective of size, will be reduced under the Credit compared with the Concession.

However, predicated on by a joint consultative process run by Treasury and the Department of Innovation, Industry, Science and Research, the detailed draft legislation that first appeared in December 2009 announced a fundamental rewrite of the definition of R&D activities and associated expenditure provisions. This was justified on the basis that the program needed to remain revenue neutral going forward for the next 4 years and that only "genuine" R&D was to be supported.

This rewrite is the root cause of the widely-held concerns with the Credit. The Government has conceded that the claims of existing taxpayers will be reduced by about 20% as compared with the Concession. However, many commentators believe that, once the new uncertainties and complexities are unravelled, the reduction will be in the realm of 50-70%. This

gap in perceptions has not significantly narrowed as the Bill has

> We completely diasgree ... that inconsistencies in the detailed changes could be resolved during implementation.

gone through its three revisions from the original December draft.

To add to the list of concerns, the Bill is now proposed to be enacted retrospectivley so as to take effect from 1 July 2010.

These changes leave us with an R&D tax incentive that reflects a philsophical shift in government support for BERD by basing eligibilty on a scientific definition of R&D rather than the current industrial one. The eligibility of experimental development activities, the heartbeat of corporate R&D, is in severe doubt despite Government assurances to the contrary. Further, where production-based R&D generates value, the Credit will be lost as a result of the operation of the enhanced feedstock provisions.

I support the widespread view that the effective level of support for all Australian companies, irrespective of size, will be reduced under the Credit compared with the Concession.

How can these concerns be resolved to the satisfaction of all parties?

THE FIRST PRIORITIES

A large coterie of tax professionals assure me that retrospective application would be a poor move in terms of good tax practice. Further, companies need a transition into a new R&D tax regime.

If it was announced immediately that the commencement date was 1 July 2011, this would allow the establishment of an independent consultation process to seek improvements in the proposed laws, followed by the pre-release of administrative guidelines so that all parties could hit the ground running in the new tax year. We support the Australian Industy Group's call for the Board Of Taxation to head up an independent, timely consultation.

- *Action Item: The attempt to make the Bills retrospective should be dropped and the commencement date pushed back to 1 July 2011.*
- *Action Item: An independent consultation process should be undertaken immediately. The Board Of Taxation is ideally placed to lead the process.*

IS THE CASE FOR DEFINITIONAL CHANGES MADE OUT?

Firstly, the need to make the definitional changes at all has not been supported by the release of any economic modelling by the Treasury. My firm has submitted modelling to Treasury that indicates that the cost imposts of higher base rates and foreign-owned IP will be more than offset by the closure of the 175% incremental provisions. Given the Government has conceded that the new rules restrict the claims of existing claimants by 20% (with others suggesting 50-70%), it is difficult to conceive of where the required flood of new claimants will come from to leave the program costing the same. Absent the modelling, the case for change has not been proven.

- *Action Item: The Government needs to release the modelling immediately.*

Secondly, assuming the case could be established by the figures, the Government has refused to be engaged on any alternative solutions that could deliver a revenue neutral outcome that would avoid the need to change the rules for ALL claimants, be they new or existing, large or SME.

Many large corporates and their industry associations have indicated that they would be prepared to negotiate a group claim cap if they can be shown that further cost control is necessary. If the cost gap could be proved, then historical claim data would enable a reviewable group claim cap to be set to

> Attempting to roll back these damaging effects after the Bill has passed will be very much a case of the proverbial horse having well and truly bolted.

limit the amount of benefit these groups could derive each year. This would achieve the revenue neutral outcome without the need to change the current rules for the SMEs that are the Government's declared priority with the Credit. And it would avoid the clear inference in the Bill's Explanatory Memorandum that large resource and manufacturing concerns do R&D that is somehow not as "genuine" as their SME brethren.

In essence, the big end of town is saying that they will accept a cap along with a lower base rate and no access to refundability if they can be shown the need for the cap based on the numbers. This would allow everyone to move on from the negative views that have been expressed about "whole of project" claims and supposed misuses of the Concession by some organisations.

- *Action Item - The consultation should consider whether the case for the definitional changes can be proven. If it can be made out on the data, consideration should be given to alternative solutions to the issues of revenue neutrality and eligible R&D activities and expenditures.*

In essence, the big end of town is saying that they will accept a cap along with a lower base rate and no access to refundability if they can be shown the need for the cap based on the numbers. This would allow everyone to move on from the negative views

... continued page 19

...continued from page 1

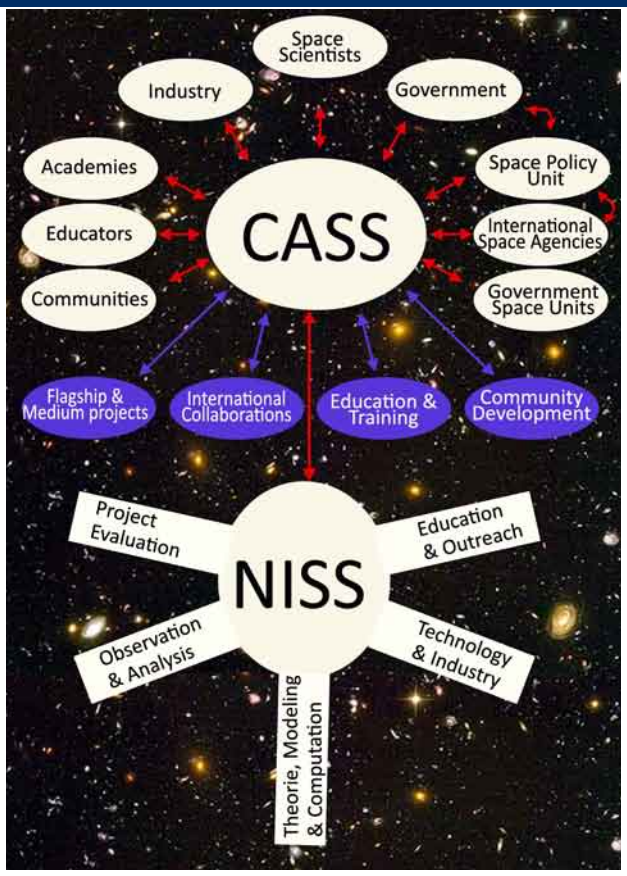
such as the Government funding of two new major space science projects and a new space science educational program, and two new space research centres at RMIT and the University of New South Wales (see Box 3).

The NCSS plan, however, aims to enhance Australia's presence in space through "a longer duration and fiscally enhanced version" of the Australian Space Research Program. A core argument is that "contrary to public perceptions" space science is relatively inexpensive, particularly if considering the potential economic benefits through 'multiplier' or 'spin-off' factors. For example, 'piggy-back' launches of satellites of 100 kg may now cost only $2 million, and ground-based facilities are relatively inexpensive. At the same time, huge costs could arise through a lack of increased public commitment in this area.

Sweden could be an example for Australia, the NCSS says, as it has developed a 'world-class' space effort using small spacecrafts at a cost of less than $15 million each.

However, fundamental would be better management and governance Australia's space research, and this will require additional public funding. The NCSS plan puts a $140 million price tag on its new initiatives that would combine novel infrastructure components with broad-based science projects.

The plan centres on a new entity called **CASS** (Coordination of Australian Space Science), which would bear similarity to **Astronomy Australia Ltd** and function as a unifying agent for science and technology as well as providing a government channel for dedicated new funding. Proposed as a corporate body with primarily managerial tasks, CASS would facilitate better coordination and linkages between research projects and initiatives.



It could also govern the second proposed new entity, the **National Institute for Space Science** (NISS). This overarching body, modelled on the **Anglo Australian Observatory** and **CSIRO's Australia Telescope National Facility** (ATNF), would focus on increasing national capacity and capability in space by developing a sustainable, vibrant research effort of international excellence.

Beyond these structural elements, the NCSS sets out scientific goals and initiatives including 'flagship' projects; 'international collaborations and future opportunities' as well as 'education and training' and 'community development'.

Through consultations with the Australian space science community, the NCSS established 'Global Themes" of research, such as the study of sun activities how they affect humans and their technologies; how solar system bodies have evolved; the observation (remote sensing) of earth and other solar system

Environmental monitoring technology and student education in space science will receive $9 million under the **Australian Space Research Program**. Projects include:

– Over $4.9 million for the **University of South Australia** to transmit data from field instruments to researchers live via satellite, for example to track animals and wildlife, manage ecosystems and monitor water, climate and marine environments. It will also have applications in mining, agriculture and other industries.
– Over $3.4 million for **Lockheed Martin Australia** to develop international standard infrastructure, which will receive and analyse Landsat Earth observation data. This will advance Australia's unique satellite data processing capability for better global climate change research, and benefits for agriculture, geology, forestry, surveillance and education sectors.
– Over $950,000 for a space education program led by **Flinders University**, which will train 40 teachers about earth observation sciences. In addition, up to 400 secondary students will undertake research projects in space-related fields.

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

Spaced out technology

at RMIT...

A new Space Research Centre at RMIT will address the lack of ground-based meteorological observation stations and the shortage of accurate data over the world's oceans and polar regions, to enhance the reliability of climate predictions. The center will focus on the study of atmospheric mass density and applications of satellite technologies in climate and space weather. The centre will be led by RMIT's Professor Kefei Zhang and involve researchers from the Bureau of Meteorology, Curtin University of Technology, the University of NSW, Electro Optic Systems Space System, GPSat Systems Australia Pty Ltd, National Space Organisation Taiwan and NOAA's World Data Centre for Meteorology.

▶ **More information: www.rmit.edu.au**

... and UNSW

The Australian Centre for Space Engineering Research (ACSER), launched at the University of New South Wales, will develop technologies for satellite navigation; Earth Observation applications such as monitoring of disasters, climate change and mine subsidence; national security; and space vehicle engineering. The centre will be led by ***Associate Professor Andrew Dempster***, who said that Australia, having been the fourth nation to launch a satellite in the 60s, has lagged ever since.

"We will be working to establish an Australian presence in the space industry", he said.

▶ **More information: www.ssis.unsw.edu.au/?p=1415**

bodies; and how life developed on Earth and might exist elsewhere. The NCSS plan outlines three large scale flagship projects addressing these issues, each budgeted at more than $10 million, and adding to a number of small and medium sized projects. These projects would "simultaneously build capability, develop community-scale research infrastructure, and address broad-themed fundamental and applied space science," the NCSS says.

- **SpaceShip Australis**, a study of space weather and the effects of the sun's variability from the surface of the Earth to the boundaries of the solar system. Such changes in space weather could have serious impacts, for example, by increasing radiation exposure to aeroplane travellers, affecting GPS and navigation systems, and causing serious damage to power grids, satellites and communication.
- **Marabibi Constellation**, a flexible program of low-cost satellites that would link with SpaceShip Australis and provide world-first, student-focused research on space weather, technology, and the earth.
- **Sundiver**, a high risk project developing a spacecraft to dive into the sun and study its supersonic wind and hot corona. The project is a "visionary mission" and will use Australia's uniquely advanced propulsion technology.

A further element of the NCSS plan is an **International Collaboration and Future Opportunities** (ICFO) **Program**, through which Australia would be able to participate in international missions and future opportunities arising during the next decade.

NCSS concludes that the outlined plan with its combined research and infrastructure efforts would "fit elegantly" into a future Australian Space Agency.

▶ More information: **www.science.org.au**

...MURRAY SPECIAL

...continued from page 7

implemented in state water resource plans.

The reductions of water allocations would differ between various catchments, and as they represent averages, local allocations of water to entitlement holders would also change depending on water availability in a particular year. Regions most affected by reductions would be the Moonie, Gwydir and Barwon-Darling regions (North), and the Murrumbidgee, Loddon and NSW Murray regions (South), for which the MDBA suggests staged transitional arrangements, such as a phasing in of SDLs, to support adjustment.

Mitigating factors

At the time MDBA guide release, ABARE–BRS also published a report Assessing the regional impact of the Murray-Darling Basin Plan and the Australian Government's Water for the Future program prepared by the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC). It suggests that the regional impacts of the Murray–Darling Basin Plan will be mitigated by a series of government policies, such as the Water for the Future program. With these measures Gross Regional Product at the Basin level will fall in the year 2018-19 by around $570 million (0.7%), compared to around $1 billion (1.3%) without mitigation measures.

Upgrade frenzy

In early November, amid growing concerns by affected farming communities, Prime Minister Julia Gillard committed $953 million from the $5.8 billion Sustainable Rural Water Use and Infrastructure program towards stage 2 of the Northern Victorian Irrigation Renewal Project (NVIRP). In this initiative, the Australian and Victorian Governments work together to upgrade old and leaky irrigation systems in the Goulbourn-Murray Irrigation District.

Already funding the project's first stage with $1 billion, the Victorian Government has committed further 10% to this second stage of the project, which so far had only in-principle support under the 2008 Intergovernmental Agreement on Murray-Darling Basin Reform.

The project could lead to significant water savings and help meeting the new SDLs as they eventuate in a final Murray Darling Basin Plan. According to Prime Minister Gillard, on average 800 billion litres of water are lost in the district through evaporation, seepage, leakage and system inefficiencies. Stage 2 alone could provide savings of around 200 billion waters, with total average savings after completion of both stages in 2017/18 expected to amount to 425 billion litres per year.

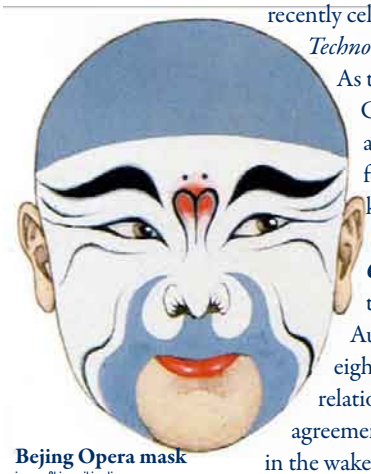
Productive survival

In early November, ABARE-BRS then published *Financial performance of irrigation farms in the Murray-Darling Basin, 2006–07 and 2007–08*, which examines the impact of the prolonged drought on farm performance across the basin in the period between 2006-07 and 2007-08. It finds that while the total irrigated land area in the basin reduced over that period by 13%, and the volume of water used for farming reduced by around 30%, farm incomes generally increased, due to increased production and higher prices for some commodity.

...continued page 19

It's all about China now...

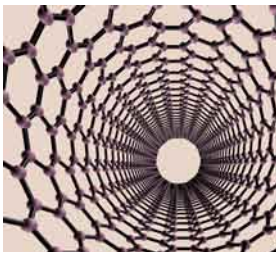
Australia's growing links with the Chinese science and research sector were recently celebrated at the *Australia-China Science and Technology Week* at the **Shanghai World Expo**. As the Go8 writes in a recent announcement, China is "investing in universities on a massive scale to bring China to the forefront of global research, innovation and knowledge."



Bejing Opera mask
image: China-wikipedia.com

Innovation Minister ***Senator Kim Carr*** commented that China is now the third most prolific partner country in Australian scientific publications, up from eighth just a decade ago. The strengthening relationship is also reflected in a number of agreements between China and Australia that came in the wake of the event.

Network of the small bearing fruit



The **Australian Technology Network of Universities** (ATN) and the **International Strategic Technology Alliance of Chinese universities** will establish an **Australia-China Joint Laboratory for Nanoscience,** building on established relationships through the **Australia–China NanoNetwork** (see also feature **'All eyes on China',** ARDR September 2009) and a current memorandum of understanding (MOU) between the **Australian Technology Network of Universities** (ATN) and the **International Strategic Technology Alliance of Chinese Universities**.

▶ **More information: http://minister.innovation.gov.au**

Historic understanding...

The **Group of Eight** (Go8) universities announced it has signed an "historic" MOU with the leading research-intensive China 9 universities, and at the forefront in a push to develop 'home grown' potential, and recruiting leading expatriate researchers back to China.

The old Shanghai University was founded in 1922 as a cooperative project by the communist party, and then merged in 1994 with three other universities to its present incarnation. (Above University Library, below a panorama shot of Shanghai.)
images: above, Shanghai University; below, World Education Group, San Francisco)

Under the MOU, the China 9's student exchange program effectively extends to Go8 universities, with students of both nations being able to spend a semester at a partnering university, with full credits towards their degree. Likewise there are new opportunities at the doctoral and post-doctoral level, a statement by the Go8 says.

More information: www.go8.edu.au

...and Shanghai partners

Shanghai University, which has been a strategic educational partner for the **University of Technology Sydney** since 1994, has entered a new educational partnership with the Australian university to boost research, student exchange and training collaboration. This will include enhancing research networks, quality and funding opportunities, staff and student international exchanges and joint centres of excellence. The universities also signed a dual-degree PhD scholarship agreement.

The partnership is part of UTS' **Key Technology Partnership** agreements which to date include four university partnerships in China and 15 in total world-wide.

▶ **More information: http://minister.innovation.gov.au**

...but vive la france

The **Go8** has entered a memorandum of understanding with the **French Embassy in Canberra**, under which Go8 students will be able to work in a French business, either in Australia or in France. Go8 chair ***Professor Alan Robson*** said that under the **French Company Internship Program** students will internationalise their degree in the most powerful way by gaining business, language and country experience.

▶ **More information: www.go8.edu.au**

Healthy hub

As part of its health reforms, the **Australian Government** has announced it will provide $5 million for new medical training and research facilities within a new **Epworth HealthCare** private not-for-profit hospital located at Geelong. The facilities will be linked to **Deakin University**'s Medical School and its planned $47 million teaching and research facility **REACH** (Deakin Regional Community Health Hub).

According to vice-chancellor ***Professor Jane den Hollander***, Deakin has also had discussions with Epworth HealthCare regarding a new teaching hospital. This would open up opportunities for further medical training and research in Geelong, Professor den Hollander said.

▶ **More information: www.deakin.edu.au/news/2010/131010medicalfunding.php**

Cross disciplinary healing

The world's first interdisciplinary national wound research centre, the $100 million **CRC for Wound Management Innovation**, has officially opened at the **Queensland University of Technology**.

Chief executive officer ***Dr Stephen Prowse*** said the CRC would bring together 22 academic, government, community care groups and industry participants to undertake fundamental genetic, biochemical and modelling research and directly link it to clinical practice and wound care products development. The research in the CRC will be led by QUT Professors ***Helen Edwards*** and ***Zee Upton***, the inventor of **Tissue Therapies**' wound-healing product VitroGro®, and ***Professor Rob Short*** from the **University of South Australia**.

Chronic wounds, costing Australia an estimated $2.6 billion each year, are particularly prevalent in elderly people and people with diabetes, who are prone to skin ulcers due to slow healing.

▶ **More information: www.news.qut.edu.au/cgi-bin/WebObjects/News.woa/wa/goNewsPage?newsEventID=33824**

Defensive research

The **University of Melbourne** and the **Defence Science and Technology Organisation** (DSTO) have launched a **Defence Science Institute** (DSI) that will use cross-disciplinary research to solve complex, long-term challenges for the **Australian Defence Force** (ADF). The project is supported by $3 million over three years from the **Victorian Government**, $2.5 million over three years from the DSTO, and a contribution equivalent to around $11.5 million by the university.

Initally it will engage researchers from the **Bio 21** and the **Parkville Neurosciences** Facility, the **DSTO**, **National ICT Australia** (NICTA), other Victorian universities and industry partners, and focus on

- biological systems, including how to prepare for and recover from biological and chemical attack;
- human protection and performance, including the use of advanced imaging tools to study and reduce neuro-trauma;
- the study of active materials – smart materials that change their properties in response to changing environments
- energy systems that will develop battery technology and renewable energy sources;
- micro-radars for use in unmanned aircraft and submersibles; and
- intelligent information systems.

image: modified from Chris Laughli Chris Laughlin/Animals Animals-Earth Scenes

Still the same principle...

▶ **More information: www.minister.defence.gov.au/snowdontpl.cfm?CurrentId=11016**

... KRIS GALE CONTINUED

...continued from page 15

that have been expressed about "whole of project" claims and supposed misuses of the Concession by some organisations.

– *Action Item: The consultation should consider whether the case for the definitional changes can be proven. If it can be made out on the data, consideration should be given to alternative solutions to the issues of revenue neutrality and eligible R&D activities and expenditures.*

WHAT NEEDS TO HAPPEN NEXT?

Politics being politics, we appreciate that the Bill may end up being the subject of passage by amendments and my firm will continue to do all we can to assist in tackling the detailed definitional issues causing concern such as the dominant purpose test, changed feedstock provisions and greatly enhanced administrative powers. We need to minimise the negative impacts of these changes if the Bill is to be pushed through.

We completely disagree with the R&D tax professional quoted in Dr Horsburgh's article that inconsistencies in the detailed changes could be resolved during implementation. They collectively amount to a philosophical shift in government support for BERD whereby support is based on a scientific definition rather than an industrial one (dominant purpose) and the benefit is likely to be lost where production-based R&D generates value (feedstock changes). These impacts do not equate with the actual innovation policies announced by the Government at the time of last year's Budget.

Attempting to roll back these damaging effects after the Bill has passed will be very much a case of the proverbial horse having well and truly bolted. It's a familiar refrain, I know, but the time to act to prevent this threat to Australia's innovation future is now.

... back to page 15

...MURRAY SPECIAL CONTINUED

...continued from page 17

$7.5 billion, that's how we love them?

In November, the MDBA released another report, which estimated in economic terms how people appreciate environmental, social and commercial consequences of improvements made in the environments of the Murray River and the associated Coorong wetlands in South Australia. Such an environmental valuation based on a 'non-use value' could support the development of sustainable diversion limits in the Murray-Darling Basin.

The researchers from **Charles Sturt University** and **CSIRO** estimated that improving the quality of the Coorong from poor to good is valued by the community with $4.3 billion, while a moderate quality improvements of the Murray are worth $3.2 billion, totalling $7.5 billion.

The study looked at the relative value Australian households place on attributes such as native vegetation, native fish populations, waterbird species and the frequency of waterbird breeding, but also increased recreational opportunities, and the magnitude of cost-savings from improving drinking water quality for downstream communities.

As the report states, the results are based on current "best available evidence about economic benefits of environmental improvements in the Murray-Darling Basin", although the authors acknowledge limitations in this approach. It should be used as only one informational input into the process, the authors say. However, it "could provide decision makers with a more complete picture of the impact of different resource allocations".

▶ **More information: www.mdba.gov.au/files/bp-kid/1282-MDBA-NMV-Report-Morrison-and-Hatton-MacDonald-20Sep2010.pdf**

... back to page 7

Dr Mark Horsburgh
PRESIDENT-ELECT, LICENSING EXECUTIVES SOCIETY OF AUSTRALIA AND NEW ZEALAND (LESANZ)

Innovation support a drop in the ocean

The resources sector has seen a lot of attention over the last year. The second mining boom has been heralded as the country's weapon against recession. It's what our country is known for: 'resource rich'.

There is no doubt that Australia is a resource-based economy. We dig, we grow, and then we send the results overseas. But there is no value to be added to what we send. The resource-based product Australia exports is used to create consumer goods, which we buy back. The model works so long as the value of the products we buy back is less than what we sell.

To date, Commercialisation Australia has awarded 54 grants to a total of $19.8 million. That's 54 out of well over 2000 applications – those aren't good odds.

Our resources will last a long time, so a resource-based economy isn't our greatest concern in the short to medium term. But it doesn't necessarily follow that domestic demand for imports will always be less than the value of resources exported. Population growth, for instance, could significantly increase import demand, but it won't have any impact on the value of exports. It's clear that we need to plan now for other revenue streams for Australia in the long term.

To do this, it's necessary to look for value-add technologies that don't require excessive infrastructure. The answer is intellectual property. But it can't just be an ad hoc approach to IP. Australia has a $1 trillion economy, with no focus. Sweden is less than half our size, but they are known for Volvo, Ericsson, Electrolux, Sandvik, Atlas Copco.

The fact is, if Australia is still reliant on our resources in 50 years time, we might be in a lot of trouble. Yet innovation in Australia is still taking a back seat to short term goals and change is not appearing on the horizon. This is true, despite the 6-month anniversary of Commercialisation Australia and its hefty mandate to be the primary source of assistance for commercialisation of IP in Australia.

The strategy for exploiting the intellectual capital that resides in Australia has been placed almost solely with Commercialisation Australia. And what originally appeared like the one government initiative with the potential to make a real difference to innovation in Australia is now looking dramatically under-equipped for the challenge.

To date, Commercialisation Australia has awarded 54 grants to a total of $19.8 million. That's 54 out of well over 2000 applications – those aren't good odds. Commercialisation Australia has also committed to annual grants amounting to less than half of that given by its predecessor program, the Commercial Ready Grants.

Biotechnology and pharmaceutical projects have been popular for the new grants, but these types of technologies typically require millions of dollars to take to market. Funding from Commercialisation Australia provides just a few hundred thousand. These companies will thus still need to rely on attracting venture capital money which was a rarity in the past and has only become more slippery given the tougher financial market.

How can we expect to continue moving forward with IP, if the government program set up to be the primary source of commercialisation assistance is taking a step backwards in the amount of funding it can provide?

At the beginning of November, the government announced $80 million in venture capital to be provided to four funds through the Innovation Investment Fund. But once again, this seems like a drop in the ocean. Commercial Ready was worth $1 billion. It's going to take a lot more than the current funding effort to get back to that level of commitment.

How can we expect to continue moving forward with IP, if the government program set up to be the primary source of commercialisation assistance is taking a step backwards in the amount of funding it can provide?

In mid October, the Minister for Innovation, Industry, Science and Research made much of providing $8 million to fund 22 new projects. The heading of the media release was 'Strengthening our economy through commercialisation'. While the rhetoric is right, the reader should make their own judgment by reviewing the list of projects funded.

To be fair, it's still too early to tell if reality will match the rhetoric. However, this reader is watching closely with just a little healthy scepticism.

Dr Tony Press
CEO OF THE ANTARCTIC CLIMATE AND ECOSYSTEMS COOPERATIVE RESEARCH CENTRE

Looking into Tasmania's climate future

No longer the 'Mendicant State' or thought of as the backwoods of innovation, Tasmania has used its unique assemblage of researchers and community networks to get on the front foot in understanding how climate change will affect the island state.

From conception, Climate Futures for Tasmania was designed to understand and integrate the impacts of climate change on Tasmania's weather, water catchments, agriculture and climate extremes.

The first Climate Futures for Tasmania report, launched on 12 October, charts projected climate changes for Tasmania through to the end of this century. An Australian first, the report's fine-scale climate modelling gives Tasmania the jump on the rest of Australia (and most of the world) in having realistic climate change projections to inform decisions about the future.

The project was funded by a consortium of 12 partners, which includes the Federal and Tasmanian governments and is hosted and led by the Antarctic Climate and Ecosystems Cooperative Research centre (ACECRC) at the University of Tasmania.

The Climate Futures for Tasmania: General Climate Impacts Technical Report is the first of seven technical reports to result from the Climate Futures for Tasmania project. Findings of the first report include:

- *Tasmania's temperature is projected to rise less than the global average temperature, by about 2.9 degrees Celsius under high greenhouse gas emissions (the path that is being tracked at present) and 1.6 degrees Celcius under low greenhouse gas emissions.*
- *There will be a steadily emerging pattern of increased rainfall over the coastal regions, and reduced rainfall over central Tasmania, but there is no significant change in the projected total annual rainfall for the state as a whole.*
- *A projected increase in pan evaporation of up to 19% is likely to impact on aspects of water availability. The increase in evaporation is greater in the north and west, and lower in the south and east.*
- *Tasmanian temperatures have risen since the 1950s but at a slower rate than mainland Australia.*

From conception, Climate Futures for Tasmania was designed to understand and integrate the impacts of climate change on Tasmania's weather, water catchments, agriculture and climate extremes. This required a robust model of Tasmanian climate future, for which the researchers processed twice the amount of data than was used by the Intergovernmental Panel on Climate Change (IPCC) to model global climate.

In the course of the project, six global climate models were 'downscaled' to a 10-kilometre grid over Tasmania, so that the detailed landscape could be taken into account in describing how the climate operates. The models were then tested against

image:Glenn Jacobson

real climate data (for example, temperature, rainfall, humidity and evaporation) from detailed weather observations taken across Tasmania since 1960. The models realistically reflected the historical record and the scientists therefore have confidence in their ability to describe future changes.

In setting up the project a great deal of effort went in to discussing with 'end users' what they wanted to know about climate change in their area of business, and what climate variables were important to them. The results of these discussions and ongoing dialogue between the scientists and the community means that the Climate Futures for Tasmania project will, from this point on, provide a series of specific reports covering diverse subjects such as impacts on agriculture; extreme tide and sea level events; severe wind and hazards; and water and catchments.

The results of the scientific modelling will be presented in a way that can be used to guide future decisions for specific areas of the Tasmanian economy. Not many climate modellers would have begun their research by using information about how to grow Pinot Noir in a scientific study of climate change, for example.

In keeping with its focus on end users, these groups will not only be informed of the results of the research, but more importantly, they will be part of a discussion about how the results can be used in responding to climate change.

Tasmanian Minister for Climate Change, Nick McKim, launched the Climate Futures for Tasmania General Impacts Technical Report before an audience of 110 people from across the research, policy, government and industry communities of Tasmania.

In keeping with its focus on end users, these groups will not only be informed of the results of the research, but more importantly, they will be part of a discussion about how the

... continued page 30

Kicking along

In mid October, Innovation Minister ***Senator Kim Carr*** announced another round of support for Australian commercialisation projects. Commercialisation Australia will provide $8 million for 22 diverse projects ranging across areas such as medicine, security, mining and defense. The major supported projects include a 2nd generation quantum key distribution system by **QuintessenceLabs Pty Ltd** ($1.22 million) and a new diagnostic test for prostate cancer by **Biosceptre International Limited** (over $1.75 million).

QuintessenceLabs will fully commercialise a new ultra-secure communications technology, which uses a quantum cryptographic key to protect information in transit with true end-to-end, real-time, one-time pad encryption. The company is a spin-off from the **Australian National University**, where founding director and chief executive officer ***Dr Vikram Sharma*** developed the technology. In 2006, the innovation was awarded the Eureka price for Scientific Research. The company is chaired by ***Professor Peter Shergold***, recently appointed as new chancellor of the ***University of Western Sydney***.

Biosceptre will use the support to conduct a clinical trial of its Prostate Cancer IHC Diagnostic Test, through which it aims to overcome limitations in currently available prostate cancer diagnoses regimes. The test is based on the discovery that a receptor P2X7, which in normal cells is responsible for programmed cell death (apoptosis), is expressed in many cancers, including prostate cancer, as a non-functional protein and can be detected in the patient's tissue samples with specific antibodies. This will help clinicians to differentiate between clinically significant (high risk) and clinically insignificant (low risk) forms of the disease.

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

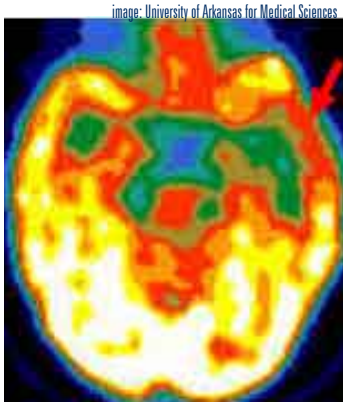
Targeted fallout

ANSTO, the **University of Melbourne** and Melbourne based **TM Ventures Pty Ltd** have entered a venture, **Clarity Pharmaceuticals**, to utilise new compounds that can significantly increase the accuracy of positron emission tomography (PET). The widely used nuclear medicine imaging technique allows clinicians to obtain a three-dimensional image or picture of functional processes in the body.

According to ***Dr Matt Harris***, managing director of TM Ventures, PET is the fastest growing nuclear medicine modality, through which radiopharmaceuticals can be traced in the body in real time, selectively illuminating diseased tissue. With the advanced PET monitoring, clinicians will potentially be able to noninvasively diagnose cancer; to guide, improve and assess treatment regimes; and provide a personal prognosis.

Developed at ANSTO and the University of Melbourne, the new compounds contain metallic radionuclide, such as copper-64, which is stably coupled to a molecular moiety, for example a peptide that specifically interacts with a target site in the body. ***Dr Michelle Ma***, then a postgraduate student at the University of Melbourne, won recently a Victoria Fellowship for her work on the patented technology.

image: University of Arkansas for Medical Sciences



PET scans can also reveal metabolic states. In this scan of a brain reduced use of glucose in parts of the brain (arrow) are associated with epilepsy.

ANSTO general manager of Business Development ***Rosanne Robinson*** said for patients with cancer, this treatment could be revolutionary. "No longer would patients suffer from the terrible side effects of chemotherapy because treatment could be precise, targeted and effective."

▶ More information: **http://newsroom.melbourne.edu/news/n-398**

Buddy extension

DuPont business **Pioneer Hi-Bred**, the world's leading developer and supplier of advanced plant genetics, and the **Australian Centre for Plant Functional Genomics** (ACPFG) have extended their research collaboration until 2015. The partnership started in 2005 with the aim to discover and develop traits to increase drought tolerance and to decrease the need for soil-applied nitrogen fertilizer, as well as to increase overall crop yields in corn, soybeans, rice, wheat, canola, sorghum and barley.

image: United States Department of Agriculture

▶ More information: **peter.langridge@acpfg.com.au; http://scinews.com.au/releases/467/view**

Anxious news

Happy approval...

The anxiolytic drug candidate BNC210 was the second clinical drug after anti cancer drug BNC105 developed by **Bionomics Limited** using its chemistry platform MultiCore®.

In preclinical studies conducted in animals, the drug was effective in relieving anxiety without the common side effects of current anxiolytics – sedation, memory impairment or tendency to addiction. In addition, as demonstrated this month in a poster at the 2010 Society for Neuroscience Annual Meeting in San Diego California, BNC210 acts more rapidly on the same pathways than other marketed drugs, including commonly used selective serotonin reuptake inhibitors (SSRI's). These pathways include the serotonin (5-HT1B receptor), glutamate (Group 2 metabotropic glutamate receptor) and cholecystokinin (CCKB receptor). In rats, BNC210 was also effective in overcoming panic attacks induced with CCK-4, a derivative of the peptide hormone cholecystokinin and a known anxiogenic.

Following an initial Phase 1 clinical study, in which the drug was found safe and well tolerated, with drug blood levels in participants sufficient for a once a day application, French authorities have approved two Phase 1b clinical trials of BNC210 for the treatment of anxiety and depression. In the first study, BNC210 will be used to treat healthy volunteers, in whom symptoms of anxiety and panic were induced with CCK-4. The second trial will examine how BNC210 effects brain and memory functions compared to the Valium-like drug Lorazepam, which is known to negatively impact on memory.

Chief executive officer and managing director ***Dr Deborah Rathjen***,

who had her contract extended for another 5 years in October, said that despite being carried out with healthy volunteers, the studies will be able to demonstrate the value of BNC210 as a treatment for anxiety and depression.

▶ More information: www.bionomics.com.au

...preluding takeover?

Bionomics' good news on the science front were overshadowed in November when Start-up **Australia Ventures Pty Ltd** invited tenders to acquire its entire 27.7% stake in Bionomics. This, however, would require a bid for all shares in the company. Some outlets have speculated that **Merck Serono**, with which the Bionomics has a partnership in a multiple sclerosis program, could be a bidder.

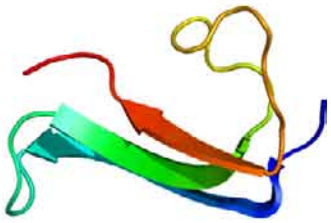
▶ More information: www.bionomics.com.au

Test progression

One of the most recognised biotech news in early November was **Cellmid Limited**'s announcement of the first fully validated test for midkine in blood serum samples. Cellmid associated scientists discovered the embryonic growth factor almost 20 years ago, which since then has been found to be involved in many functions relevant in diseases such as cancer, including cell growth, cell migration and cellular adherence.

Strongly induced in mid-gestation, hence the name midkine, tissue of healthy adults expresses only low levels of the heparin binding protein. However, Midkine levels increase in oncogenesis, inflammation and tissue repair, and because of its potential as a biomarker of certain cancers, the detection of the embryonic cytokine in adults could be of interest as a diagnostic and prognostic tool. Cellmid owns a substantial patent portfolio covering the use of midkines in the early detection of cancer.

The company collaborated with **German BioGenes GmbH**, which has manufactured a first batch of the MK ELISA (enzyme linked immunosorbent assay) kit. The test can be purchased directly through Cellmid. The company will also apply for CE marking, a mandatory conformance mark required for many products in the single European market.



Structure of the midkine protein.
image: Wikipedia, published under creative commons liscence 3.0

Cellmid's midkine story includes its lead therapy approach of using the anti-apoptotic function of midkine to treat acute myocardial infarct. In October, the company added another aspect to this, with the launch of **Advangen International Pty Ltd** (ADV), a wholly owned subsidiary, which will focus on the use of midkine in cosmeceutical products, such as a topical hair loss treatment.

▶ More information: www.cellmid.com.au

Encapsulated news

Piggy bags for sweet...

Living Cell Technologies Limited has provided an update on its clinical trial of DIABECELL™, after ten of the 12 enrolled insulin-dependent diabetes patients received the implant of encapsulated insulin producing islets from pigs. The alginate microcapsules are designed for the passage of insulin and nutrients, while at the time preventing immunological rejections to the porcine islets.

Following on from a Phase I/IIa trial in Russia, where DIABECELL was intravenously injected with dosages of up to 10,000 islet equivalents per kilogram body weight (IEQ/kg), the NZ trial now tests a series of increasing dosages of up to 20,000 IEQ/kg to determine the ideal dose range for patients.

Patients in the first group received the lowest dose of10,000 islet/kg and were followed for at least 30 weeks. In these patients the severity of low blood glucose events was reduced on average by 64%. In addition, episodes of a potentially fatal complication, so called clinically significant hypoglyceamic unawareness, which occurs in about 20% of insulin dependent patients, were found reduced by 76%. These patients were also able to reduce their insulin dose on average by 32%.

However, in patients of the second group, who received the next higher dosage of 15,000 IEQ/kg severity of low blood glucose events reduced by only 8% after 12 weeks and unaware low blood glucose events by only 30%. LCT now awaits the data from 20,000 IEQ/kg dosage group and crucial data on HbA1c and blood glucose levels, which will be revealed with the unblinding of study data after one year of follow-up.

▶ More information: www.lctglobal.com

...and shaking progress

LCT also announced progress with its NTCELL product developed for the treatment of neurological disorders, such as Parkinson's disease. The capsules contain epithelial cell clusters from the choroid plexus region of neonatal pig brains. In a rodent model of Parkinson's disease, NTCELL product implanted into affected parts of the brain and monitored over four weeks reduced disease-related abnormal movement by 56% compared to controls with empty capsules. Examination of the brains after the course of the treatment showed marked repopulation of the affected area of the brain with dopamine containing cells, the depletion of which is the cause of the disease symptoms.

LCT says that similar improvements were also found in an ongoing study with primates. With final results expected by mid 2011, the trial is expected to provide critical validation for potential human trials. Medical director ***Professor Bob Elliott*** commented that under the influence of hormone-like secretions by the NTCELL implants, the patient's own dopamine-producing cells are relocating or regenerating, and such brain repair had been reported in a number of publications by LCT.

Professor Elliott is currently also interim chairman of the company. He was appointed after ***Dr David Brookes*** and ***Simon O'Loughlin*** failed to be re-elected in a recent Annual General Meeting, and non-executive director ***David McAuliffe*** resigned.

▶ More information: www.lctglobal.com

Successful patch work

Following a successful product profiling Phase 1 study at the **Royal Adelaide Hospital**, which tested various dosing regimes of a TPM-ocycodone patch, Phosphagenics is optimistic it can soon move from lab-scale development to commercial patch

TPM Technology: Vitamin E (alpha Tocopheryl) phophate mixtures form layers that can be used to encapsulate and deliver key ingredients - here shown in a cream application.
image: modified from elixia.com.au for the purpose of this publication

manufacturing , with Phase 2/3 trials possible in 2011. The study found daily application of the patch reproduced therapeutic plasma levels of oxycodone, reaching steady state when applied daily over a period of 14 days – a profile ideal for the treatment of chronic pain. The study also found that a weekly patch produced steady levels of oxycodone in the blood suitable for less severe pain indications. Dr Ogru said the company would explore the arising commercial opportunities with international experts.

In the latest development, the company signed a consultancy agreement with multi-billion dollar global corporation **3M** to advance the development of the oxycodone pain patch, moving from lab-scale development into commercial patch manufacturing. 3M is a science based company and a leading company in patch development and manufacturing, producing thousands of products around the world. The details of the arrangement remain, however, undisclosed.

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

Love, love me do…

October saw the end of **Calzada Limited**'s engagement with **Avexa**, which began in May this year with the buy of a 12% stake in the company. Avexa then rejected Calzada's request to appoint to its board Calzada chairman ***David Franklin*** and director ***George Cameron-Dow***. Calzada has now ended the woes and sold its by then 17% stake in Avexa, realising around $4 million.

Calzada's walk away is the culmination of an at times hostile exchange between the leadership of both companies, with Avexa insisting its board had the right mix and accusing Calzada's of having "rebuffed Avexa's attempts to engage with it in good faith". Calzada, however, refuted Avexa's claims, insisting that it had not sought control of Avexa, yet had wanted to ensure that value was restored to the company.

Questioning the legitimacy of Avexa's board, Calzada proposed a range of alternative directors, including ***Dr John Chiplin,*** who had engineered **Arana Therapeutics** ascent to a leading therapeutic antibody developer before it was swallowed by US company **Cephalon** for $329 million. Instead, as a replacement for retiring Mr Cameron-Dow, Dr Chiplin has been appointed to the board of Calzada.

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

... I do love you...

Calzada meanwhile has entered a licensing deal with **Phosphagenics Limited** for a product that utilises Phosphagenic's TPM™ (Targeted Penetration Matrix) technology to enhance the delivery of Calzada's anti-obesity peptide AOD9604. In a large Phase 2 clinical trial the human growth hormone derivative, then administered orally, failed to significantly reduce weight across the entire study population. However, Phosphagenics' chief executive officer ***Dr Esra Ogru*** said the compound had huge potential. "Topical delivery could by-pass earlier problems associated with oral absorption and efficacy of AOD9604," she said. Following human efficacy studies in Australia the product could be launched worldwide in early 2011.

▶ **More information: www.avexa.com.au; www.calzada.com.au**

...and love you too...

Moving on from the Calzada ordeal, Avexa announced in November that it had entered a licensing agreement with Swiss drug development company **Valevia Pharmaceuticals GmbH**, under which Valevia will fund all future developments of Avexa's preclinical antibacterial drug program. Avexa will, however, retain control its intellectual property, while other terms of the agreement remained confidential.

Avexa says the deal could potentially be worth up to $65 million in milestone payments and royalties. Additional milestone payments and royalties may result if Valevia develops novel compounds covered under Avexa's IP portfolio. A collaboration with the University of Wollongong and Avexa has developed a series of antimicrobials active against microorganisms that have become resistant to antibiotics such as vancomycin, methicillin and mupirocin. Avexa's lead compound AVX13616 has been selected for pre-clinical testing agains various strains of Clostridium difficile and mupirocin-resistant strains of Staphylococcus aureus.

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

...and do buy you

Avexa will buy a 24% stake in **Allied Medical** for $1.5 million, of which one half will be conditional on Allied Medical progressing to an ASX listing. The deal will also give Avexa the right to be represented on Allied's board. Avexa was attracted to Allied Medical also because of that company's involvement in **Coridon Pty Ltd**, which was set up by ***Professor Ian Frazer*** and colleagues with a vaccine focussed infectious disease program.

Avexa also announced that it has secured a meeting with the US FDA to discuss the company's anti-HIV drug apricitabine (ATC), which is in phase 2/3 clinical trials.

▶ **More information: www.avexa.com**

Mud sling terminated

image: Elwin based on a sketch by Daryl Cogle

Another soap of corporate dispute that reached conclusion in October was **Solargran Limited**'s legal fight with **BioProspect Limited**, a dispute over a Development Agreement set up in 2007 and finally entered into in February 2010.

The agreement covered the global commercialisation of Solagran's 'Bioeffectives' in animal health, animal nutrition and agriculture. The "exciting business" with Solagran turned sour in June, when Solagran released a statement claiming a dispute had arisen in relation to the parties' rights and obligations under the agreement, while BioProspect claimed to be unaware of such dispute, and intended to go ahead with the commercialisation developments.

That changed in July when the parties entered a dispute resolution process. BioProspect now claimed it had suffered losses due to misrepresentations by SLA about the nature and extend of the company's

intellectual property rights around the Bioeffectives technology. The company asked for compensation and that the agreement was set aside. In a second aspect, Bioprospect claimed it had, contrary to the agreement, not received Bioeffectives at cost price. The company demanded access to SLA's books, which SLA rejected referring the matter to its lawyers.

A temporay injunction by the **Federal Court** was issued in September, in which BioProspect sought to prevent Solagran from selling part of its stake of almost 10% in BioProspect, but this was discharged in early October. The court also dismissed a new interim injunction application by Bioprospect. Following the decision against Bioprospect both parties mediated a retraction from their legal claims. The Development Agreement was terminated and the parties agreed to pursue their business strategies separately.

Terminal termite verdict

In another blow for BioProspect, the company had to suspend the development of its natural termite solution TERMILONE®, after a field trial by **Ensystex Corporation** found six months after applying TERMILONE® 80EC as a soil-applied barrier, there was significant termite attack even at higher concentration treatments. This would indicate degradation of the active compound Eremophilone Oil (EM) in soil, the company said. In addition, recent cost analysis of EM manufacture were also unfavourable, both for the treatment of timber and soil. The company will now focus on its other natural product ranges.

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

Natural killers

Patrys Limited specialises in cancer targeting antibodies, mainly of the IgM subclass, that are of human origin and therefore unlikely to cause adverse immunological reactions in clinical use.

The company's approach is to screen for antibody producing human B-cells that are effective against cancer cells, to then use the respective genes to generate candidate antibody at large scale. This is possible through a human recombinant cell line PER.C6®, the use of which Patrys has licensed from Dutch company **Crucell N.V.**

A particular commercial advantage is then established by identifying novel targets these antibodies bind to.

The company has currently two antibodies in the clinical stage: PAT-SM6, targeting a broad range of cancers; and PAT-SC1, which Patrys acquired in 2009 from **Debiovision Inc.**, and which has been effective in a human clinical trial with gastric cancer patients.

Patrys' lead product, PAT-SM6, is a potential therapy in a range of cancers including melanoma, breast, colon and pancreatic cancer. So far it is the only clinical product targeting the GRP78 protein, a so called heatshock protein, which in cancer but not in normal tissue is expressed on the cell surface, therefore accessible to antibodies. The protein is described in the literature as being involved in tumour proliferation, survival, metastasis, and resistance to a wide variety of therapies. According to Patrys', as PAT-SM6 binds to GRP78 protein the complex is internalised inducing apoptosis (cell death).

In October, Patrys announced that it has initiated a clinical trial of PAT-SM6 for the melanoma indication at the Royal Adelaide Hospital (RAH). The trial establishes safety and tolerability of the therapy, with the first group of patients being treated with no safety issues being reported two to three weeks after start of treatment.

For the PAT-SC1 antibody, which targets a protein called CD55 present on the surface of gastric cancer cells, the **US FDA** confirmed in early November **Orphan Medicinal Product Designation**, which applies for disease indications of less than 200,000 incidences per year in the US. Patrys says that fast track development in the US, where less than 20,000 cases occur each year, could then be leveraged in a much larger global market with over 1 million cases each year. The company currently converts the antibody to its PER.C6® production platform.

Meanwhile three of its Geman collaborators on these project received a boost with three grants rom German funding bodies totalling $675,000.

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

Pluripotent visions

Take it all, no objections

Mesoblast Limited received confirmation for a successful acquisition of its US partner company Angioblast Systems Inc. after unanimous approval by Angioblast's stockholders. It also took the final hurdle, after a set period for an anti-trust objection by the US Government expired.

Minimal invasion

The company was further buoyed by interim results from its Phase 2 trial of NeoFuse™, which it presented at the *ASX Small to Mid Caps Conference in Hong Kong*. The trial tests safety and effectiveness of the allogeneic mesenchymal precursor cells (MPC) in patients requiring minimally invasive spinal fusion surgery of the cervical and lumbar spine. If successful, the therapy could overcome the need for a second surgical procedure, currently required with the use of hip bone autograft.

After reviewing 17 of the 60 enrolled patients, who receive either the NeoFuse product or standard therapy, the **Data Safety Monitoring Board** reported no cell-related safety issues. There were also no ectopic bone formations or nerve root compressions as reported for alternative biologic therapies. At three months of follow-up, some 90% of patients implanted with NeoFuse™ had achieved successful bone bridging, with significantly reduced pain reported in both treatment groups (mean pain reduction scores of more than 20% compared with baseline). These results extend the positive results in an earlier pilot trial, and if sustained throughout the trial will be followed by a Phase 3/pivotal trial.

Blood expansion...

After its recent success with umbilical cord blood, Mesoblast plans to broaden the application of its "off-the-shelf" MPCs for the expansion of haematopoietic stem cells in patients with blood cancers requiring a bone marrow transplant (BMT), including in the multiple myeloma indication.

Currently, the use of the patient's own bone marrow stem cells, which are removed prior to chemotherapy and then purged of cancerous cells, bears the risk of residual cancer cells being reintroduced. Mesoblast says that by using MPCs, cancerous cells could be removed while healthy haematopoietic stem cells are expanded prior to re-infusion, and this could produce superior long-term outcomes.

With its new strategy the company aims to potentially target the entire BMT market. Collaborators in the US have already used Mesoblast's cell product for "rapid and significant expansion of haematopoietic stem cells from the bone marrow PBPCs of patients with multiple myeloma after residual cancer cells had been removed."

...and heartening progress

Mesoblast could also report further good news from a preclinical trial in 30 sheep, in which the company's Revascor™ product was directly injected into the coronary arteries after a heart attack to prevent heart failure. The company said that a "simple intracoronary infusion" of the MPCs "increased blood vessel numbers, prevented scar formation, and significantly improved heart muscle function after a heart attack preventing heart failure".

Mesoblast says that it will now proceed with multi-center Phase 2 clinical trials of the product.

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

Sweet mimicry

Progen Pharmaceuticals Ltd has cleared all formal requirements for the first in-human trial to test the safety and tolerability of PG545, a new anti-angiogenesis compound that was found in preclinical models to block both blood vessel growth in tumours and their spread throughout the body. The compound may also be active in multiple cancers.

PG545 is a heparanase inhibitor as it mimics its substrate heparan sulfate (HS). By cleaving heparan sulfate, the enzyme Heparanase degrades and remodels the tissue matrix outside of cancer cells. It has been found upregulated in tumours and this is associated with high tumour vascularity and poor postoperative survival of cancer patients.

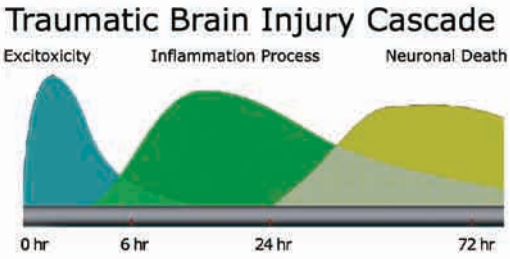
With PG545, Progen seeks to develop an improved HS mimetic as, in contrast to other mimetics, it is a single molecular entity.

To be carried out at the **Linear Clinical Research Unit** in Perth with around 25 patients, who have andvanced non-haematologic malignant solid tumours. The company expects the first patient already treated this year.

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

Trauma relief

Neuren Pharmaceuticals has completed its additional Phase 1 study with NNZ-2566, a neuroprotectant drug, which was now also found safe and well tolerated in females. No significant differences were found to previously studied male patients.



A cascade of molecular, biochemical and cellular events characterise TBI related damage. Cell death or functional disturbances in the stage triggers inflammation, which in turn causes further further functional disturbances and ultimately the death of more neurons. NZ-2566 interfers with all of this processes, including by reducing the level of expression of genes associated with inflammation, necrosis and apoptosis.
image: adapted from a figure by Neuren Pharmaceuticals

Neuren developed the compound in collaboration with the **US Army's Walter Reed Army Institute of Research** (WRAIR) and the **US Army's Combat Casualty Care Research Program**, to treat acute traumatic brain injury (TBI) for which currently there is no drug treatment available. The synthetic analogue of a part of the insulin-like growth factor-1 intervenes with the cascade of damaging processes that in brain trauma can ultimately lead to the death of brain cells. It mode of action is to reduce the expression of genes associated with inflammation, necrosis and apoptosis occuring in TBI.

Following the completion of the study, females will now included in a Phase 2 study that is currently in the recruiting stage and will proceed pending approval of an amended prototocoll by the **US FDA** and **Institutional Review Boards** (IRBs).

In addition to the intravenous formulation, Neuren announced that it will develop NNZ-2566 also as an oral treatment. The company said that according to pharmacokinetic studies the oral dose required for blood levels targeted in the current Phase 2 trial would be reasonable and acceptable.

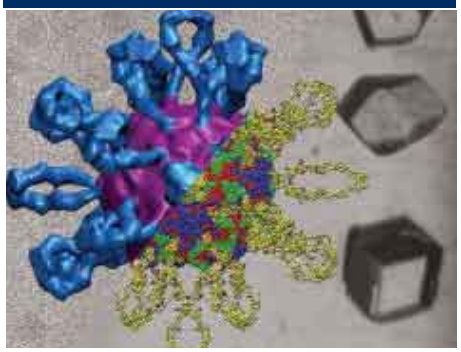
▶ **More information: www.neurenpharma.com**

Viral helper

Oncolytic viruses have been under investigation for many decades as an alternate avenue for the treatment of some cancers. Seneca Valley virus, for example, is currently in development to treat tumours with neuroendocrine characteristics.

CAVATAK is a common enterovirus sometimes associated with cold-like symptoms. It infects cells by docking to specific receptors displayed on the cell surface, ICAM-1 (Inter cellular adhesion molecule 1) and DAF (decay accelerating factor). ICAM-1, however, is more prominently displayed in some cancers, including metastatic melanoma cells. Viralytic's strategy is based on the virus infecting predominantly these ICAM-1 and DAF bearing cancer cells, which it destroys either through massive replication or the induction of apotposis. As large numbers of virus are then released, they sustain infection of other cancer cells. The effectiveness of this approach has been demonstrated in immuno-deficient SCID mice. The company has also identified (bio-selected) a variant of the virus that can infect cells in the absence of ICAM-1, using only the DAF receptor, and this could potentially target a greater range of human cancers.

In Australia, **Viralytics Limited** is investigating an enterovirus, the common Coxsackievirus A21 (CVA21), which the company trades as CAVATAK. The virus is a naturally occurring relative of the poliovirus causing upper respiratory tract infections.



Coxsackievirus A21 - ICAM- interaction. The receptor located on the surfaces of cells, is represented in blue, and the virus is represented as red.
Image: Graphic/Department of Biological Sciences, Purdue University

In early November, Viralytics lodged a **New Investigational Drug** (IND) application with the **US FDA** for a Phase 2 Melanoma trial, in which 54 patients will receive 10 injections of CVA21 over a six months period. The multinational trial, referred to as CALM study (CAVATAK in Late stage Melanoma), will be in the US, Europe and Australia, and is designed to both maximise the direct killing of tumour cells by virus, as well as inducing an effective immune response against virus bearing tumour cells.

The company also announced that an independent **Data Safety Monitoring Committee** monitoring a current intravenous Phase I dose escalation trial of CAVATAK in melanoma, breast and prostate cancers, has approved an increased dosing, 10 times higher than the previously used dosage. Managing director Bryan Dulhunty said "intravenous delivery of CAVATAK, opened up many new cancer indications that could potentially be treated by CAVATAK".

At the end of October, the company indicated a further broadening of

the potential use of modified oncolytic viruses in alternate cancer therapy strategies, when it announced an Australian patent granted for a bio-selected Coxsackievirus that is not dependent on the ICAM-1 receptor. A similar patent was previously granted to the company in South Africa.

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

Early detection

HealthLinx Limited, an emerging biomarker and diagnostic company, conducts a second larger scale trial of its OvPlex™ ovarian cancer diagnostic test. The test is sold as a more sensitive and specific tool for medical professionals to assess cancer in women in the early stages of cancer, when symptoms are often vague such aspain in the lower abdomen or side, and/or a bloated, full feeling in the abdomen. In 2008, the test was released to the Australian market, and is now also available in the UK and the Republic of Irland. In 2010 it won the *BioSpectrum Asia's Product of the Year Award for 2010*, and has won support of $750,000 by the **Victorian Government** for the second multicentre, multinational study.

The company has included two additional new biomarkers, AGR2 and HTX010, which the company says will markedly improve the diagnostic efficiency in early ovarian cancer. To date, the two new biomarkers have been analysed in over 400 case and control samples and showed each statistically significant elevations in plasma concentrations in both early stage and late stage ovarian cancer patients.

"Our aim is to fine tune the OvPlex™ test to ultimately provide sensitivity and specificity of at least 97% in the target patient population" said ***Nick Gatsios***, managing director of HealthLinx. This compares to 92% sensitivity and 94% specificity determined in a previous biomarker trial. The advance of the AGR2 marker, which has been associated with the metastatic spread of the cancer, is of particular relevance to the company, and is developing the immunoassay as a potential clinical tool in a range of cancer related applications. Global company **Millipore Corporation** already has signed a license agreement for the research related use of an AGR2 targeting antibody.

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

And the winner is...

The Prime Minister's Prizes for Science 2010 were awarded in November. They included:

image: Bearcage Prodcutions

- **Dr John Shine**, director of the Garvan Institute in Sydney, received the $300,000 Prime Minister's Prize for Science for his science and his research leadership. Among his many achievements, he is best known for a landmark discovery he made during his PhD at the ANU, called the Shine-Dalgarno sequence. The small stretch of DNA, which also bears the name of his supervisor, Professor Lynn Dalgarno, marks the start of a gene in the bacterial genome and is fundamental for modern gene cloning, including the production of drugs.

image: Ron D'Raine

- **Dr Katherine Trinajstic** received the $50,000 Malcolm McIntosh Prize for Physical Scientist of the Year, awarded to early career researchers in the physical sciences. Dr Trinajstic discovered that fish living 380 million years ago in the area of nowaday's Kimberley ranges, gave birth to live young.
- **Dr Benjamin Kile** from Walter and Eliza Hall Institute in Melbourne received the $50,000 Science Minister's Prize for Life Scientist of the Year. The prize recognises oustanding achievements of early career researchers in the life sciences. Dr Kile discovered why platelets—the blood cells responsible for clotting—have a short shelf life at the blood bank. He also discovered a gene critical in the production of blood stem cells in our bone marrow, while also associated with many cancers.

image: Bearcage Productions

- **Dr Matthew McCloskey**, director of studies at Sydney Grammar's Edgecliff Preparatory School received the $50,000 Prime Minister's Prize for Excellence in Science Teaching in Primary Schools for bringing real science experiments back into the classroom, building on his own experience as a research scientist and zoologist.

image: Bearcage Productions

- **Ms Debra Smith**, head of science at Centenary High School in western Brisbane received the $50,000 Prime Minister's Prize for Excellence in Science Teaching in Secondary Schools for inspiring thousands of students and helping to redefine the senior science curriculum in Queensland and across Australia.

image: Bearcage Productions

ICT going south

After the **NBN Co** announced the set up of its **Network Operations Centre** in Melbourne in July, the Victorian capital's push to become Australia's ICT hub gained over the past month further momentum with several developments.

Expanding bits...

Computer and IT consulting corporation **IBM** has expanded its R&D capability in Australia entering a partnership with the **Australian** and **Victorian Governments** to establish a new **IBM Global R&D Lab** at the **University of Melbourne**. According to director of IBM Research ***Dr John Kelly***, it will be IBM's first laboratory combining R&D in a single organisation to accelerate the company's 'smarter planet strategy', working closely with leading Australian scientists and engineers from academia, government and commercial entities. Expected to be open in early 2011, the new facility will focus on areas including:

image: IBM.com

- *Smarter natural resource management* - key areas will relate to resource discovery, production, and supply chain and operations such as oil and gas, minerals, water and food.
- *Smarter natural disaster management* – including work on real-time event (stream) processing, weather modelling, traffic management and mobility analytics.
- *Computational life sciences* – IBM will extend the existing collaboration with the University of Melbourne to encompass a broader set of topics in healthcare and life science analytics.

▶ More information: **www.ibm.com/au/en/; www.pm.gov.au/node/6956**

...and digital attraction...

US based global telecommunications company **Tellabs**, which has already headquartered in Melbourne, will further expand its operations by establishing a new **Innovation Solutions Research Lab**. The Victorian Government also announced that New Zealand cloud computing specialist company **Xero Limited** will have its Australian headquarters in the southern capital.

Melbourne will also be the headquarters of **Online Services Corporation**, which launched globally end of October as one of the first Australian companies to market Microsoft's cloud-based Online Services.

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

Futile action

While the state election was looming, the **Victorian Government** announced a $110 million *ICT action plan*, a comprehensive policy on the use of information and communications technology (ICT), which included an increase in the ICT industry's global profile; establishment of Victoria as Australia's ICT R&D centre; and the use of ICT to foster innovation, building skills, and broadband leadership. At the *AusBiotech 2010* conference in Melbourne, the former **Victorian Government** also unveiled a $55 million *Victorian Biotechnology Action Plan*, which aimed to create a statewide 'systems approach' by bringing together universities, research institutes, hospitals and industry.

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

Little helpers

Three Victorian biotech companies will share in $410,000 provided through the Government's $11.4 million **Competitive Business Fund** (CBF). Grants include: $250,000 to medical diagnostic company **Universal Biosensors** towards its Rowville manufacturing hub expansion; $60,000 to **GlaxoSmithKline Australia** towards a pilot trial of its membrane contactor technology potentially saving $1 million a year in the production and disposal of medicinal alkaloid; and $100,000 for SGE Analytical Science's to apply a new diamond-like coating technology to a range of products.

▶ More information: **www.premier.vic.gov.au/component/content/article/12428.html**

Big picture strategy

The wonders of medical imaging
image: Eizo (www.eizo.com/

Prior to the election, the **Victorian Goverment** announced $8.5 million for the **Victorian Biomedical Imaging Capability** (VBIC), a collaboration led by the **Florey Neuroscience Institutes** and involving **Monash University**, the **University of Melbourne**, **Swinburne University of Technology**, **Peter MacCallum Cancer Centre** and **CSIRO**. The coordinated network of capabilities and research capacity in medical imaging is expected to vastly improve biomedical imaging in the state, and advance prevention and treatment of conditions such as cancer and brain and heart disease.

The VBIC will increase capability and capacity in:

- cancer research imaging at Monash University, Peter MacCallum Cancer Centre, **Prince Henry's Institute** and **Southern Health**; and
- cognitive and clinical neurosciences research at Florey Neuroscience Institutes, **Mental Health Research Institute**, University of Melbourne, CSIRO, Swinburne University, Monash University, **Alfred Health** and Southern Health.

The Government's $8.5 million investment through the $25 million Victoria's **Science Agenda Strategic Project Fund** will be leveraged with a $9 million cash investment from the VBIC partners and an additional $7.3 million in in-kind resources.

▶ More information: **www.swinburne.edu.au**

Hot Qld initiatives

Queensland's Government took a series of initiatives to promote developments in geothermal energy generated from hot sedimentary aquifers or enhanced geothermal systems.

Heated search...

Queensland has Australia's only geothermal power station at Birdsville. However, it is too far away for the economcally viable delivery of energy to coastal markets. The state's government will now invest $5 million in a drilling program to identify potentially-viable geothermal resources closer to coastal power transmission infrastructure. The *Coastal Geothermal Energy Initiative* will analyse data from shallow test holes, which will be drilled to determine the presence of potentially-viable geothermal resources located in the eastern parts of the state. The Government says that areas with geothermal potential were identified near Roma, in the Tarong Basin, the Maryborough Basin South, the Duaringa Basin North and the Hillsborough Basin, many of which are near existing high voltage transmission infrastructure.

▶ **More information: www.cabinet.qld.gov.au/MMS/StatementDisplaySingle.aspx?id=72254**

...everywhere in Qld

The Queensland Government has released 40 permits for geothermal exploration since 2005. In October, a further 11 sites covering more than 3000 square kilometres for possible geothermal exploration were made available, including areas near Ben Lomond west of Townsville, in the Birdsville area, and sites near Jundah and Windorah. Four sites are located in central Queensland near Blair Athol, Mount Salmon west of Rockhampton and one each near Callide and Lorray west of Bundaberg.

Mines and Energy Minister ***Stephen Robertson*** said that the sites have been identified as having great geothermal potential, but consultation with all stakeholders will take place before any exploration permits are granted.

Growing collaboration

The new **Queensland Alliance for Agriculture & Food Innovation** (QAAFI), launched in October at the **University of Queensland** (UQ), was established through a $6.5 million partnership between the university and the **Queensland Government**'s **Department of Employment, Economic Development and Innovation** (DEEDI).

It aims to establish the state as a leader in tropical and subtropical agriculture and food research. Inaugural QAAFI director ***Professor Robert Henry*** said QAAFI's research will be highly industry focused and return millions of dollars to Queensland agriculture and food industries.

The alliance will aim to capitalise on new areas of research such as genomics, materials science and advanced systems modelling. An important aspect, said Primary Industries Minister ***Tim Mulherin***, would be that QAAFI researchers will remain embedded with research teams in DEEDI, providing vital links to the breadth of expertise available in both UQ and DEEDI.

QAAFI incorporates three centres - **Nutrition and Food Sciences**, **Plant Sciences** and **Animal Sciences**, and its staff will be based at 11 sites distributed across UQ campuses and Queensland Government research stations and centres, facilitating regional linkages and collaboration with other organisations and research centres.

▶ **More information: http://www.qaafi.uq.edu.au/**

Solar promotion

One small scale feed-in frenzy ends...

The **NSW Government** has ended its **Solar Bonus Scheme**, which provided a gross feed-in-tariff of 60 cents a kilowatt/hour of solar electricity. If new legislation* is passed, the "most generous in the country" will be replaced with a more "sustainable" scheme of 20 cents/kWh. ***Premier Kristina Keneally*** said the move was neccessary after a mandatory review of the scheme found it "incredibly successful", with a take-rate faster than expected creating more than 100 MW of renewable electricity capacity. The review also found that since introduction of the scheme in 2009, the price of solar panels, most of which are imported from China and Spain, more than halved.

Additional elements of the new scheme included: an overall capacity limit of 300 MW for all generators connected under the scheme; and a new interagency **Commercial Scale Renewable Energy Working Group** concerned with the possibility of installing mid scale solar systems instead of a network expansion.

▶ **More information: www.industry.nsw.gov.au; *Electricity Supply Amendment (Solar Bonus Scheme) Bill 2010**

...another considered a larger scale

Victoria currently has a feed-in tariff of 60 cents/kWh for small scale solar applications (up to 5 KW), capped at a total capacity of 100 MW. The now former **Victorian Government** released prior to the election an Information Paper on a proposed large-scale feed-in tariff scheme to support the state's new solar power target of 5% by 2020, and its interim target of 500 GWh by 2014. Under the scheme, large-scale solar facilities would be paid an incentive to feed the renewable power they generate into the grid, above what they receive for that power on the energy market. In October, Victoria's newly established **Medium-scale Solar Working Group** also released a discussion paper aimed at improving medium scale solar energy investments and uptake, for which submissions closed 09 November.

▶ **More information: www.premier.vic.gov.au/component/content/article/12600.html**

Tassi news

Tassi opts out...

The **Tasmanian Government** has taken steps to maximize the 'connection' of Tasmanian households to the **National Broadband Network** (NBN). In early October, the Government passed legislation replacing the current 'opt in' model of the NBN roll out with an 'opt out' scheme, under which all accessible homes and businesses will be automatically connected, unless they actively decline.

The move received backing by the the state's peak employer group, the **Tasmanian Chamber of Commerce and Industry** (TCCI). Its chief executive ***Robert Wallace*** commented that the 'opt out' model would clarify that connection to the premise is "just the optic cable being attached to the premise which is at no cost to the property owner and will obviously add value to the property".

▶ **More information: www.media.tas.gov.au/release.php?id=30962**

...amid warming foresights...

In October, the first report of the **Climate Futures for Tasmania** project, *General Climate Impacts*, was released outlining projected changes to Tasmania's climate during this century. The report and its outcomes are described in detail in a commentary on page 21.

▶ **More information: www.media.tas.gov.au/release.php?id=30631; General report: www.climatechange.tas.gov.au**

...amid forestry cooling

A report by the **Cooperative Research Centre for Forestry** (CRCF) sees major challenges ahead for the Tasmanian Forest industry. The paper *Tasmania's Forest Industry 2010* outlines a continuing downturn since 2008, following a period of expansion in the two previous years, when employment in the industry rose by 7% due to new hardwood plantations and increased investment in processing facilities.

Between 2008 and 2010, employment fell by 33% in a downturn that particularly impacted on the processing sector. This, the study states, was caused by multiple factors including a reduced demand for wood products amid the global financial crisis, a strong Australian dollar, and reduced investment in new plantations.

In addition, the report identifies successful environmental campaigns against native forest woodchips as a factor.

Tasmania, Styx valley

On 19 October 2010, sections of the forest industry and the environmental movement signed the **Tasmanian Forests Statement of Principles** – a document that sets the scope for nine to 12 months of negotiations to end the acrimonious debate over forestry. The document was also signed by the Forest Industries Association, Tasmania's peak forest industry representative.

On 19 November 2010, ***Premier David Bartlett*** announced a governance model for implementing the Statement of Principles, which includes a **Tasmanian Government** sub-committee, an independent expert panel, as well as working groups and advisory committees. The opposition, however, is fiercely opposed and has, in latest developments, presented an alternative 13-point plan.

▶ **More information: www.premier.tas.gov.au**

...TONY PRESS CONTINUED

...continued from page 21

> What is inevitable is that the past we know will not be the same as the future we face. Decisions about major infrastructure investment or the course of agricultural development must be informed by well-researched projections of future climate.

results can be used in responding to climate change.

The importance of the Climate Futures for Tasmania report cannot be underestimated. Global greenhouse gas emissions have already 'locked in' a general increase in temperature across Tasmania. With the emissions path the world is currently travelling, however, Tasmania is coming very close to the report's projection that by the end of this century the average annual temperature will be 2.9 degrees Celsius higher than today – a six-fold increase in the temperature rise observed over the past 50 years.

What is inevitable is that the past we know will not be the same as the future we face. Decisions about major infrastructure investment or the course of agricultural development must be informed by well-researched projections of future climate. That is the reality confronting all governments and communities.

The Climate Futures for Tasmania research has found both winners and losers in its projections. One important finding is that Tasmania, with its geographical location and maritime environment, is likely to warm less than the global average, and that projected for mainland Australia. And based on projected regional changes, some areas in Tasmania could become more suitable for crops that cannot be grown at present. Lovers of Australian hearty reds may be pleased to know that Tasmania will become more suitable for growing shiraz, and less for pinot noir.

However, there will also be downsides: for example, the general increase in temperature and loss of rainfall in the central and north-western parts of Tasmania has implications across the economy, from farming and agriculture to power generation.

Studies like Climate Futures for Tasmania should become the centrepiece of plans to adapt to climate change. They will provide a climate service to governments and the community in a similar way that weather forecasts do. Regular re-analyses and projections can then be made to take into account new information or improved modelling to refine our view of the future.

Adapting to climate change will be much harder without this.

...back to page 21

No (bio-)risk taker

Marine biosecurity specialist **Professor Chad Hewitt** is new pro vice chancellor of research and also head of campus at the CQUniversity Gladstone Campus. He was previously director of the Australian Maritime College's (AMC) National Centre for Marine Conservation and Resource Sustainability. He is also a member of the Department of Agriculture, Fisheries and Forestry Eminent Scientists Group, which advises the Minister of Agriculture on import risk assessments undertaken by Biosecurity Australia. Professor Hewitt's research has primarily focused on how humans have transferred species around the globe, the consequences of those movements in ecological and evolutionary contexts, and the ways that we can predict, prevent and/or mitigate the impacts of these novel species.

Chad Hewitt

Musical manager

The Australian Council of Learned Academies (ACOLA), recently formed by Australia's four Learned Academies to replace its former representing body, the National Academies Forum, has appointed a professional secretariat, ACOLA Secreteriat Ltd. Its inaugural general manager will be **Dr Jacques de Vos Malan**, a renowned composer who previously served as chief executive of the Melbourne Recital Centre, a Victorian Government owned company. As an administrator, he has worked for the Victorian State Government as well as the Adelaide Festival Centre.

Jacques de Vos Malan

Healthy negotiator

Northern brain relay

Queensland chief scientist **Professor Peter Andrews**, who since 2003 has been a major driver of Queensland's Smart State agenda, will retire in end of this year. He will hand over to former chief executive officer of CSIRO, **Dr Geoff Garrett**, who was appointed for a 3-year period on a part-time basis. Dr Garrett holds a doctorate in metallurgy from the University of Cambridge and was prior to his engagement with CSIRO heading South Africa's national science agency (CSIR). With CSIRO, Dr Garrett pursued a more unified 'One-CSIRO' approach, and pushed stronger partnerships across Australia's innovation system through CSIRO's Flagship Programs, which in December 2008 received the top Prime Minister's Award for Excellence in Public Sector Management.

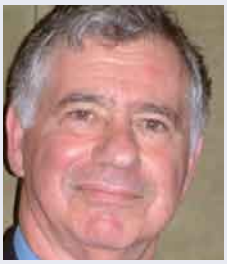
Geoff Garrett

Woody leader

Ron Adams has been re-elected as director and chair of Forest & Wood Products Australia Limited (FWPA). He will be joined at the board by new non-executive director **Dr Michele Allan**. Both were appointed for a period of three years.
In 2006, Mr Adams was appointed first as director and then also as chair of the former Forest & Wood Products Research and Development Corporation (FWPRDC), which then became the FWPA in September 2007. He is also managing director of WESPINE Industries Pty Ltd.

High flyer

Civil engineer **Dr Harry Poulos**, emeritus professor at the University of Sydney and senior principal and technical master with consultants Coffey Geotechnics, will be the first Australian to be named a distinguished member of the American Society of Civil Engineers. This recognises Dr Poulos' groundbreaking research and practice in foundation engineering, having contributed with his expertise to structures such as the world's tallest building, the Burj Khalifa in Dubai.



Harry Poulos

New number 2 at ANU

Coastal and ocean engineer **Professor Ian Young** has been appointed as vice chancellor of the Australian National University, from 1 March 2011. Currently vice-chancellor of Swinburne University, he will succeed retiring ANU vice-chancellor **Professor Ian Chubb**. Professor Young was previously the sector's representative on the Australian Qualifications Framework Council. He is presently chair of Education Australia Ltd, a director of IDP Education Pty Ltd, the world's largest recruiting agency for international students, and a director of Universities Australia, Open Universities Australia. Professor Young has been elected as a fellow of the Institution of Engineers, Australia, a fellow of the Australian Academy of Technological Sciences and Engineering and is a member of the American Geophysical Union. He was also awarded the Centenary Medal for Services to Australian Society.

Ian Young

Healthy negotiator

Pharmaceutical company Janssen-Cilag Pty Ltd executive **Dell Kingsford Smith** has won the 2010 Pat Clear Award, which each year recognises contributions by an individual, group or team for the benefit of the Australian medicines industry. Ms Kingsford Smith, senior director of Health Economics and Global Strategic Marketing and Market Access at Janssen, received the award at the 2010 Medicines Australia Conference for her effort in negotiating with the Department of Health and Ageing an improved transparency of the PBS listing process. This enabled consumers to contribute to the evaluation process for the PBS listing and have more information about the medicines they are taking and how they are assessed for reimbursement.

Legal promotions

The Professional Standards Board for Patent and Trade Marks Attorneys has a new chairperson, **Lisa O'Neill**. The Brisbane based lawyer will be joined on the board by a new member, Adelaide based patent attorney **Karen Spark**. Further members of the board include: patent and trades mark attorneys **Dr Mark Horsburgh** (reappointed), **Karen Sinclair** (reappointed) and **David Webber**; patent attorney **Julie Ballance**; and **Professor Jill McKeough** from the University of Technology Sydney (reappointed). The board also includes IP Australia's director general **Philip Noonan** as an ex-officio member.

Multicultural leader

The University of Western Sydney has announced **Professor Peter Shergold** will succeed outgoing UWS chancellor **John Philips**. Between 2003 and 2008 Professor Shergold was the nation's most senior public servant as secretary of the Department of the Prime Minister and Cabinet. In this position he established the Office of Multicultural Affairs, headed the Aboriginal and Torres Strait Islander Commission (ATSIC) and was secretary of various government departments.

Peter Shergold

Cross-discipliniser

Curtin's former professor of Mining Engineering and director of the WASM, **Professor Peter Lily**, will return to the university from January 2011 as new executive director, Minerals and Energy Strategy. In this function he will lead strategic business partnerships with the resources industry, particularly through the Curtin Institute of Minerals and Energy (CIME), which offers cross-disciplinary expertise across areas ranging from mining, geosciences and minerals to environmental health and sustainability. Professor Lily is at present director of CSIRO's Minerals Down Under National Research Flagship and a member of the Western Australian Government's Mining Industry Advisory Committee. He is a fellow of the Australian Academy of Technological Sciences and Engineering, and a fellow and chartered professional of both the AusIMM and Engineers Australia.

Peter Lily

Talking heads

Chris Chapman has been reappointed as chair of the Australian Communications and Media Authority (ACMA), which he has led since February 2006. He will be seconded by a new deputy chair, **Richard Ben**, who was previously general counsel and company secretary for Unwired (2003 – 2010) and networks business manager for Network Ten (1996 to 2003). Further appointments as new part-time Authority Members are **Louise Benjamin**, **Emeritus Professor Reg Coutts** and **Hugh Marks**.

Australia going liquid

Liquid boom approval...

Queensland's hope of cashing in on a new coal seam gas (CSG) to liquid natural gas (LNG) industry stayed well alive after Australian Environment Minister ***Tony Burke*** announced a conditional environmental approval of two mega projects at Gladstone:

- The $7.7 billion **GLNG** project is a venture between **Santos**, Malaysia's **PETRONAS** and, after buying a 20% stake since September, french company **Total**. The project includes coals seam gas production in the Bowen and Surat Basins, and processing facilities, onshore pipelines and LNG plant facilities with a capacity of producing 7 million tonnes of LNG per annum (mtpa).
- The $15 billion **QGC Pty Ltd's Curtis LNG** (QCLNG) project. Following the approval, **BG Group**, which wholy owns QGC, announced a Final Investment Decision that it will go ahead with the project. It will be the world's first LNG plant supplied by coal seam gas. Over the course of the next four years, BG plans to invest a total of $15 billion in the project, developing the liquefaction plant and related wells, field facilities and pipelines, and potentially expanding the project with a third train. Sales agreements covering 9 mtpa of LNG were negotiated with Chile, China, Japan and Singapore.

However, Tony Burke placed more than 300 conditions on each of the projects, particularly addressing potential groundwater issues. Queensland Premier ***Anna Bligh*** said that together with state imposed conditions the companies would have to comply with some of the most stringent environmental conditions ever required.

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

...keeps flowing in Qld...

The Queensland Government has also given the environmental go ahead for the Australia Pacific LNG (APLNG) project, which awaits now federal approval. The joint venture between **Origin** and **ConocoPhilips** could, if fully implemented, involve $35 billion of investment. The project consists of coal seam gas fields in the Surat and Bowen basins, 450 km of pipeline infrastructure to a processing plant in Gladstone with the capacity of up to 18 mtpa of LNG.

More information: www.cabinet.qld.gov.au

...and in the West

Shell's **Prelude floating LNG facility** in the Browse Basin off the coast of Western Australia also received conditional environmental approval on the federal level, under which Shell will have to develop an oil spill contigency plan and would be required to pay for any environmental rehabilitation in case of a spill.

The proposed floating facility will be the first of its kind in the world to process gas into LNG for export directly at the gas field. The technology could provide access to smaller 'stranded' gas resources, where onshore processing with LNG terminals and associated LNG pipeline infrastructure would be too costly. Shell will use a gigantic vessel weighing 600,000 tonnes, to asscess the resource, with the advantage that the mobile carrier could be reused after the gas fields run dry. The capacity of the plant would be 3.5 mtpa of LNG, as well as Condensate and LPG.

image: Shell

Resources Minister ***Martin Ferguson*** said the technology would provide a third string to Australia's LNG development bow, complementing conventional LNG hubs and the coal seam gas based LNG plant proposals.

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

Carbon bonanza

A $5 million **MBD Energy Limited** *Tarongtrial* will use algae not only to capture carbon emissions from Queensland's **Tarong Power Station**, but sustainably use them to produce biomass, oil and other algae products, thus potentially generating a significant revenue stream. MBD claims that the approach bypasses the inherent problems associated with 'geosequestration' by keeping captured CO_2 above ground and producing valuable commodities.

Tarong will be the first coal-fired power station in Australia to use the technology developed at **James Cook University** in Townsville. The **Queensland Government** pledged a contribution of $1 million to the trial, in which MBD Energy will establish a one hectare algal biomass display plant beside Tarong Power Station, 180km north-west of Brisbane. Further facilities will be built next to power stations in Victoria (**Loy Yang A**) and New South Wales (**Eraring Energy**).

The Algal Synthesis process involves the injection of carbon gases into waste water contained in large plastic tubes to produce oil-rich algal biomass every 24 hours, which could be used to produce animal feed and oils for plastics and transport fuels.

The Tarong Power Station test plant is expected to capture about 700 tonnes per year of CO_2 and to produce one tonne of algal biomass per day, 120 tonnes per annum of algal oil and 240 tonnes per annum of algal meal by 2012. If successful, MBD expects to commercialise the Tarong project by expanding to approximately 80 hectares, thereby producing 11 million litres per annum of algal oil and 25,000 tonnes of algal meal and abating approximately 70,000 tonnes of CO_2 during 2013.

More information: Peter Cassuben, (02) 9965 9301 or 0417 980 009; Associate Professor Kirsten Heimann, (07) 4781 5795 or 0422 208 577

Regulatory row

The **Australian** and the **Western Australian Governments** have taken opposing views on whether a national offshore petroleum regulator should be established. At the end of September, the Government released its response to reports* from inquiries held in 2008* and 2009*, which dealt with the regulation of offshore petroleum safety and the operations of the **National Offshore Petroleum Safety Authority** (NOPSA).

Supporting the majority of the 34 recommendations, the Government specifically committed to the establishment of a national regulator. Already in August, Resources Minister ***Martin Ferguson*** expressed the Government's intention "to establish a single national regulator in Commonwealth offshore areas from 1 January 2012, with the option for states and the Northern Territory to confer their powers for state coastal and inland waters and islands to the national regulator."

This has met opposition by the Western Australian Government, which says it would strip regulatory responsibilities from the State to the Commonwealth. The State Government, however, had a responsibility to regulate activities that could affect the state's economy, environment and community.

WA Petroleum Minister ***Norman Moore*** said that WA would instead propose a new Federal agency to ensure existing regulators comply with best practice regulation. States would act as designated authorities and administer regulations, while the Australian Government would audit the regulators to ensure their competency and efficiency.

"The Federal Government's current proposal only alters the structure of the regulator - it does not change the rules which underpin it or the way companies are meant to provide information," he said.

▶ **More information: WA Government: www.mediastatements.wa.gov.au; Australian Government: http://minister.ret.gov.au; *Better practice and the effectiveness of the National Offshore Petroleum Safety Authority (June 2009); Marine Issues (June 2009); and The Review of the National Offshore Petroleum Safety Authority Operational Activities (March 2008)**

Rich & secure coexistence

An interim report of a review of the 127,000 km² Woomera Prohibited Area (WPA), released in early November and open for comment until early December, has put forward a model that could promote better management of national security as well as the economic interests of South Australia. The state has a dual interest in this, the report states, but the benefits it may gained through supporting Defence industries are heavily outweighed by the potential of resource development.

Since the South Australian desert area was declared prohibited in 1947, the WPA and its immediate surrounds were found to have high potential for a diverse range of resources, particularly uranium-bearing copper-gold deposits, holding the majority of Australia's known copper (62%) and uranium (78%) deposits. The **Australian Government** commissioned the review in May 2010, amid increasing demands by industry to gain access to the area, which could pose challenges to Defence activity. Already there is some coexistence of the two interests, with three mines operational, and numerous mining leases approved in the WPA, of which most is South Australian Crown land.

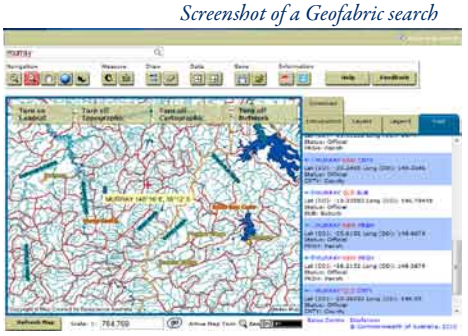
The Woomera prohibited area
source: Government Review of the Woomera Prohibited Area Interim Report

The review panel led by ***Dr Alan Hawke*** finds scope to increase the national value of the WPA while preserving Defence interests. It proposes a new coexistence model under which a core area would be assigned for Defence use. In other areas, it proposes a time-share arrangement in which Defence would have to clearly articulate time and space requirements in order to provide resources industries with periodic access to explore and develop mineral and petroleum resources and greater certainty for potential investors.

▶ **More information: www.defence.gov.au/woomerareview/101105.MR.SS.MF.Woomera%20Report.pdf**

Screenshot of a Geofabric search

Wet snaps



The **Bureau of Meteorology** (BOM) has been tasked by the **Australian Government** with compiling Australia's water information, and to make that information as accessible as possible. In October and November, BOM and partners launched two new products, the Australian Hydrological Geospatial Fabric (Geofabric), and Australia's first national water storage website.

BOM, **Geoscience Australia**, the **Australian National University** and **CSIRO** developed the Geofabric as a specialised Geographic Information System (GIS) that comprehensively shows spatial relationships between hydrological features such as rivers, dams and reservoirs. This allows, for example, to determine the area from which a particular catchment receives its water, assisting in natural resource management, water utilities, water science and research, government and the community.

The BOM's new national water storage website covers more than 90% of the water volume in Australia's publicly owned storages, now also available as an iPhone application. According to BOM's deputy director of Climate & Water, ***Dr Rob Vertessy*** it is the first time that current Australia-wide water storage information is available from a single source.

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

Sun mapper

Image: Geoscience Australia

The Australian Government has allocated $5 million for a project by **Geoscience Australia** to scale the solar radiation potential across Australia. The **Solar Prospectivity Maps**, which will show both physical and socio-economic information, will then help scientists and investors to identify suitable locations for solar power plants. First data from the project will be released at the *Solar2010 Conference* at the **Australian National University**.

▶ **More information: www.ga.gov.au**

Renewable consultation quicky

On 03 November, the **The Australian Centre for Renewable Energy** (ACRE) released a consultation paper on the $100 million **Renewable**

Energy Venture Capital (REVC) Fund, which closed for submissions on 19 November.

Resources Minister ***Martin Ferguson*** said that the fund will encourage development of early-stage Australian renewable energy technologies through critical early-stage equity investments that will leverage private funds for emerging renewable technologies.

"This fund is important to address a key challenge facing many renewable energy companies - access to capital," he said.

In the first half of 2011, the ACRE Board will start a process to identify appropriate fund managers to deliver the initiative, which is part of an integrated approach by ACRE to support the development of Australian renewable energy and enabling technologies with a total of $690 million in funding.

▶ More information: **http://minister.ret.gov.au**

Taxing shortfall

ABARE-BRS has released a report prepared for **Australia's Future Tax System Review Panel** in April 2010. *Non-renewable resource taxation in Australia* reviews the effectiveness of current resource taxation arrangements in the mining sector, compared with alternative arrangements, particularly rent based taxes. In Australia, Commonwealth responsibilities are restricted to minerals in offshore areas beyond three nautical miles, and uranium deposits in the Northern Territory. In all other cases within three nautical miles, state and territory governments bear responsibility, with non-renewable resource taxation arrangements varying widely across jurisdictions.

The report finds that in recent years (2000-01 to 2006-07) there was a likely substantial shortfall in actual resource taxation revenue compared with potential revenue. ABARE-BRS executive director Philip Glyde noted this would suggest that current resource charging arrangements are not sufficiently responsive to changes in industry profit.

Other key results of the study for the period 2000-01 to 2006-07 include:

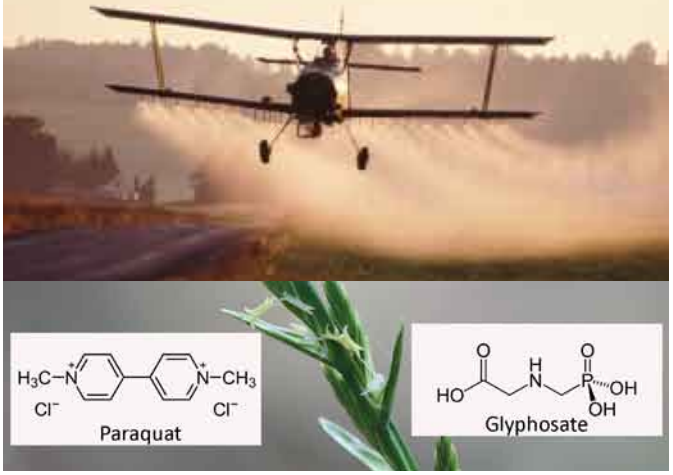
- The present value of net cash flow before taxes is estimated as $167 billion in Australia's mining sector, of which $39 billion was collected in resource taxes.
- The present value of resource tax payments in Australia's mining sector is $67 billion, if a hypothetical Brown tax is used as a benchmark and assumed to be levied at a constant 40% of annual net cash flow, .
- The shortfall in potential resource tax revenue for the period is around $28 billion in present value terms (or $4 billion a year on average).
- In present value terms, the estimated economic rent for Australia's mining sector ranges from $161 billion ($23 billion a year) for risk neutral investors to $139 billion ($20 billion a year) for risk averse investors with a minimum rate of return equal to the long-term bond rate plus 20 percentage points.

(note: for complete summary points see report)

▶ More information: **http://adl.brs.gov.au/data/warehouse/pe_abarebrs99001750/resourceTaxation20101029.pdf**

Knocked but maybe not out

In the US and other countries, the use of Glyphosate resistant (GR) crops is alleged to have caused the evolution of GR weeds.



Herbicide resistance, particularly in annual ryegrass, is an emerging threat for Australian agriculture. For instance, the **Australian Herbicide Resistance Initiative** recently launched at the **University of Western Australia** focuses on a broader national effort to address the emerging challenge. A significant number of annual ryegrass populations were already known to have developed resistance against glyophosate, the most important 'knockdown' herbicide available (see also 'Resistant focus', ARDR October) and farmers are encouraged to adopt a double knock strategy by alternating glyophosate with the only viable alternative 'knockdown' herbicide, paraquat.

However, **University of Adelaide** researchers have discovered an annual ryegrass population resistant to paraquat, which should concern farmers. Weed management expert ***Dr Peter Boutsalis*** said that now none of the currently available knockdown herbicides can be guaranteed to control ryegrass.

▶ **More information: http://www.adelaide.edu.au/news/news41881.html**

Flying crop sensor

Researchers at the **University of New England** have completed initial trials of 'Raptor', a new crop sensor attached underneath a low-flying aircraft that rapidly scans, from heights of more than 50 metres, crop biomass over entire paddocks. The relative reflectance of rapidly sent pulses of red and near infrared light indicate plant vigour, such as biomass, or water or nutrient status, says project leader ***Professor David Lamb***.

Raptor device attached under a plane

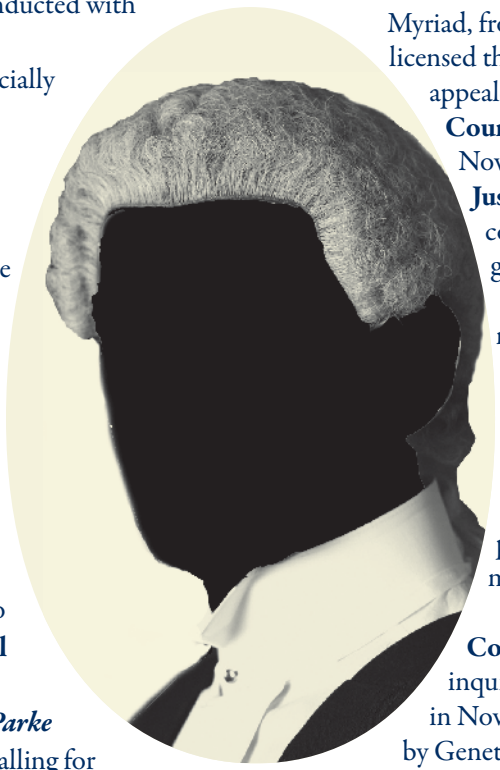
The **Cooperative Research Centre for Spatial Information** (CRCSI) funded the project as part of its 'Biomass Business' project to address key limitations in the traditional methods of using satellite or aerial imagery to map crop vigour. According to Professor Lamb, the Raptor can be used under cloud and even in the night, for example to help in the application of variable-rate growth hormones when standard air borne imagery is not available.

▶ More information: **www.une.edu.au**

Patent or not to patent...

A ban on human gene patenting gathered momentum when politicians, campaigners for gene patent reform and representatives of the biotechnology industry met at a non-partisan 'gene patents breakfast' in Canberra. Ahead of the meeting, **AusBiotech** released a statement calling for calm, saying that the "complex debate is being conducted with incomplete information."

In *Biotchnology News*, which is commercially associated with AusBiotech, chief executive officer ***Dr Anna Lavelle*** clarified the organisation's position, saying that it did not object to a research exemption on gene patents, but she warned that the broad scope of reform called for by some could result in a "disincentive for venture capitalists to invest in companies that do not have appropriate patent positions".



However, members of the Government and Opposition are set to follow proponents of more radical reform, as supported by **Cancer Council Australia** chief executive ***Professor Ian Olver*** and also ***Sarah Murdoch***, the patron of the **National Breast Cancer Foundation**.

In early November, Labor MP ***Melissa Parke*** threw her weight behind the campaign by calling for an end to the patenting of genes in a private member's motion, which received rare multi-partisan support. At the breakfast meeting she said: "Proponents of gene patents argue that private companies will not engage in genetic research unless they have the economic incentives created by the patent system. In fact the opposite is happening. Gene patents are stifling rather than benefiting scientific research and innovation, because they inhibit access to the most basic information."

During the course of this year, the **ARDR** published several contributions on this issue, including by **ANU** patent law expert ***Dr Luigi Palombi*** and ***Dr Julian Clark*** from the **Walter and Eliza Hall Institute**. Together, these opinions reflect the significant complexity of the issue, also apparent in the statements by expert witnesses in a recent Senate inquiry into gene patents. Also in the ARDR, **Genetic Technologies** chief executive officer ***Paul Leman*** wrote after US company **Myriad Genetics** lost a 'land mark' case over its intellectual property covering patents over human breast cancer genes (BRCA1 and BRCA2) that already many government funded laboratories and organisations infringe existing patent rights. "Should this patent protection be removed in Australia, Genetic Technologies would benefit financially as it would no longer stand out as the entity in Australia paying royalties for tests such as BRCA."

Myriad, from which Genetic Technologies has licensed the use of BRCA genes in Australia, appealed against the decision by a US **District Court**, yet this took a significant turn in November, when the **US Department of Justice** dropped a minor bombshell by contradicting longstanding US policy on gene patenting.

In a so called amicus curiae brief, nominally in support of neither party, the Department agreed on behalf of the US with the District Court that isolated and purified DNA molecules are not patentable and further, that this was consistent with older **Supreme Court** precedent regarding patentable subject matter.

Here in Australia, the **Senate Community Affairs Reference Committee** inquiry into gene patents released its report in November. The inquiry had been motivated by Genetic Technologies' attempt to enforce its rights over the BRCA genes in 2002-03 and 2008. Based on this case the Committee considered the proposal of an express prohibition on gene patents but was unable to reach defintive conclusion because of a "lack of comprehensive, systematic and accessible data in relation to gene patents." Because of this uncertainty, the Committee did not recommend an amendment to current legislation to express prohibit gene patents. It noted, however, that current law prohibits patenting of a 'mere discovery' and raised substantial doubt this would conform with current practice by IP Australia.

Express prohibition, the Committe found, may become unnesseccary, though, as developments in the US are likely to influence IP Australia's procedures for granting patents, and because of the aforementioned introduction of a private member's bill, the Patent Amendment (Human Genes and Biological Materials) Bill 2010 into the federal Parliament.

The Committee outlined 16 recommendation, notably including in recommendation 13 a broad research exemption of gene patents, as was widely supported by stakeholders.

Cloud's the future

A major report by the **Australian Academy of Technological Sciences and Engineering** (ATSE) has looked at the opportunities and challenges of cloud computing, which it defines "as a means to access a shared pool of configurable computing resource". There are valuable opportunities, the report says, but Australia needs to encourage the uptake of cloud computing while removing unnecessary barriers. In many countries, private sector, businesses, organisations such as NASA, and Governments increasingly realise the potential of cloud services to reduce costs. It is now a market worth more than $20 billion and growing rapidly.

ATSE lists examples such as the New York Times' use of Amazon Web Service to archive published material from 1851 to 1980 within 24h for US$240.

Cloud computing can also facilitate better management and use of very large databases, important for the increasing number of data intensive research such as environmental monitoring. Key advantages include:

- users pay per use for services and infrastructure, reducing the requirement for capital investment;
- cloud computing is scalable;
- cloud computing software facilitates the manipulation of large databases;
- the increased scale of processors and data storage devices provides economies of scale and energy use; and
- cloud computing can enable entirely new innovative business services.

Governments can play an important role in the uptake of cloud computing by researchers and the business sector, and by addressing emerging issues related to privacy, security, trust, data transfer capacity and lock-in with service providers. Privacy legislation – which pre-dates the development of cloud-based services – needs to be reviewed, the report says. It also notes that Australia has comparably high broadband prices and not yet extensive broadband links, large-scale data centres and a requisite regulatory environment. The report recommends:

- a whole-of-government approach to arising security and privacy issues, with a new taskforce reviewing current legislation and identifying steps required for a supportive regulatory environment;
- new businesses that are cloud-focused in their internet-scale applications should be actively encouraged through the Government's Commercialisation Australia Program;
- a review by the **Department of Broadband Communications and the Digital Economy** of broadband pricing and policies of commercial and other providers;
- expanded courses in Australian universities to build knowledge and skills in cloud computing, including short courses for industry, government and university researchers on cloud computing and its data-parallel programming models.
- an Australian equivalent of the **NSF's Cluster Exploratory Program CluE** and the **NSF-Microsoft Program** to actively encourage the use of cloud computing;
- refined investment plans by the **National Research Infrastructure Council** (NRIC) that refelect the benefits of cloud computing;
- that proposals for research data storage using **Super Science** funds require to have evaluated cloud computing services.

▶ More information: **www.atse.org.au**

Manic connective

Facilitated by faster internet connections, Australians download increasingly larger volumes of data and spend more time online, as most have access to the internet at multiple locations, which they complement with a growing number of mobile internet connections.

According to new research by the **ACMA***, at June 2010 approximately 77% of the population 14 years and over were connected to the internet at home, and 66% had a broadband connection. Nearly 2.4 million people used the internet via their handheld mobile during June 2010, up from 1.6 million during June 2009.

More Australians are heavy internet users...

During the June quarter 2010, Australians downloaded 57% more data than in the same period in 2009 (155,503 and 99,249 terabytes respectively).

For a number of years there has been exponential trend growth in downloaded data volumes as more people spend more hours doing it.

In the age group of persons 14 years and above, 28% are now considered as 'heavy' users, spending more than 15 hours a week online, further 27% use the internet between 7 and 15 hours a week.

By contrast, in 2005, only 14% were considered 'heavy' users.

For the majority of Australians the internet has become an essential part of their lifes, says ACMA chairman ***Chris Chapman***, and they use for a wide range of activities with communications, research, information, banking and finance and general browsing being most popular.

Online social networking and access to news continue to be major activities. During June 2010 alone, 8.7 million Australians spent in total more than 41.5 million hours accessing mainstream social networking sites such as Facebook and YouTube from home, while over the same period, over 6 million persons accessed mainstream online news sites.

▶ More information: ***2009-10 Communications report series - Report 1 – Australia in the digital economy: The shift to the online environment**

Bands on the run

Two share a band ...

With new arrangements in the 2.5 GHz band to facilitate new uses such as wireless access services (WAS), the **Australian Communications and**

Media Authority seeks to align Australia with international standards. Parts of the 2.5 GHz band will, however, remain to be used by current licensees for electronic news gathering (ENG), while new bands will have to be made available to maintain the delivery of these services.

ACMA acknowledges that the new arrangements will affect a range of important sectors including television broadcasters, the telecommunications and space industries as well as the **Department of Defence**. The agency is confident, though, that the arrangement will secure the current standard of important news service delivery.

"The retention of the mid-band gap for ENG-use is a world-first initiative", ACMA chairman ***Chris Chapman*** said. In regard to stakeholder concerns expressed during a previous consultation phase, Mr Chapman said the ACMA has taken a balanced approach. However, he also highlighted the complexity of the task, particularly in the development of arrangements in bands other than 2.5 GHz, which could take several years. In the meantime, ENG operators will not be able to relocate from the 2.5 GHz band.

The ACAM will establish industry working groups to develop the technical frameworks for new licences in the 2.5 GHz band, schedule spectrum tune-ups and continue discussions with stakeholders on 2.5 GHz processes.

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

...and what about the dividend?

How to best re-allocate the 'digital dividend spectrum', set free with the switch-over to digital television broadcasting technology, is the topic of a discussion paper *Spectrum Re-allocation in the 700 MHz "Digital Dividend" Band* released by the ACMA.

"The ACMA will be developing an allocation approach that seeks to put the digital dividend spectrum back to work in a way that maximises the benefits to the Australian public," Mr Chapman said. Amid growing demand for wireless broadband, the use of digital dividend spectrum is expected to include advanced wireless broadband services to improve the capacity of mobile telephone services to carry broadband data.

Closing date for submissions is 6 December 2010.

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

Radio gaga in the bush

The bush has yet to enjoy the breadth of digital radio, in place now in Australia's capital cities for over a year. Minister for Broadband, Communications and the Digital Economy ***Senator Stephen Conroy*** has asked for public comment on a position paper *Technologies for digital radio services in regional Australia*, which supports a current review of digital radio technologies.

The paper provides information on the various potential technologies for transmitting digital radio broadcasting services in regional Australia. This includes Digital Audio Broadcasting Plus (DAB+), which is used in metropolitan regions, while its suitability to cover regional analog services, particularly on the AM band, is yet to be determined. The paper discusses also other terrestrial and satellite technologies available to transmit digital radio broadcasting services, key consumer/listener requirements for digital radio in regional areas, and the key technical issues for the major digital radio technologies and their potential for regional digital radio services.

"Regional areas of Australia are eager to experience the benefits of digital radio and this review will enable residents to advise the Government of their requirements and help determine the most appropriate digital technology for their local radio services," Senator Conroy said. Submissions close 24 December 2010.

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

Bush connection

From TV to web...

The **CSIRO** has given insight into a new advanced wireless technology, Ngara, which is only half complete but, the agency says, already offers six users at a time the ability to upload information without reducing data transfer speeds and while being connected through a single set-top box.

credit: collage includes elements from images by Geoff Ambler (CSIRO)

Importantly, the technology uses the spectrum of a single analogue television channel (7 MHz), making it feasible for rural property and business owners to connect to high-speed internet re-using old analog TV channels. CSIRO's system is achieving this through enhanced spectral efficiency of 20 bits per second per Hertz (20 b/s/Hz), 10 times the industry's minimum standard.

The technology is, however, still in development, with CSIRO completing research by testing the downlink part of the system, which will also run at 12 Mbps per user.

▶ **More information: www.csiro.au**

...to connected walkabout

The **ACMA** has completed licensing in the 2GHz band suitable for 3G mobile telecommunications services at more than two thousand sites throughout regional and remote Australia. The agency says that with 963 licenses issued to Optus and 1401 to Telstra, new license applications will be accepted through an over the counter administrative process.

The agency also announced that for wireless access services (WAS), additional spectrum is now available in the 3.6 GHz band on the Queensland Coast.

This will further support the deployment of broadband wireless and other wireless access services in regional areas of Australia, ACMA chairman ***Chris Chapman*** said. "The ACMA has already issued 194 licences to 11 service providers in locations in South East and Northern SA, Victoria, Tasmania, Southern and Northern NSW, Queensland, Western Australia and the Northern Territory."

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