

R&D

REVIEW

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*Linking Australian Science,
Technology and Business*

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Treasure hunt under the sea

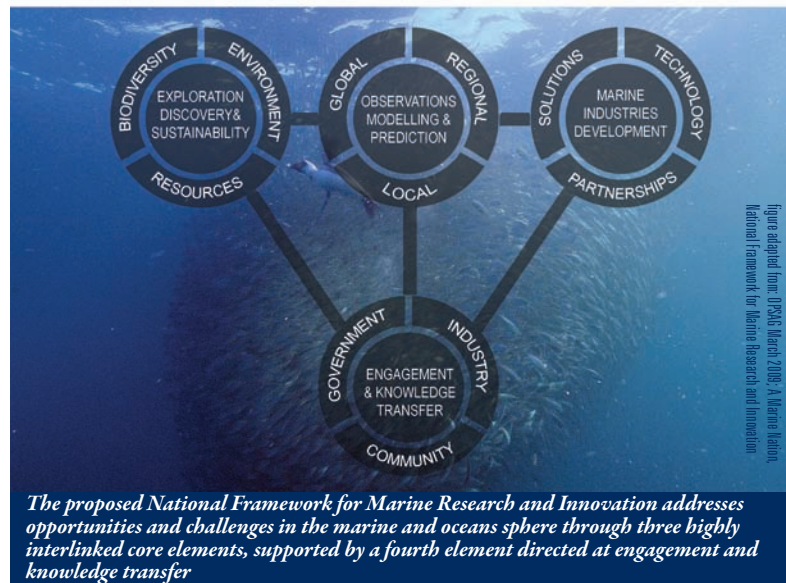
The Australian Government has launched a new [National Framework for Marine Research and Innovation](#). The document was released less than a year after the [United Nations](#) extended Australia's marine jurisdiction by 2.5 million km² to 13.5 million km² by confirming the location of the outer limit of Australia's continental shelf in nine distinct marine areas beyond 200 nautical miles.

A Marine Nation: National Framework for Marine Research and Innovation was prepared by a steering committee of the Australian Government's **Oceans Policy Science Advisory Group (OPSAG)** by bringing together science providers in consultation with users of marine science. The committee however notes that for further development and implementation of the framework "a more formal high level steering committee.... will be needed, with a balanced representation from the marine science sector", and recommends setting up a **National Steering Committee for Marine Research and Innovation**.

Australia now lays claim to the third largest marine jurisdiction of any nation. Its marine sector contributes at least 4% of GDP and is growing faster than other sectors, through energy and food production, recreation and tourism, in line with a global trend. Its international maritime trade grew from \$249 billion in 2005/06 to over \$340 billion in 2007 and a recent evaluation by the AIMS estimated that since 2000 its marine industries increased in value by 42% to \$38 billion in 2006/07. The AIMS Index also identified a range of emerging industries, such as marine biodiscovery, seabed mining, carbon capture and storage, desalination and tidal power.

The OPSAG document notes that, according to current evaluations, insufficient investment in marine science is causing economic loss to Australia, and inadequate investment is significantly reducing the potential for economic performance in the development of Australia's marine industries. The paper particularly emphasises the need to address acute shortages of skilled marine scientists and technologists such as chemists, economists, engineers, geographers, mathematicians, microbiologists, modellers, physicists, statisticians and taxonomists, and to provide career pathways for early career researchers.

While opportunities and challenges for Australia's marine domain



The proposed National Framework for Marine Research and Innovation addresses opportunities and challenges in the marine and oceans sphere through three highly interlinked core elements, supported by a fourth element directed at engagement and knowledge transfer

are complex and interlinked, the paper says they can be grouped into five distinct categories:

1. Opportunities for increased economic and energy security from marine and subsea resources. These include potential marine oil and gas resources; fisheries and aquaculture; the developing field of biodiscovery; marine minerals; and emerging economic activities such as desalination and renewable energy technologies
2. The conservation of marine biodiversity and ecosystem services.
3. The management and protection of the marine coastal environment.
4. Climate change.
5. National security and safety at sea.

In order to address these opportunities and challenges the paper advocates a renewed national effort in marine science through nationally coordinated research. It outlines a framework based on four key elements, each including a series of programs:

1. Exploration, discovery and sustainability.
Proposed programs include three major areas:
– Biodiversity, which is to classify, map and conserve Australia's

marine living resources and to deliver information for ecosystem management and indicators of ecosystem health;

- Coastal and ocean environment, which is to explore and document Australia's inshore coastal, continental shelf and deep ocean.
 - Subsea and seabed resources, which is to explore subsea oil and gas, and seabed minerals, based on geological surveys, profiling, remote sensing, seabed mapping and in situ seafloor sampling for all of Australia's extended continental shelf.
2. Observations, modelling and prediction. This element aims to develop predictive models that can be used for adaptive and sustainable management of marine resources, marine protected areas and the coastal zone, and for predicting climate change and variability. The proposed programs are directed:
 - at observations, characterisation, understanding and modelling of global ocean processes and dynamics;
 - understanding marine biophysical systems at the coastal and regional level; and
 - local investigations of the biogeochemical and physical marine system.
 3. Marine industries development. This element acknowledges the need for strong and expanded engagement with marine research and innovation providers by developing:
 - innovative technologies in partnership with economically important industries;
 - innovative (marine) solutions involving marine technology and engineering, materials science (new materials, advanced sensors), robotics and marine information and communications technology; and
 - formal partnerships between industry and government end users.
 4. Engagement and knowledge transfer. This last element is to support the above three and acknowledges the need for effective engagement between research providers and stakeholders. Proposed programs focus on three areas and include:
 - more effective engagement and communication with Australia's marine industries, including knowledge and technology transfer;
 - more effective involvement of policy makers; and
 - better engagement with the Australian community on the value of Australia's marine domain, its opportunities and challenges.

► **More information:** www.opsag.org

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Helping hand in the storm

A new **Investment Follow-on Fund (IIFF)** will offer \$83 million to twenty venture capital fund managers, licensed by the **Commonwealth** under existing programs, to invest in innovative early stage start-up companies employing at least 1000 people. The initiative follows recommendations by the Review of the National Innovation System *Venturous Australia*, which had emphasised the importance of a functioning venture capital market to the innovation system and had urged support of the supply of venture capital. According to the Minister for Innovation, Industry, Science and Research, **Senator Kim Carr**, the IIFF is one of a number of Government initiatives to assist the flow of capital into Australian firms. In a [speech](#) at the **National Press Club**, Senator Carr has stressed that a full Government response to the review will be part of the budget process and the immediate IIFF support is to address the urgent problems companies face in the current global financial crisis.

However, the announcement received a mixed response. The chief executive officer of **AusBiotech**, **Dr Anna Lavelle**, says that the initiative is falling short of what innovative companies, particularly in the biotechnology sector, need in order to survive in the current economic environment. She says that while the Innovation Investment Follow-on Fund will boost investor confidence, only an estimated 25% will go toward the biotechnology sector. "This is a \$600 million problem..." she says calling for refundable tax credits and competitive matched grants as outlined in the *Venturous Australia* report.

► **More information:** (Senator Carr) **Catriona Jackson, 0417 142 238;** (Ausbiotech) **Lorraine Chiroiu, 0429 801 118**

Hidden costs

In pursuit of climate change mitigation policy makers need to take account of all costs associated with alternative power sources, says a major report by the **Australian Academy of Technological Sciences and Engineering (ATSE)**. The report found some major gaps and uncertainties in the cost estimates obtained with existing methods for valuing externalities (environmental and social costs that are not accounted for in the market price of electricity). These hidden costs arise from impacts on, for example, climate, human health, crops, structures and biodiversity and need to be identified and quantified, preferably in monetary terms. The report *The Hidden Costs of Electricity: Externalities of power generation in Australia* recommends:

- to enhance and expand Australia's capability in externality assessment and valuation, especially through collaboration with international agencies and centres of expertise;
- to increase the policy focus on externalities by Federal and State governments with preferably one Federal Department responsible



for collection, analysis and dissemination of externalities data;

- an enhanced externalities database, with investment-grade data, preferably as monetary valuations, in order to inform policy development; and
- a broadly based public communication program to reliably inform the Australian community on the social and environmental externalities of its electricity generation technology options.

Currently the best available studies of externalities of power generation, says the report, are the European Union's [ExternE Project](#) and its successor [NEEDS](#) (New Energy Externalities Development for Sustainability). ExternE has produced estimates of monetary costs of greenhouse, health and other environmental impacts of power station emissions, based on full life-cycle assessments. In practice these data are difficult to attain. However, ATSE says that while attaching monetary values to externalities is problematical and subjective it is of increasing importance given that billion dollar investments are at stake.

In a recent study, [Energy Technology for Climate Change: Accelerating the Technology Response](#), ATSE had noted that about \$250 billion, with substantial additional development costs, would be needed to bring the new technologies into production by 2050.

► [More information](#): Bill Mackey, 03 9340 1206 or 0418 923 370

Across the divide

A new \$10 million Researchers in Business program is set to bridge the gap between public sector research and business. The program will address the traditionally low collaboration between public sector researchers and industry and will help facilitate the commercialisation of innovative ideas and boost innovation in small and medium-sized firms.

Researchers in Business will place researchers in small and medium-sized businesses for two to twelve months. The scheme will provide \$50,000 per business to employ researchers from universities or public research agencies. The program is part of the **Australian Government's** \$271 million investment in business growth through the **Enterprise Connect** network.

► [More information](#): Catriona Jackson, 0417 142 238

Enduring legacy

One year after the death of leading water expert *Professor Peter Cullen*, the **Australian Government** has set aside \$1 million in seed funding to establish a new water and environment trust in his honour. Objectives of the **Peter Cullen Water and Environment Trust** will include:

- to protect and enhance the Australian natural environment, in particular aquatic environments and their catchments; and
- to provide and facilitate learning, communications and informed debate about aquatic environments and their catchments, and about things that influence them.

Senator Penny Wong, Minister for Climate Change and Water says the funding is "a most appropriate gesture given Peter Cullen's contribution to water reform in Australia as a founding National Water Commissioner."

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

Leading the way

The **University of Wollongong** has opened its new **Australian Institute for Innovative Materials** which will house over 200 researchers and

students and two flagship research groups:

- the [Intelligent Polymer Research Institute](#), led by *Professor Gordon Wallace*; and
- the [Institute for Superconducting and Electronic Materials](#), led by *Professor Shi Xue Dou*.

The university also harbours the headquarters of the **ARC Centre of Excellence for Electromaterials Science** and co-hosts the **Materials Node of the Australian National Fabrication Facility**, a "very serious concentration of expertise and resources in an area of research that will help define the twenty-first century," says Innovation Minister *Senator Kim Carr* in launching the institute. The developing innovation campus matches the research capabilities of the university and its specialist institutes to the research needs of industry, important to "bridge the cultural divide between universities and industry," he says.

► [More information](#): <http://minister.innovation.gov.au/Carr/Pages>

Debated legislation

The **Australian Science Media Centre** has released a series of comments from climate experts on the exposure draft legislation for the **Carbon Pollution Reduction Scheme** (CPRS) released in March.

Dr Richard Dennis, executive director of the **Australia Institute**, has repeated his earlier publicised criticism, that under the proposed cap-and-trade system voluntary action will not be able to reduce Australia's overall emissions below the target set by the Government.

By contrast, *Professor Barry Brook*, the Sir Hubert Wilkins Chair of Climate Change at the **University of Adelaide**, says "there is nothing inherently wrong with a cap-and-trade scheme". However, he says obvious problems with the legislation are that the proposed cap for 2020 is too weak, and free permits are being handed to heavy polluters.

According to *Dr Peter Cook*, chief executive of the **Co-operative Research Centre for Greenhouse Gas Technologies** (CO₂CRC), decreasing CO₂ emissions will globally require a portfolio of mitigation measures including energy efficiency, wind, solar, geothermal, and nuclear. He emphasises that such a portfolio will also have to include carbon capture and storage (CCS) but that Australia's emissions trading scheme (ETS) alone will not drive its uptake and deployment. "Additional efforts will be needed to get CCS going," he says.

► [More information](#): www.aussmc.org/CPRS_draft_legislation.php

Capturing the goods

A \$200 million initiative to fund stormwater harvesting and re-use projects, the outcome of Senate negotiations over the *Nation Building and Jobs Plan* in February, is open for applications with the first round closing on 30 June 2009. The initiative has been created through the \$12.9 billion **Water for the Future** package.

Under the proposal guidelines, grants or refundable tax offsets will be available for up to 50% of eligible capital costs. The minimum project size is \$4 million and whilst there is no maximum project size, funding is capped at \$20 million per project.

The projects are required to source 100% of their energy needs from renewable sources or fully offset the carbon impact of their operations.

► [More information](#): 1800 218 478, www.environment.gov.au/water



Standardised peeks

Researchers at ANSTO and the **University of Canberra** have designed the first international standards designed to test X-ray equipment used to scan air cargo and shipping pallets and large shipping containers.

According to ANSTO's *Mr Ned Blagojevic*, it is the first time an independent scientific standard has been set to determine the best X-ray equipment for air and sea cargo examination around the world. *Professor Dudley Creagh*, the Commonwealth Scientific Advisor for the

project, says a significant feature of the ANSTO standards is that they substantially reduce the amount of time Customs officers must take to ensure their X-ray equipment is working properly.

"In the past it would take a working shift to undertake the performance testing. Now it takes only a matter of minutes."

So far ANSTO has built 15 test standards, with 10 currently in use by **Australian Customs Services**. Mr Blagojevic says

the **United States Government** will require 100% inspection of cargo entering the country by 2012 and having the correct standards for X-ray machines is vital.

► **More information:** Sharon Kelly, 02 9717 9575 or 0400 394 085

Southern Ocean studies

An **Institute of Marine and Antarctic Studies (IMAS)** has been established at the **University of Tasmania**. IMAS will integrate the **Institute of Antarctic and Southern Ocean Studies** and the **Tasmanian Aquaculture and Fisheries Institute**, and collaborate with **State Government**, industry stakeholders, **CSIRO** and the **Australian Antarctic Division**.

IMAS will be a centre of excellence in the study of the Southern Ocean on a local, national and international level. It will focus on aquaculture, fisheries management, biodiversity, ecosystem management and modelling, and plankton research in the Southern Ocean and physical oceanography. One of its main themes will be climate change and its impacts.

► **More information:** 03 6226 2124, Media.Office@utas.edu.au

Good Fellows

Sixteen of Australia's leading scientists have been elected to the **Australian Academy of Science**:

- *Professor Marilyn Crowl Ball*, Research School of Biological Sciences, **Australian National University**;
- *Professor John Philip Carter*, Pro Vice-Chancellor and Professor of Civil Engineering, **University of Newcastle**;
- *Professor Frank Caruso*, Director, Centre for Nano Science and Nanotechnology, **University of Melbourne**;
- *Professor Andy Kong-Hong Choo*, **Murdoch Children's Research Institute**;
- *Professor Warrick John Couch*, Centre for Astrophysics and Supercomputing, **Swinburne University of Technology**;

- *Professor Hugh Francis Durrant-Whyte*, School of Aerospace, Mechanical and Mechatronic Engineering, **University of Sydney**;
- *Professor Charles Reay Mackay*, Director, Immunology and Inflammation Research Program, **Garvan Institute of Medical Research**;
- *Professor Paul Mulvaney*, Bio21 Institute, **University of Melbourne**;
- *Professor Robert Glenn Parton*, Institute for Molecular Bioscience, **University of Queensland**;
- *Professor George Paxinos*, **Prince of Wales Medical Research Institute**;
- *Dr Michael Robin Raupach*, **CSIRO Marine and Atmospheric Research**;
- *Professor Leigh William Simmons*, Centre for Evolutionary Biology, **University of Western Australia**;
- *Professor Xu-Jia Wang*, Centre for Mathematics and its Applications, **Australian National University**;
- *Professor Peter Michael Waterhouse*, School of Biological Sciences, **University of Sydney**;
- *Professor Mark Westoby*, School of Biological Studies, **Macquarie University**; and
- *Professor Raymond Leslie Withers*, Research School of Chemistry, **Australian National University**.

► **More information:** www.science.org.au/media/newfel2009.htm

Crisis helper

Another piece in the \$271 million **Enterprise Connect** network, the new \$14 million **Mining Technology Innovation Centre**, has been launched in Mackay, Queensland. The centre will:

- provide a comprehensive free business review of the firm that identifies strengths and weaknesses, strategic business issues, potential areas for business improvement and growth;
- provide access to matching grants of up to \$20,000 to address areas identified by the review for improvement and growth;
- find and adapt the latest research and technology to improve their products;
- provide access to specialist facilities and advice to assist in turning ideas into new products;
- identify new markets for cutting-edge technology;
- prepare the firm to become export ready, including management and marketing skills;
- assist in identifying sources of government support for the firm's activities; and
- provide network opportunities and ongoing mentoring.

► **More information:** www.enterpriseconnect.gov.au

Your say on IP

Senator Kim Carr, Minister for Innovation, Industry, Science and Research, has called for submissions on proposed reforms to Australia's intellectual property (IP) system. The multifaceted reforms aim to reduce barriers in the innovation landscape for researchers and inventors, allow patent claims to be resolved faster and strengthen penalties for counterfeiting and other serious forms of trade mark infringement.

IP Australia will commence consultation on two reform papers and will release further papers over the coming months.

► **More information:** www.ipaustralia.gov.au; Peter Willimott, 02 62832282, 0410 698 391

Revolution(s) in the making

Innovative ambitions

In a speech at the **Australian Financial Review Higher Education Conference** in March, Minister for Innovation, Industry, Science and Research **Senator Kim Carr**, has outlined the Government's ambition "to progressively address the gap in funding for the indirect costs of research, subject to the capacity of future budgets." This commitment by the Government will be in the expectation that universities provide better, more meaningful data on research costs through activity-based reporting, and meet specific performance targets which the Government will develop in consultation with the sector.

A set of objectives targeted by additional funding will include to:

- drive structural reform within institutions and across the sector;
- increase transparency and accountability;
- ensure that resources are allocated rationally and used efficiently;
- make universities responsible for their decisions; and
- improve the way universities manage their estate.

These will also be objectives of the mission-based funding compacts, which, as announced in the May 2008 budget paper on the 'education revolution', will form a new funding framework from 2010. The compacts will be collaboratively developed agreements between Government and public universities to detail funding arrangements and university obligations.

Senator Carr says that funding mechanisms and compacts will be used to encourage hubs and spokes arrangements that support collaboration between universities and build on research strengths. He emphasises that, particularly for younger universities and regional universities, collaborative research networks will offer a chance to increase their research intensity.

The Government aims to progressively increase the number of research groups performing at world-class levels, as measured by international performance benchmarks, says Senator Carr, and has the longer-term goal of increasing international collaboration in research by Australian universities.

The Government has also the ambition to double the level of collaboration between Australian businesses, universities, and publicly funded research agencies over the next decade. According to data from the **Australian Bureau of Statistics**, only 1% of Australian firms currently draw information or innovative ideas from universities, and only 2% from government agencies.

The Government is further developing a research workforce strategy for the period to 2020 to meet expected shortfalls in the supply of research-qualified university staff and aims to significantly increase the number of students completing higher degrees by research.

► **More information:** <http://minister.innovation.gov.au>

Shaping a revolution

In a series of speeches, the Minister for Education, Employment and Workplace Relations, **Julia Gillard**, has outlined a response to the [Review of the Australian Higher Education System](#).

In line with the review recommendations, Ms Gillard has announced a Government target of 40% of all 25-34 year olds to be qualified at bachelor level or above by 2025. This compares to current levels of 32%.

In line with the review recommendations, Ms Gillard announced that all Australian universities will be funded on the basis of student demand from 2012. The system will, however, not be based on a voucher system with students receiving a set dollar entitlement, as was suggested by the review, but will entail Commonwealth payment to universities on the basis of student numbers. The current funding floor for universities will be maintained for the calendar years 2009, 2010 and 2011 and the current cap on over-enrolment will be raised from 5 to 10% from 2010 and then wholly removed in 2012.

Ms Gillard also announced a national regulatory and quality agency for higher education. "The regulator will accredit providers, carry out audits of standards and performance, protect and quality assure international education, streamline current regulatory arrangements to reduce duplication and provide for national consistency," she says emphasising that the new system will not be 'micro managed' by the political system. "Command and control from Education Ministers and **DEEWR** will be replaced by clear public interest tests and goals, agreed compacts and transparent oversight by the new independent national regulatory body," she says.

Ms Gillard also addressed the need for greater equity. Only 16% (92,000 students), of higher education enrolments at undergraduate level, are currently from lower socio-economic background. A new target will aim to increase this to 20% (147,000 students) by 2020. Ms Gillard says Australia's elite institutions have the lowest proportion of low socio-economic status enrolments. By contrast, regional universities are enrolling an average of 10% more students from the poorest backgrounds than applies on average across the sector.

To support regional communities \$2 million will be provided for a feasibility study into a [national regional university](#) proposed by **Charles Sturt** and **Southern Cross Universities**. The cost of providing quality teaching and research in regional Australia will also be examined and a new, more logical basis for funding will be introduced.

To improve equity in the system and improve Australia's skill basis, Ms Gillard says there is also a need to provide more direct student pathways between Vocational Education and Training (VET) and universities. Both universities and VET need to work together "to produce integrated responses to national needs in knowledge, skill development and social inclusion." The Government will commission the **Australian Qualifications Framework Council** to improve the articulation and connectivity between the university and VET sectors to enable competency-based and merit-based systems to become more student-focused.

She also says that a new single tertiary education sector ministerial council, with representatives from all tertiary education and training systems will oversee the registration and accreditation of providers and enforce performance standards.

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



Staying in the sky

Computers in Seattle, US, have prevented a virtual midair collision between an unmanned helicopter and a simulated aircraft over Kingaroy, Queensland, using new technology developed by **Boeing Research & Technology** and the **Australian Research Centre for Aerospace Automation (ARCAA)**.



photo: adapted from Mike Goettings, the unmanned Boeing Little Bird Demonstrator

Professor Rod Walker from **Queensland University of Technology**, which partners with **CSIRO** in the ARCAA joint venture, says the automatic aircraft separation system was just one of a number of technologies being explored in the Smart Skies Project. The system, he says, works like the airspace 'oracle', supervising all aircraft and resolving potential collisions. In the simulation the system detected a potential collision and automatically issued new flight trajectories to the aircraft.

ARCAA is currently also developing an unmanned aircraft that perceives airspace similar to human pilots. **Dr Jonathan Roberts**, of the **CSIRO ICT Centre**, says the new technologies being investigated will help solve a number of challenges facing the integration of unmanned aircraft into airspace.

► **More information:** Rod Walker, ra.walker@qut.edu.au, 0417 791 311; www.smartskies.com.au.

Sugar cane paper

A cheap and easy way to use sugar cane bagasse has been discovered by **Queensland University of Technology** researcher **Tom Rainey**, dispelling the myth that bagasse paper production would never be economically viable in Australia. According to Mr Rainey, the research has overcome a major technical hurdle in optimising bagasse fibre so it can be made into pulp for the production of paper, board, structural and packaging materials. Mr Rainey says the process will be more profitable because the raw sugar cane material is up to five times cheaper to buy than wood, and higher paper production rates are possible. He suggests that the technology could provide a new market for Australian sugar cane growers.

The PhD research was supported by the **Sugar Research and Development Corporation** and the **Queensland Government** in association with **QUT**.

► **More information:** Tom Rainey, 07 3138 1633, t.rainey@qut.edu.au



photo: Queensland University of Technology

Sting prediction

A **University of Adelaide** researcher has found basic environmental monitoring data coupled with relatively simple population models can help predict timing and magnitude of mosquito peaks that lead to disease outbreaks in human populations. Ecologist **Associate Professor Corey Bradshaw** says this could help prevent outbreaks of serious mosquito-borne diseases like dengue and Ross River fever by using efficient and cost-effective mosquito control measures when they are most effective and most needed.

The researchers analysed 15 years of population data of the northern Australian mosquito, *Aedes vigilax*, which transmits the Ross River and Barmah Forest viruses, and compared it with environmental factors affecting populations including tides and rainfall. *Aedes vigilax* is a salt-loving species and populations tend to peak after very high tides. However, it is the frequency of high tides and the amount of rainfall in the preceding months that are the critical elements dictating the magnitude of eventual peaks.

"With this model, mosquito control efforts can be scaled according to the expected size of a future peak," says Professor Bradshaw who believes that the same model could be applied to other mosquito species transmitting vector-borne diseases such as dengue fever or malaria.

► **More information:** www.adelaide.edu.au/news/

The pressure is off

In a groundbreaking study published in *The Lancet*, Melbourne's **Monash University**, the **Baker Heart and Diabetes Institute** and **St Vincent's Hospital** have successfully trialled a new method to treat high blood pressure using a catheter-based treatment. According to study leader, Monash's **Professor Henry Krum**, the surgical technique is set to dramatically reduce high blood pressure in those 5-20% of patients who do not respond to medication. The trial with 50 patients showed an excellent safety profile with no long-term adverse events resulting from the procedure and, says Professor Krum, may be the most significant treatment of high blood pressure since introduction of the drugs in use today. Carried out under local anaesthetic, the procedure uses radio energy frequency delivered via a catheter to silence targeted nerves in the renal artery that supply blood to the kidneys.

"The catheter allowed us to target a very specific area to deliver the right amount of frequency to the nerves without damaging the surrounding areas," says Professor Krum.

► **More information:** Samantha Blair, 03 9903 4841

Men's menace: fractures

In older Australian men even small fractures are an indicator of underlying osteoporosis and a warning of a potentially serious life threatening break, such as a hip fracture. The consequences of a hip fracture are often more serious for men than for women, yet many fractures go undetected and untreated, according to early results from The CHAMP study conducted by researchers from the **University of Sydney**.



broken top femur

image: wikimedia/Booyabazooka

The study with 1700 older men, one of the world's largest of its kind, used bone density testing and scans of the spine to assess bone health and fracture history. It found that 1 in 4 of the men aged over 80 years had some form of bone fracture in their back, pausibly caused by actions such as bending over, slipping and falling, says researcher **Kerrin Bleicher**.

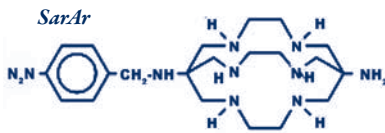
The study also found that while 1 in 4 men aged over 70 was eligible for Medicare supported treatments for osteoporosis less than 1 in 10 was actually receiving it.

► [More information: www.ibms2009.com/](http://www.ibms2009.com/)

Getting personal

Collaborative research conducted by ANSTO and Cambridge University in the UK is utilising a new Australian platform imaging technology known as SarAr² to track the drug treatment in patients with severe diseases like cancer. This will provide a basis for an optimised treatment that is most affective at the site of disease while having minimal damage to surrounding healthy organ tissues.

The SarAr technology platform was developed by ANSTO and the ANU under the guidance of project leader **Dr Suzanne Smith**. It is based on SarAr, a ligand or 'cage' with



adapted from Di Bartolo, Sargeson, Donlevy, Smith, Dalton Transaction, 2001, 2303

high affinity to metals such as radioactive copper, Cu⁶⁴, a preferred isotope used in PET (Positron Emission Tomography) imaging. Facilitated by SarAr, Cu⁶⁴-radiopharmaceuticals injected into the blood can stably attach to the drug used in the treatment of the patient and the radioactive complex then located using PET as it travels through the patient's body.

In the collaborative research project this approach will be utilised together with Magnetic Resonance Imaging (MRI) to detect early responses to tumour treatment. According to Dr Smith the project marks a major step towards personalising medicine by targeting treatments.

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

Anti-cancer diet?

In China, the incidence of breast cancer is 4-5 times lower than in developed countries. A study conducted by the **University of Western Australia** and **Zhejiang University** (China) suggests this is due to dried and fresh mushrooms and green leaf tea in the traditional Chinese diet.

A research team at UWA's School of Population Health examined the mushroom and tea consumption of more than 2,000 women aged from 20 to 87 in relatively affluent southeast China. "Mushrooms and mushroom extracts have been shown to possess anticarcinogenic properties and to stimulate immune responsiveness," says team leader **Associate Professor Min Zhang**. Epidemiological research also suggests green tea has anticarcinogenic effects against breast cancer.

The researchers interviewed all the women about their consumption of mushrooms and tea. The data were adjusted for factors such as physical activity, weight, menopause, alcohol consumption and smoking, including passive smoking. The researchers found that the combination of dietary intake of mushrooms and green tea-drinking decreased breast cancer risk with an additional reduced effect on the malignance of cancer.



Green Tea leaves

photo: Elaine Tan

If confirmed, the finding could lead to an inexpensive dietary intervention against breast cancer, says Dr Zhang.

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

Smoking guns

A study by **University of Adelaide** researchers involving over 1000 Adelaide women aged 30-33 aims to determine factors which, experienced during pregnancy, may influence their daughter's reproductive and general health in later adult life and also effect the following generation.

The cross-generational study is being led by **Associate Professor Michael Davies**, co-director of the Centre for the Early Origins of Health and Disease at the new **Robinson**

Institute. Results to date indicate links between maternal smoking in pregnancy and obesity and reproductive dysfunction in the daughters 30 years later. There may also be links between maternal obesity and, in their daughters, obesity and polycystic ovary syndrome.

"We are looking at the current health status of the daughters and relating that back, through medical records, to the pregnancy conditions and environment of the mother," says Associate Professor Davies.

The researchers hope to extend the study by following up the mothers' current health and following the children's health.

► [More information: www.adelaide.edu.au/news/archive/?cat=mediarel](http://www.adelaide.edu.au/news/archive/?cat=mediarel)

Attractive algae

According to research by **CSIRO Energy Transformed** it is possible, under ideal conditions, to produce biodiesel from algae at a lower cost and with less greenhouse gas emissions than fossil diesel.

CSIRO's **Dr Tom Beer** says greenhouse gas emissions can be reduced by avoiding the use of a fossil resource for fuel production, capturing methane produced by the processed algae to generate energy and taking into account the potential greenhouse gas offsets from industry. Also, algae thrive on CO₂ and emissions from industry could therefore also become a useful resource.

The production of algae does not require land used to grow food and algal farms, by comparison to crops that are grown for biodiesel, have a very low environmental impact, says Dr Beer.

The research shows that a 500 hectare algal biodiesel plant in a rural area could create up to 45 jobs and provide opportunities to diversify in the agricultural sector. However, Dr Beer says that there are still challenges in relation to cost, infrastructure needs and the scale of production required to make algal plants feasible. "We see biodiesel from algae as one potential option for sustainable fuel production amongst a range of other technologies."

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

Fiery dipole

Researchers from **CSIRO's Wealth from Oceans National Research Flagship** believe that lower than normal sea-surface temperatures in the eastern Indian Ocean have contributed to the very dry weather conditions preceding Victoria's past two major bushfires, in February 1983 and this year. In both cases, cooler ocean sea-surface temperatures in the eastern Indian Ocean may have contributed to a substantial reduction in spring-time rainfall over the south-east of Australia.

Sea-surface temperatures in the east and western Indian Ocean tend

to be at the opposite end of the scales, commonly referred to as the Indian Ocean Dipole. When the dipole is in a positive phase, sea-water off the Sumatra-Java coast, northwest of Australia, tends to be cooler than normal, reducing the rain-bearing systems that normally extend to Victoria during Spring. In February, a study led by researchers at UNSW had shown this connection, which challenges the accepted understanding of the drivers of Australia's climate.

According to Argo measurements of the dipoles, an international observation program that uses robotic floats drifting below the ocean surface, both recent Victorian bushfires occurred in protracted droughts made worse by three consecutive positive Indian Ocean Dipole events between 2006 and 2008. Temperature records of the past 100 years also reveal that in the past three decades the frequency of positive Indian Ocean Dipoles were much higher than over the previous 70 years. According to CSIRO's *Dr Wenju Cai*, this is consistent with climate change experiments from the 2007 IPCC Fourth Assessment Report projecting a mean warming pattern across the Indian Ocean reminiscent of a positive dipole pattern.

► **More information:** www.csiro.au/news/Media-Releases.html; www.science.unsw.edu.au/news/indian-ocean-drought/

Concerning replacements

Two new and powerful greenhouse gases, Nitrogen trifluoride (NF₃) and sulfur hexafluoride (SF₆), are accumulating in the atmosphere, according to international research led by scientists from the US Scripps Institution of Oceanography and CSIRO's Centre for Australian Weather and Climate Research.

The two gases are used in industrial processes, partly as alternatives to other harmful greenhouse and ozone depleting gases.

For example, NF₃ is used in the electronics industry as a replacement for perfluorocarbons (PFCs) and SF₆ is used in structural fumigation applications as a replacement for methyl bromide.

"Currently the level of these gases in the atmosphere is low, but their concentration is growing. In addition, these gases have significant global-warming potential," says CSIRO's *Dr Paul Fraser*. Information about the abundance of these gases in the atmosphere, their growth rates, lifetimes, and emissions is just emerging, he says.

► **More information:** www.csiro.au/news/New-greenhouse-gases-growing.html



It's all in the hormones

A UNSW research review published in *Obesity Reviews* indicates a link between oestrogen and the ability of women to store fat. On average, women have 6-11% more body fat than men and studies suggest oestrogen reduces a woman's ability to burn energy after eating, resulting in more fat being stored around the body. This may prime women for childbearing. "Female puberty and early pregnancy – times of increased oestrogen – could be seen as states of efficient fat storage in preparation for fertility, foetal development and lactation," study author *Associate Professor Anthony O'Sullivan* says. This may have implications for dietary advice

given to women during pregnancy and the design of exercise regimes.

During exercise, women burn off more fat than men yet they lose less body fat, suggesting they are more efficient fat storers at other times. This may have had benefits in evolution. Associate Professor O'Sullivan says additional research is needed to provide more insights into the role of oestrogen in the regulation of body fat. However, he stresses that the impact of oestrogen on fatty acid oxidation after eating cannot explain why some women are obese. The contributing factors to obesity are complex and include both genetic and environmental factors.

► **More information:** *Anthony O'Sullivan*, 9113 2040, 0413 165 562

Winning the unwinnable

Current flu vaccines are directed against a specific subtype of influenza type A virus and cannot cross-protect against a challenge with virus of another subtype. And as the virus subtype changes every flu season the vaccine needs to be constantly updated. In a pandemic with novel subtype variants emerging from a wildlife reservoir such as birds, existing vaccines would be largely ineffective. However, a new discovery by researchers from the University of Melbourne may now provide an important step towards protection against such a threat.

The development boosts Killer T cells, the hit-men of the immune system, as lead author *Associate Professor Stephen Turner* describes it. Killer T cells locate and destroy body cells infected with virus helping us to overcome infections. Current influenza vaccines are poor at inducing killer T cell immunity, Professor Turner says. This is unfortunate as Killer T cells are able to recognise components conserved between different influenza viruses.

By inducing Killer T cells pre-emptively a vaccine could provide some protection from a potential pandemic. This motivated the researchers to add to the vaccine a compound, glycolipid α -galactosylceramide, known to modulate the immune response. Tested in an animal model, this approach resulted in the survival of long-lived populations of 'memory' Killer T cells which the researchers believe could significantly boost protection against different variants of flu virus. "The significance of these findings is that rather than having to design a new vaccine altogether, we can improve current flu vaccines by adding this potent immune modulator," Professor Turner concludes.

► **More information:** *Rebecca Scott*, 03 8344 0181, 0417 164 791

Healthy seaweed

Seaweed extract was found to have a positive effect on the immune system and to reduce inflammation markers in the body, according to a study by Southern Cross University presented at the *International Evidence-based Complementary Medicine Conference* in Armidale.

A research team led by *Professor Stephen Myers*, director of the SCU NatMed research centre, found a formulation containing a blend of extracts from three different species of seaweed (brown algae) plus nutrients primed the immune system in a beneficial way. Professor Myers says preliminary findings warrant further studies to validate this activity.

The seaweed extract is produced by *Marinova*, an Australian biotech company based in Tasmania which specialises in developing medicinal products from marine algae.

► **More information:** *Zoe Satherley*, 66230 3144, 0439 132 095.



Ultrastructural details of an influenza virus particle (virion)

No easy bounty

In April 2008, the [United Nations Commission on the Limits of the Continental Shelf](#) adopted recommendations by the Australian Government for the outer limits of nine of the ten areas of Australia's extended continental shelf. This confirmed Australia's entitlement to exploit some 2.56 million square kilometres of extended continental shelf, which equals around a third of the land mass of continental Australia.

Many commentators have since noted the enormous resource potential of these seabed areas, which contain a cornucopia of non living resources, most notably seabed oil and gas. There are also many valuable living resources, often attractive for exploitation because of the relatively shallow depths of many parts of the extended continental shelf. In addition, significant marine genetic resources have been discovered with proven medical, pharmaceutical and industrial benefits, some of which already support a thriving international bio-prospecting industry. Further additions to the catalogue of resources can be expected as scientists are still in the process of researching outer continental shelf areas.

However, international acknowledgment of Australia's claim is only the first step in realising this bounty as Australia and its exploitation contractors will have to grapple with multi-objective management in a complex legal, investment and operating environment.

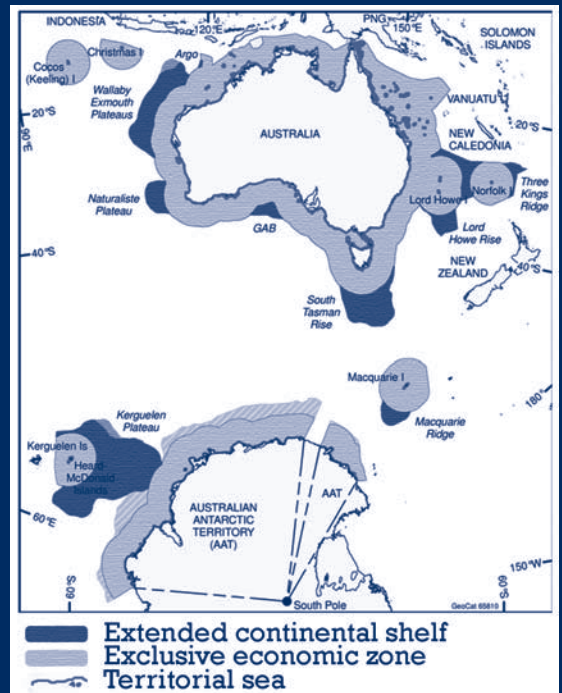
Stretching beyond 200 nautical miles from the coast of Australia and its offshore territories, Australia's extended continental shelf lies far beyond its territorial sea limit of 12 nautical miles and beneath vast tracts of high seas water column. Under international law all States can exercise in the high seas a wide array of freedoms, such as navigating, conducting marine scientific research, laying submarine cables and pipelines and, subject to conservation and management measures imposed by some regional fisheries management organisations, also fishing.

Under the relevant provisions of the [1982 United Nations Convention on the Law of the Sea \(LOSC\)](#), Australia's exploitation of the extended continental shelf must not infringe or interfere with the rights enjoyed by the global community in these areas.

The siting of installations to drill for hydrocarbons or mine seabed minerals on the extended continental shelf will therefore need to observe the established shipping routes in the area, the location of submarine cables and pipelines and the existence of equipment related to marine scientific research on the seabed. The potential for protracted disputes arising between Australia and other States with multiple interests in the water column above Australian exploitation sites will have to be factored into investment decisions. In addition, investors in such activities face the prospect of some of their profits being surrendered because, after the first five years, Australia is obliged to make annual payments or contributions in kind for all production at an extended continental shelf.

Under the LOSC, these payments, which are to be made to the International Seabed Authority (ISA), will be distributed to countries which have ratified LOSC, taking into account the interests and needs of developing States. The proportion of profits to be remitted to the ISA is not inconsiderable, commencing at 1% of the value or volume of production at the site in the sixth year of production and increasing by 1% for each subsequent year until the twelfth year of production and remaining at 7% in subsequent years.

There are significant logistical and security challenges involved in establishing and protecting exploitation activities on the extended continental shelf. Offshore installations located in remote outer



NEW MAP OF AUSTRALIA

continental shelf areas could be vulnerable to terrorist attack as well as the severe weather events that are predicted in connection with climate change. Illegal exploitation of the outer continental shelf by foreigners is a real threat. It will be necessary to conduct more surveillance and enforcement patrols. Australia has limited resources to conduct comprehensive surveillance and monitoring of its exclusive economic zone out to 200 nautical miles let alone scanning activities occurring beyond it.

Experience garnered from enforcing Australia's fisheries legislation in waters surrounding remote offshore territories such as Heard and McDonald Islands, where two foreign vessels suspected of illegal fishing were only apprehended after lengthy hot pursuits across thousands of miles of ocean, foreshadows some of the jurisdictional dilemmas and practical difficulties which may be encountered by maritime enforcement units. In addition, the extended continental shelf areas around Heard and McDonald Islands fall within the Antarctic Treaty area and contractors in these areas will be subject to the stringent environmental protection provisions of the Antarctic Treaty regime. Distinguishing between legitimate marine scientific research activities conducted from foreign vessels on Australia's extended continental shelf and illegal foreign bio-prospecting for marine genetic resources will be an ongoing enforcement challenge because the two activities are closely intertwined.

Other global governance imperatives related to the protection of the high seas marine environment are relevant to outer continental shelf areas. The international community has been discussing the conservation of high seas biodiversity in the United Nations and considering a range of options for more effective biodiversity conservation. These include developing environmental impact assessment guidelines for all activities occurring in high seas areas and establishing high seas marine protected areas. The introduction of high seas biodiversity conservation measures in outer continental shelf areas may constrain resource exploitation. Policy makers, scientists and industry players eager to explore and take advantage of potential resource bounties offered by Australia's extended continental shelf will have to come terms with operating in this complex, dynamic and multi-faceted environment influenced by many national and international factors.

Dr Antony Della-Porta

MANAGING DIRECTOR, BIOSECURITY AND BIOCONTAINMENT INTERNATIONAL CONSULTANTS (BIOZIC)

It's in our interest: live FMD virus import

C SIRO's [Australian Animal Health Laboratory](#) (AAHL) opened on 1 April 1984 after intensive debate on whether it should be able to handle [live foot-and-mouth disease virus](#) (FMDV). Its construction was based on an extensive evaluation of the design strengths and weaknesses of overseas biocontainment facilities. The massive building is probably still the most secure biocontained laboratory structure in the world, built to handle extensive evaluation of FMDV vaccines in cattle and pigs for use if there was an outbreak of FMD in Australia. This most severe challenge would release enormous quantities of virus by the animals. Yet nearly 25 years later live FMDV is still not being handled at AAHL.

In 1983, a [review](#) by Professor Frank Fenner recommended not to allow the importation of the virus but to review the case after 5 years of operation of AAHL. That has now stretched out to more like 25 years. It is a positive step forward that the Beale Report "[One biosecurity – a working partnership](#)" has now recommended to permit such import.

In its Recommendation 59 the Beale report states:

"The import of positive control samples (including foot and mouth disease virus) for use in laboratory diagnostic research and capability building for exotic disease pathogens is vital and should be permitted under strict import permit conditions to laboratories such as the Australian Animal Health Laboratory."

Recently, [Minister Tony Burke](#) has suggested that an import may only be warranted in the case of a disease outbreak. However, this seems to defeat the very purpose of having live virus, which are needed for positive controls to verify new diagnostic technologies before the outbreak occurs. Are we to wait until the Australian livestock industries are seriously damaged and our export trade in animal products in free fall before live virus is imported?

One might suspect that the Government is unwilling to allow importation of live FMDV because it fears a backlash from the Australian farming community.

The main argument against importation of live FMDV into AAHL is that it could escape and cause an outbreak of foot-and-mouth disease. So what are the risks of this happening and how are these handled?

In the first possible scenario, the virus could escape from the laboratory through either the air handling system, through the sewage treatment plant or leak out through the building. In 2007, the virus did probably escape in [Pirbright, UK](#), through broken ceramic sewage pipes and caused an outbreak of foot-and-mouth disease in the UK. However, the pipes dated back to 1926, had not been properly maintained and were outside the biocontainment area. By comparison, at AAHL the sewage treatment plant is within the biocontainment area, is properly maintained and the function of the treatment plant and work practices are reviewed twice yearly by an external independent committee, the AAHL Security Assessment Group (ASAG), which has a member of the National Farmers Federation as a representative. The high efficiency particulate air (HEPA) filter system at AAHL is also within the biocontainment area and again regularly tested and then reviewed by ASAG.

Indeed, AAHL is one of the most air tight biocontainment facilities in the world and has been subjected to leakage tests in line with AS/NZS2243.3 and been shown to far exceed the requirements of this

standard. Further, AAHL is located in Geelong and in a zone free of animals susceptible to foot-and-mouth disease.

In a second possible scenario, the staff will take the virus out and infect animals. This scenario assumes staff carry FMDV by either being contaminated or infected. However, the virus does not infect humans, although it can be transmitted on clothing and carried in the nose for up to 24 hours after exposure.

AAHL staff change their clothes before entering the laboratory and then remove their laboratory clothes before exiting through a body shower. They are subjected to quarantine rules prohibiting them from keeping animals that can get foot-and mouth disease and contact with such animals for a proscribed time sufficient to ensure that they can no longer carry infectious virus.

What is the experience overseas? We have laboratories in Winnipeg in Canada, Lleystad in the Netherlands, Tubingen in Germany and many others safely handling the virus on the mainland. They have operated safely with far less biocontainment and security oversight than AAHL.

The question may be asked, do we still suffer 'colonial cringe' in believing we cannot have a facility that can contain the live virus?

The advantages for having live positive controls are that it provides the opportunity to develop and validate new diagnostic technology such as micro-array technology which could identify the type and sub-type of the FMDV. It also provides a clear indication of appropriate vaccines if required and the opportunity to develop new vaccine technology such as virus-like particles or carrier virus technology which does not contain the complete virus genome.

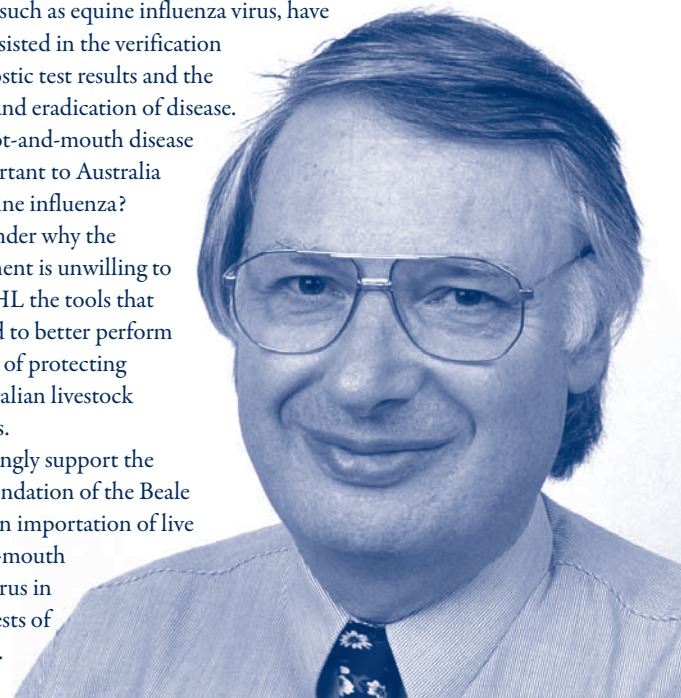
At present the vaccines are based on killed-virus vaccines as formalin-inactivated vaccines have previously been found to contain live virus

and cause outbreaks of foot-and-mouth disease. Possession of live virus controls, such as equine influenza virus, have greatly assisted in the verification of diagnostic test results and the control, and eradication of disease.

Is foot-and-mouth disease less important to Australia than equine influenza? I just wonder why the Government is unwilling to give AAHL the tools that they need to better perform their role of protecting the Australian livestock industries.

I strongly support the recommendation of the Beale Review on importation of live foot-and-mouth disease virus in the interests of Australia.

The question may be asked, do we still suffer 'colonial cringe' in believing we cannot have a facility that can contain the live virus?



The power of synergies in research

In the current global financial crisis, governments are likely to consider re-prioritising funding for public science. One area that they should avoid cutting is funding for international research collaboration.

Funding for this area is – of course – vitally important, as coordinated research efforts minimize wasteful duplication and maximize benefits of scale, scope and speed, allowing international research collaboration to play a key role in addressing major challenges such as climate change and energy security. Governments are aware that international research cooperation tends to be more frequently cited (i.e. is more ‘productive’) than average and often addresses major global challenges to which governments themselves seek coordinated responses via diplomatic channels. Consequently, funding cuts may selectively impact on less competitive areas – the ‘slack’ in the system.

Partly because of the previous point, international collaboration is increasingly treated as being part of the core mission of research rather than a footnote to it (for example, recent changes made by the Australian Government to ARC, CSIRO, and CRC program funding). Institutions with concentrated excellence-driven research funding (provided it is concentrated on the basis of excellence) are well positioned to fund collaboration with international peers as part of the ‘core business’ of doing their research. In many areas of research there is tremendous potential to link, and therefore exploit, the synergies between existing research programmes. Indeed, the research proposals that score well in peer-review funding allocation mechanisms frequently contain an international collaboration dimension.

Since the early 1970s and for obvious political reasons, Europe has led the way with **COST Actions** – mechanisms for exploiting useful synergies between existing national research projects (see www.cost.esf.org). The idea behind COST Actions is to fund the additional transaction costs associated with researchers coordinating their research, sharing results and developing generic tools and methods (such as formal standards) that have collective benefits. Particularly during times of budget cutbacks, these research coordination and synergy-based ‘actions’, with their potential to leverage the research we are already funding, and to do this internationally, are a useful model for sustaining international research collaboration. In other words, funding the international coordination transaction costs is a cost-effective leverage mechanism.

The low risk strategy for researchers seeking to sustain international collaboration during the global financial crisis is to prosecute a two-pronged approach of: a) treating international cooperation as integral to research rather than an optional extra (i.e. absorbing the transaction costs internally); whilst also b) seeking to develop effective multilateral mechanisms for linking together and exploiting the synergies between existing research programmes in different nations.

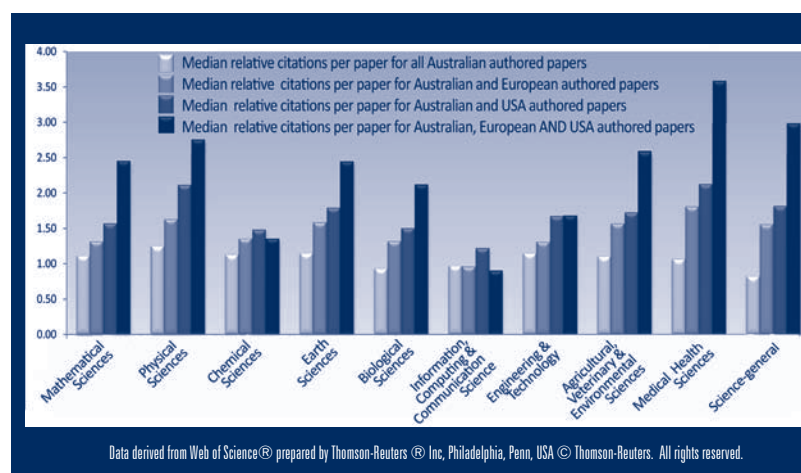
These approaches are not new, they are already well-established best practice for effective research teams - they provide a basis for ‘self-reliant’ approaches to international research collaboration. By mainstreaming international collaboration in the core business of research in this way, without the necessity of accessing (always limited) dedicated funding for international collaboration, a sustainable operating model is possible.

For Australian researchers, a major advantage of this approach is

that as potential partners they are of lower risk for prospective overseas collaborators. There is (by intent) no need to rely on additional targeted external funding to actually collaborate internationally, which avoids familiar pitfalls experienced when relying on (hard to get) additional funding. This is a particular advantage in collaborations with researchers in the EU’s **Seventh Framework Programme** (FP7) because Australian participation in FP7 is hard for those that rely on dedicated external funding. An additional advantage is that leveraging existing research via international cooperation allows assessing and learning how to manage the particular types of risk faced in such collaborative work. This in turn places Australian researchers in a better position to make the best use of any additional dedicated funding that may become available to support international collaboration in the future – based upon a demonstrated track record of success.

Not surprisingly, this self-reliant model is already well-established. It means that statistics on the funding allocated by governments to support international research cooperation by no means reflect the real importance of research cooperation - just the tip of the iceberg. Partly for this reason FEAST has started to map patterns of international research collaboration by tracking the incidence of internationally co-authored publications. The first of FEAST’s Discussion Papers examining these issues has just been released, and is free to download.*

The initial results of this mapping work (using Thomson-Reuters citation data) indicate that whilst bilateral collaboration between Australia located and Europe located authors is associated with improved citation rates, in most research fields multilateral collaboration that also includes US based researchers is associated with even better citation performance. This can be grasped in the figure below.



This pattern applies to most research fields (note, however, that results for Information, Computing and Communication Science are not robust because these areas are not well covered by this data source).

Perhaps it is time to look into designing innovative new multilateral mechanisms for coordinating and exploiting the synergies between existing research - worldwide. Whilst the cooperation architecture and associated governance challenges would be significant, the ability to sustain international research cooperation in key thematic areas during the financial crisis is a pretty useful outcome.

* www.feast.org/document.php?ID=1

Not forgotten

Alzheimer's research is the focus of two new initiatives in Western Australia.

In the first, **Edith Cowan University (ECU)** and pharmaceutical company **Alzhyne Limited** will together move new ECU research developments in the diagnosis and treatment of Alzheimer's disease into commercialisation. Under a license and option agreement, Alzhyne will have the first option to license new intellectual property resulting from the research. Alzhyne will also have the option to fund new projects on a commercial basis, either exclusively or in partnership with ECU.

In a second development, elderly couple **Ron and Peggy Bell** have donated \$100,000 for a new fellowship at the **University of Western Australia (UWA)** to study Alzheimer's disease. The inaugural Bell Research Fellow, **Mandy Vidovich**, will work in the university's **Centre for Health and Ageing** clarifying the interaction between genetic makeup, lifestyle and memory.

► [More information: ECU, 08 6304 2288; UWA, 08 9224 2855](#)



G'day sunshine

Leading international supplier for the solar power industry, Germany's **Roth & Rau AG**, will set up a silicon solar cell production line at the **University of New South Wales (UNSW)**. The pilot line will be the backbone of the \$20 million **UNSW Solar Industrial Research Facility (SIRF)**, the first solar research and development facility of its kind in Australia. It will be an industrial-grade manufacturing facility for the development of UNSW's silicon solar cell technologies from laboratory processes to factory-ready industrial processes.

► [More information: Peter Trute 02 9385 1933, p.trute@unsw.edu.au](#)

Risky focus

Queensland Health and **Bond University** have created a **Population Health and Neuroimmunology Unit (PHANU)**, one of a very few of its kind, to conduct studies into autoimmunity and neuroimmunology within the context of population health. This follows a recent WHO report, *The Global Burden of Disease*, and a directive to the international health community to prioritise research, illness prevention and diagnostic tools that address the growing prevalence of mental and neurological disorders within communities world-wide.

The PHANU will focus on 'at risk' population groups for the development of illness prevention and form part of **Queensland Health's** Population Health Plan for 2007 through 2012.

► [More information: Vivienne Dye, 07 5595 1116, vdye@bond.edu.au](#)

Everyone's a scientist

High profile projects such as *Operation Possum* and *Operation Bluetongue* are examples of large scale projects that can be successfully conducted through a partnership between scientists, the general community, media organisations and other research institutions. This approach enables researchers to undertake projects that could not be resourced by the usual avenues of funding. Citizen-Science will also be a driving



force of projects at the new **Barbara Hardy Centre for Sustainable Urban Environments** launched at the **University of South Australia**. The projects will focus on the role and interactions between the natural environment and the structure, nature and composition of human communities, says the director of the centre, **Professor Chris Daniels**.

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

Massive investment

RMIT University has unveiled plans for its \$200 million 10-storey Swanston academic building development at the northern end of Melbourne's CBD. The building is the centrepiece of the university's \$500 million investment into the **RMIT Quarter** of the CBD and will include innovative teaching and learning spaces. The 34,350 square metre building is RMIT's biggest ever investment in an academic building and will also house the university's **College of Business**.

RMIT's \$500 million capital works program will create at least 2,000 jobs over the next five years, including 800 at the Swanston academic building and 200 at the nearby Design Hub.

Construction on the Swanston building will begin in August.

► [More information: www.rmit.com.au](#)

SMaRT start

The **University of New South Wales** has launched its new **Centre for Sustainable Materials Research and Technology, SMaRT@UNSW**, which



brings together researchers from the Faculties of Science, Engineering, Built Environment and the **Australian Defence Force Academy** to work with industry on the development of innovative, sustainable materials and manufacturing processes.

Centre director **Scientia Professor Veena Sabajwalla** says SMaRT Centre has twin goals of delivering environmental and economic benefits. A flagship technology of the centre is a process invented by **Professor Sabajwalla** and developed together with steelmaking giant, **OneSteel**.

The polymer injection technology takes used car tyres as an energy and emissions-saving substitute for coking coal in electric arc furnace steelmaking. Following successful trials at mills in NSW and Victoria, OneSteel is now trialling the technology at a plant in the United States.

► [More information: Bob Beale, 0411 705 435, bbeale@science.unsw.edu.au](#)

Feasible money

The **Australian Government** has committed \$2 million for a feasibility study into the creation of a new national university based in regional Australia as has been jointly proposed by Charles Sturt University and Southern Cross University. It will be undertaken by external consultants and is to be completed in three stages.

A first 'needs' stage will examine the role of regional universities in meeting local and national labour force needs; assess the future demand for distance education; and identify gaps in the current arrangement and resourcing of institutions in meeting these needs. The second 'modelling' stage will examine options for meeting future needs - in particular the formation of a new national university. If the establishment of a new national university, or possible alternatives are found to better meet the needs identified in stage 1, a detailed analysis will be undertaken to prepare recommendations for achieving this goal.

► [More information: Bruce Andrews, 02 63386084](#)

Defence fast lane

Four defence technology projects will be fast-tracked and receive a total of \$13 million through the Capability and Technology Demonstrator (CTD) Extension Program, which is managed by the **Defence Science & Technology Organisation (DSTO)**. The projects were selected on the basis of initial trials and Defence priorities and include:

- A missile detection system by **Avalon Systems Pty Ltd**. The technology will be further developed for land and sea trials.
- A high-definition, real-time vision system for unmanned aerial vehicles developed by **Sentient Pty Ltd**, which tracks small moving targets on the ground. The extension project will be used for surveillance of the maritime environment, and will enhance the onboard autonomous systems of the air vehicle.
- A system from **GKN Aerospace** that reduces the infrared emissions from engines in Australian Defence Force aircraft and helicopters. The extension project will enable full-scale development and testing of the prototype.
- An intelligent robot developed by **Deakin University** that allows remote operators to 'feel' a physical environment and to render an explosive device safe without damage to people or property. The project will refine the operational capabilities of the robotic system.



► **More information:** Kate Sieper (Warren Snowdon): 02 6277 7620, 0488 484 689

Anti-mitotic potential

By screening synthetic molecules and natural extracts using high-content imaging and computational analyses, cancer researchers at Perth-based company **BioPharmica Limited** have discovered a new class of potential anti-cancer drugs which potentially inhibit cell proliferation, resulting in the killing of all human cancer cell lines tested to date. The induction of cancer cell death is due to an anti-mitotic activity which does not affect the microtubule cytoskeleton in interphase cells, but perturbs the function of the mitotic spindle, thereby selectively linking cell division with cell death.

According to BioPharmica, an anti-mitotic lead compound identified by its researchers shows the potential to have a pronounced impact on cancer treatments and outcomes and the company says that there is opportunity for a drug development company to participate in this lead compound development program.

► **More information:** Mr David Breeze, 08 9328 8366

Targeted delivery

pSivida's lead product, BrachySil™, is based on a radioactive 32-phosphorus form of BioSilicon™, which can be directly delivered into the tumor via a fine gauge needle and guided by ultrasound or CT. The company has now announced completion of patient enrolment in a BrachySil™ dose ranging clinical trial for pancreatic cancer, which is currently conducted in the UK at the **Guy's and St Thomas' NHS Foundation Trust**, London, and the **University Hospital**, Birmingham. The trial will assess the safety of escalating radiation doses of the BrachySil™ device. Patient survival and tumor response are secondary end points.

The study follows a safety study of BrachySil™ in patients with inoperable pancreatic cancer which had shown BrachySil™ in combination with standard chemotherapy (gemcitabine) was well tolerated with no

clinically significant adverse events related to the device. The data also showed disease control in 82% of patients and an overall median survival of people in the study of 309 days. By comparison, the median survival for these patients following diagnosis is typically less than 178 days with standard chemotherapy.

► **More information:** www.psvida.com/news

Damage reversal

Prana Biotechnology Limited's lead compound for the treatment of Alzheimer's Disease (AD), PBT2, which stems from a library of so called Metal-Protein Attenuating Compounds (MPACs), is in clinical development for its potential to interfere with the toxic mechanisms of AD. In addition, PBT2 is also a suitable candidate for Huntington Disease. Underlying both diseases are toxic interactions of metals and specific protein aggregates, which in the case of AD involves the Abeta protein.

Prana had previously reported that PBT2 reduces this metal protein association thereby reducing the damage to nerve tissue. In a latest development, Prana reports that PBT2 can, in a mouse model, also reverse the actual loss of nerve tissue believed to underlie AD. Encouraged by its potential and the lack of a disease-modifying drug available to patients, chairman **Geoffrey Kempler** says that Prana is continuing discussions with potential partners to accelerate further development of PBT2.

► **More information:** www.pranabio.com/

Clear complexion

Peplin's lead product candidate PEP005 (ingenol mebutate) Gel is now planned to advance to Phase III development after it has shown positive results in a Phase IIb actinic (solar) keratosis (AK) Australian and US trial for lesions on the head. AK is generally considered the most common precancerous skin condition and usually appears as small, rough, scaly areas on the face, lips, ears, back of hands, forearms, scalp or neck.

In the trial, a concentration of 0.015% PEP005 (ingenol mebutate) Gel applied once daily for three consecutive days did result in a median reduction in overall lesion count of 84.5%, a total clearance rate in the intent to treat population equal to 50.0% and a partial clearance rate of 71.9%. Peplin plans to use this dosing regimen in Phase III clinical trials for patients with AK lesions on the head in the second quarter of 2009.

According to chairman and chief executive officer **Tom Wiggans**, there is no current product on the market that offers a short course of therapy as well as proven safety and efficacy for both head and non-head lesions.

► **More information:** www.peplin.com/

Safe flavonoid

Triphenliol stems from a pipeline of synthetic drugs which were created by **Novogen Limited's** scientists based on plant isoflavonoids, a family of plant chemicals found to restore normal cell-death mechanisms in cancer cells. Triphenliol is currently in clinical development as a biliary cancer therapeutic, and Novogen's subsidiary, **Marshall Edwards, Inc.**, has now presented data at the *Annual Meeting of the American Association for Cancer Research* showing that it has an acceptable toxicity profile in animals.

A number of preclinical studies were performed to support an Investigative New Drug (IND) application to undertake clinical studies

with triphenolol as a chemosensitizing agent in combination with gemcitabine. Approval of the IND was granted by the **US FDA** in January 2009. In summarising the results of these studies, the data presented in the conference abstract show that *in vitro* triphenolol is non-mutagenic in the bacterial reverse mutation assay (Ames test) and non-clastogenic in the mouse erythrocyte micronucleus assay. Further, studies in animals not only indicated acceptable pharmacokinetics, but also no accumulation of triphenolol when administered to animals in repeated doses.

According to **Professor Alan Husband**, group director of Research at Marshall Edwards, the data provide a strong foundation for further clinical development of triphenolol. There is an urgent need for new pancreatic cancer treatments because fewer than 20% of patients are candidates for surgery (pancrectomy). Current treatment is limited to chemotherapy with gemcitabine, to which most patients are resistant or acquire resistance.

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

Apoptotic news

A **Novogen Limited** synthetic isoflavonoid compound, NV-128, has induced cell death in Ovarian Cancer Stem Cells (OCSCs) in a dose-dependent manner, the company has announced.

Ovarian cancer stem cells usually survive conventional chemotherapy and are considered to be the potential source of recurrence. NV-128, however, appears to promote cell death in these cancer stem cells through inhibition of the so called mTOR pathway by inducing specifically the dephosphorylation of mTOR, a serine/threonine protein kinase that regulates cell growth, proliferation, motility and survival. The findings potentially provide a new avenue for treating ovarian cancer patients resistant to chemotherapy.

Professor Gil Mor and his team at **Yale University** have recently identified and characterised a CD44+ epithelial ovarian cancer stem cells and demonstrated that in these cells the mTOR survival pathway is up-regulated. In the epithelial ovarian cancer cell lines, NV-128 caused substantial cell death in mice engrafted with human ovarian cancers, resulting in reduced tumour growth. Importantly, this effect was achieved without apparent toxicity.

In this study, the isoflavonoid had a dramatic effect on the growth and differentiation of CD44+ ovarian cancer stem cells. CD44+ ovarian cancer stem cells were treated with increasing concentrations of NV-128 and positive results were observed as early as 15 minutes post-treatment. In addition, NV-128 prevented ovarian cancer stem cell differentiation in the Matrigel differentiation system.

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

How long is sex safe?

Starpharma Holdings Limited's VivaGel®, a topical microbicide in development for the prevention of HIV and HSV-2, is currently in a clinical trial to explore the length of time the antiviral activity of VivaGel remains following vaginal application. This is to determine how long before sex VivaGel® could be applied to prevent infection. According to Starpharma, the trial in 12 healthy women has now completed patient testing. The study will measure the level of antiviral activity retained by VivaGel® after vaginal administration. For this purpose, vaginal samples have been collected from each study participant, up to 24 hours after five separate VivaGel® applications, and these samples are now being analysed for anti-HIV and anti-HSV-2 (genital herpes) activity.

Preliminary findings indicate that the gel was well tolerated by the women. This is in line with results from three other completed studies – two in women and one in men – showing the gel to be safe and well tolerated. Full trial results will be available following complete analysis of the laboratory samples and study data, expected within approximately two months.

► **More information:** www.starpharma.com/

Men maker

As **Acrux's** treatment for testosterone deficiency, or hypogonadism, in men moves closer to market, 'Testosterone MD-Lotion®' has now been replaced by the commercial brand name AXIRON™.

Acrux undertakes currently a Phase III trial with AXIRON™ for which enrolment has been completed. Sixty of the 150 enrolled hypogonadal men have already finished treatment and results from the trial are expected in the third quarter of 2009. Feedback from trial subjects and physicians on the use of AXIRON™ to date has been positive and the rate of compliance and acceptance with the treatment has been high.

Acrux plans to submit a marketing application to the **US FDA** in December 2009. If approved, AXIRON™ is expected to enter in early 2011 the testosterone therapy market which grew globally in the year to March 2008 by 20% to approximately \$0.9 billion, with testosterone gels comprising \$0.6 billion.

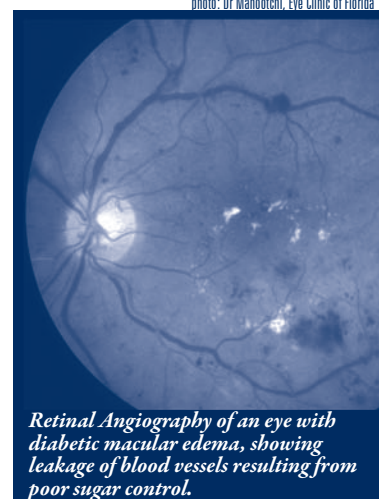
The commercial manufacturing arrangements for AXIRON™ are a key part of the marketing applications to regulatory authorities. In parallel with the Phase III trial, Acrux has been actively transferring the manufacturing process to **Orion Corporation** in Europe, which will be the exclusive source of supply for AXIRON™. The transfer and scale-up of the process has been completed and Orion is preparing for manufacture of registration batches.

► **More information:** www.acrux.com.au/IRM/content/default.html

An eye full of data

pSivida's Iluvien - formerly known as Medidur™ FA – is an intravitreal insert being developed for the treatment of diabetic macular edema (DME). The miniaturized injectable device delivers Fluocinolone acetonide (FA) into the vitreous of the eye after being inserted into a patient's eye with a 25-gauge needle.

Running concurrently with a Phase III FAME Study (Fluocinolone Acetonide in Diabetic Macular Edema), pSivida's licensing partner **Alimera Sciences** is conducting a 36-month, open-label, Phase II study which is to assess the systemic exposure of the corticosteroid, fluocinolone acetonide (FA) in DME patients treated with Iluvien. Secondly, the PK Study is to provide information on the safety and efficacy of Iluvien in a DME patient population. The study is conducted with 37 patients, of which 20 patients are on a low dose, and 17 patients on a high dose of Iluvien. Interim results after 12-months showed in low dose patients no adverse events related to intraocular pressure (IOP). Of the high dose patients, 23.5% experienced IOP increases of 30mm of



Retinal Angiography of an eye with diabetic macular edema, showing leakage of blood vessels resulting from poor sugar control.

photo: Dr Mahootchi, Eye Clinic of Florida

mercury (mmHg) or greater at some time point and one of those patients required surgery to address their elevated IOP. This compares positively to clinical data with patients using Retisert, an intravitreal drug delivery device containing 0.59 mg FA and approved for treatment of chronic non-infectious posterior uveitis. These data show 35% of patients treated with Retisert experienced IOP increases of 30 mm HG or greater during the first year.

Both dosages of Illuvien showed similar efficacy to Retisert in a subgroup of patients with the same visual acuity inclusion criteria as the larger Phase III FAME trial.

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

Psoriasis news

Arana Therapeutics Limited has announced positive results from its Phase II trial of ART621 in patients with stable plaque psoriasis. The primary endpoint was met with repeat doses of ART621 being well tolerated and exhibiting a safety profile consistent with anti-TNF activity, the method of administration and the underlying study population. Arana will continue clinical development of ART621 with two ongoing Phase II trials for rheumatoid arthritis (RA) in combination with methotrexate.

Secondary findings from the study provided insight into the efficacy, immunogenicity and pharmacokinetics of ART621. While the study was not designed to demonstrate efficacy, evidence of some anti-TNF activity was seen as four subjects in the ART621 group compared to none in the placebo group achieved a 50% reduction in Psoriasis Area and Severity Index (PASI) score at week 12. One of these ART621 subjects also achieved a 90% PASI reduction.

No human anti-ART621 antibody responses were detected for up to four weeks after the last injection, suggesting inherently low immunogenicity of the drug. Consistent with prior Phase I data, ART621 exhibited a half life of approximately 14 days.

► [More information: www.arana.com/news_media.htm](http://www.arana.com/news_media.htm)

Collaboration validation

Phylogica Limited has reported on a successful collaboration with the Cambridge Molecular Therapeutics Programme (CMTP) at the prestigious **MRC Hutchison Institute**. The collaboration involved the testing of selected Phylogica's Phylomer® libraries against a biological pathway involved in cancer using an in-house screening systems at Hutchison Institute. According to Phylogica, multiple peptides from a small sample of the Phylomer® library blocked this pathway, providing a valuable third party validation of the Phylomer® libraries.

According to Phylogica's executive director **Dr Doug Wilson**, the best binding Phylomer® peptides will be used as signposts for their targets in the cancer cell and this could lead to new chemical drugs. Further, the Phylomer® peptides will be tested in their own right for their potential as anti-cancer drugs and these options are currently subject of commercial discussions between Phylogica and the Hutchison.

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

Hardening patent

A key patent, focussed on the injectable grades of NovoSorb™, has been granted in Australia to **PolyNovo Biomaterials Pty Ltd**, a company 60% owned by **Metabolic Pharmaceuticals Limited**.

NovoSorb™ was invented within the **CSIRO** and is a new classification

of biodegradable polymer largely based on known and clinically accepted building blocks. NovoSorb™ is potentially useful in surgical situations, such as bone defects or joining soft tissue, and could improve the way in which certain injuries are treated. For example, certain grades of polymers can be manufactured as an injectable two part liquid system. Combined injected, the polymer then hardens to reach the desired final properties for the relevant surgical application. After having served its function in the human body it degrades harmlessly.

This patent is also pending in a number of other jurisdictions with further grants expected in the coming months, giving PolyNovo a strong global position on the NovoSorb™ technology.

The Australian patent number is 2003281481 and is due to expire on 23 July 2023.

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

Beating resistance

Avexa's Apricitabine (ATC) is currently in a Phase III trial with HIV patients that have acquired nucleoside reverse transcriptase inhibitor (NRTI) resistance. The company has announced that the last patient enrolled in the initial two dose phase of the trial has passed the week 16 time point. This triggers the start of the data analysis for the week 16 results, which are expected to be announced in the second quarter of 2009.

Avexa had previously reported the completion of recruitment of eligible patients for this phase of the AVX-301 trial on 24 November 2008. Patients who have passed the week 16 time point continue in the 48-week trial, which has a primary endpoint at week 24.

The company has further announced positive data from its Phase IIb clinical trial of ACT, which found no signature resistance after 96 weeks of treatment. Over 85% of patients continue to have HIV below detectable levels and all 39 patients continue to receive treatment. In addition, patients' CD4 cells increased in number over the 96 weeks.

► [More information: www.avexa.com.au/news/press_releases_2009](http://www.avexa.com.au/news/press_releases_2009)

Patently anti-inflammatory

Arana Therapeutics Ltd has been awarded patents by the **Australian Patent Office** for its PMX53 and related compounds. These small cyclic peptides are potentially useful in a range of inflammatory conditions, such as age related macular degeneration (AMD) and osteoarthritis.

Australian patent, No. 2002336783 covers PMX53 and a range of related compounds as G protein coupled receptor antagonists, including the C5a receptor antagonists. Australian patent number 2003269609 covers the use of such compounds in osteoarthritis. The patent terms run until 2022 and 2023 respectively.

PMX53 has demonstrated activity in various non-ocular disease models, says **Steffen Nock**, acting chief executive officer. "The approval of these patents strengthens our PMX portfolio which we are seeking to out-license," he says.

► [More information: www.arana.com/news_media.htm](http://www.arana.com/news_media.htm)

Cardiac arrest

Ventricor Limited has been placed into Voluntary Administration after the company has not been able to attract sufficient capital to fund its operations through to 30 June 2009.

Over 130 potential investors in Australia, US and Europe were approached over a period of more than a year. In addition, a share purchase

plan offer was made to shareholders, but did not attract sufficient capital. In its 11 December 2008 announcement, the company sought expressions of interest from parties wishing to acquire the company or take a strategic stake, and over 50 organisations were approached. On 27 February 2009 the company reported that discussions were continuing with two parties but that any potential transaction structure would require short term funding in the form of a private placement or bridging facility.

A non-binding proposal has been received recently for an asset purchase. However, as that proposal does not contemplate short term funding, the Board has decided to place the company in voluntary administration and consequently it will be open to the administrator to consider this proposal. The company has appointed *Mr Steven Sherman* and *Mr John Gothard* of **Ferrier Hodgson** to act as administrators.

These developments were in spite of successful clinical trials with the VentrAssist® Left Ventricular Assist Device (LVAD). Interim analysis of its recently completed US Bridge Transplant (BTT) trial found 85% of patients were transplanted or alive or on support at 6 months and 82% at 12 months. On review of the results, the **Data and Safety Monitoring Board** concluded that the performance goal had been met and that adverse event rates were consistent with published rates for similar populations and devices.

The VentrAssist LVAD model LVA3 continues to be implanted worldwide and modest sales continue. The company says there are more patients implanted with the VentrAssist third generation centrifugal LVAD than all other centrifugal pumps from all other manufacturers, combined.

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

Oz IT for Thais and Libyans

IBA Health Group Limited's Middle East and Africa division won a two-year deal to implement an **iSOFT** hospital information system and a **LabCentre** solution at **Al Khadra Hospital** in Tripoli, Libya. The agreement is worth \$1.4 million.

iSOFT's eHIS solution will be implemented at Al Khadra private hospital in two phases in partnership with **Alshada Pharmaceutical & Medical Equipment** in Tripoli. eHIS will provide point-of-care access to patient medical records to inform clinical decisions. Integrated with the iSOFT LabCentre laboratory information system, clinical staff can request pathology tests and review and analyse results online.

IBA's subsidiary **iSOFT Thailand** has completed the first phase of a \$8.4 million project to replace 10 legacy hospital information systems at **Siriraj Hospital**. The hospital is Thailand's largest and one of the biggest in Southeast Asia.

In the first phase, iSOFT installed a master patient administration index, and also implemented a blood bank module, which manages blood donations, tests specimens and tracks stocks. In subsequent phases, new clinical and patient management systems for inpatient and outpatient care will be installed.

The Thai language version of iSOFT's eHIS application will be used by 10,000 healthcare providers, including 6,000 nurses, and includes new billing and insurance modules for improved cost control.

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

Big buy

Stem Cell Sciences plc has entered into a definitive agreement with **StemCells, Inc.**, a publicly traded Delaware corporation, for the sale of

the Trading Subsidiaries of the company and certain ancillary agreements, assets, properties and rights for a maximum total consideration of approximately US\$4,849,000.

StemCells, which is focussed on the discovery and development of tissue-derived cellular products for therapeutic uses, will acquire the operating subsidiaries and certain related assets of Stem Cell Sciences (SCS) for 2,650,000 shares of StemCells common stock and approximately \$715,000 of waived loan entitlements.

Members of the SCS Board and other significant stockholders representing over 30% of the SCS shares outstanding have irrevocably agreed to vote in favour of the transaction. Approval by StemCells' stockholders is not required.

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

Pounding contract

NeuroDiscovery Ltd subsidiary **NeuroSolutions Ltd** has entered into a specialist services agreement with a major international pharmaceutical company. The contract is valued at approximately £250,000 (approximately A\$540,000) and is expected to take around 12 months to complete. Under the terms of the agreement, NeuroSolutions will use its specialist pharmacology and electrophysiology expertise to evaluate the client's proprietary compounds. For commercially sensitive reasons the name of the client cannot be disclosed.

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

Pluripotent half year

Mesoblast Limited has announced its half-yearly results.

With cash reserves at 31 December 2008 of \$9.6 million, the company remains well funded and continues to progress its lead orthopaedic programs towards Phase III pivotal trials.

Mesoblast's US-based sister company **Angioblast Systems** is also progressing in its non-orthopaedic applications of the stem cell technology platform and a clear portfolio is emerging of allogeneic, or 'off-the-shelf', stem cell-based products for a wide array of clinical indications.

During the reporting period market analysis firm **Frost & Sullivan** has named Mesoblast the 2009 Emerging Company in the US Soft Tissue Repair market and further named its proprietary platform stem cell technology the 2008 US Stem Cell Market Technology Innovation of the Year. In addition, the orthopaedic product development for both bone and cartilage repair/regeneration has progressed, the non-union long bone fracture repair trial concluded positively and the lumbar unilateral spinal fusion trial continues with good safety profile.

The spinal fusion program was expanded to cervical spine in addition to lumbar spine, with preclinical results showing safety and effectiveness of NeoFuse™ for interbody fusion of the cervical spine in the neck. Australian institutional ethics approval was granted to begin the first human trial of Mesoblast's adult stem cell treatment for the prevention of knee osteoarthritis after an acute traumatic knee injury and anterior cruciate ligament reconstruction.

Mesoblast also initiated a broad-based collaborative clinical program with one of Singapore's leading private healthcare providers, **Parkway Group Healthcare Pte Ltd**, a subsidiary of **Parkway Holdings Limited**. Parkway Independent Ethics Committee approved Mesoblast's first registry trial of RepliCart™, its adult stem cell product for patients with knee osteoarthritis.

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

Filling the Mitsubishi gap

In its first round, the new \$40 million **South Australia Innovation and Investment Fund** will provide \$15.4 million for ten project grants ranging from \$366,000 to \$3 million to establish and expand local manufacturing capabilities. The fund was set up by **Australian** and **South Australian** governments in response to the closure of **Mitsubishi's** Tonsley Park assembly plant in March 2008. It includes \$10 million for intensive assistance to retrenched workers and \$30 million to support industry development. The fund is estimated to generate up to 450 jobs and \$67 million in investment. Funded projects include:

- a complex analysis laboratory to service South Australia's growing minerals industry;
- an aerospace and defence component machining facility;
- the production of a bolt-on turbine technology designed to reduce fuel consumption and greenhouse gas emissions in new and existing car and truck fleets.

Applications for the second funding round are open and must be submitted by 29 May 2009.

► **More information:** www.innovation.gov.au, 03 9268 7548.

Sea matters...

Developments in two states will provide investments into Marine science and research.

New South Wales

The **NSW Government** and the **Ian Potter Foundation** will jointly provide \$1.2 million to support the **Sydney Institute of Marine Science** in building a new marine molecular biology lab and to lease a new building to expand its headquarters at Chowder Bay in Mosman.

The institute is the NSW headquarters of the national **Integrated Marine Observing System** which provides information on wave heights, tides and currents as well as collecting data from tracking systems and acoustic receivers for fish and marine mammals.

Research at the institute include a study of sea urchin roe aquaculture for the Japanese sushi market; monitoring pollution and heavy metal contamination in Sydney Harbour using oysters; and tagging and monitoring marine mammal and shark movements.

The centre will also explore the impact and management of climate change on beaches and coastline and examine how marine bacteria and other microbes affect the ecology of the oceans. In addition, it will support undergraduate courses for marine scientists and managers. There are plans for a Masters in Marine Science course targeted for 2010.

South Australia

Stage two of the **Lincoln Marine Science Centre** (LMSC) at Port Lincoln has now opened. The \$6.59 million development is housing around 35 scientists and educational staff.

The centre is part of the Marine Innovation South Australia (MISA) initiative, a partnership between the **South Australian Government**, **Flinders University**, the **South Australian Research and Development**



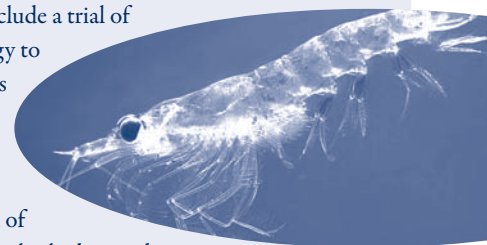
Institute (SARDI), the **University of Adelaide**, the **South Australian Museum** and SA seafood industries. It supports four high priority research areas: seafood product quality and value-adding, aquaculture innovation, ecosystem services and bio-security. Scientists now based at the LMSC have direct access to industry partners and work closely with them to meet industry needs.

► **More information:** (NSW) **Lee Davelaar** 0418 269 508, (SA) www.ministers.sa.gov.au/news.php?id=4513&page=1

...and so do rivers

Research into the Western Australian Swan Canning river system will receive a share in \$146,780 funding through the Swan Canning Research and Innovation Program. Environment Minister **Donna Farragher** says that projects include a trial of high-resolution laser technology to count zooplankton, and studies on the impact of catchment run-off on crustaceans, and on fish health in Claisebrook Cove. The resident population of river bottlenose dolphins will be looked at, and also what triggers certain types of toxic algae. The **Swan River Trust** initiated the collaborative research program in 2007-08 to build scientific understanding of the Swan Canning river system. It draws on the expertise of the **CSIRO** as well as local and interstate universities.

► **More information:** 08 9213 7250



NSW push to cleverness

A new **NSW Fulbright Scholarship** will be jointly funded by the **NSW Government**, which has committed \$250,000, and NSW universities with additional support from companies and individuals. The program will provide students special opportunities to participate in the prestigious **Fulbright Program** operating in over 150 countries. Applications for the scholarships, valued at \$50,000, are to be invited in June this year. The winner will be a postgraduate or postdoctoral student whose project is judged to have greatest potential benefit for NSW.

The NSW Premier, **Nathan Rees**, has further announced an annual forum between the **NSW Government**, university vice-chancellors and business leaders to identify priority areas for research, business and education. He expressed commitment to explore the potential of educational institutions, businesses and industry to become more competitive on an international scale. Minister for Education **Verity Firth** says the Government will also help NSW universities actively pursue Commonwealth funding in meetings with each university prior to their funding discussions with the **Australian Government**.

► **More information:** www.osmr.nsw.gov.au/

Millennium act

The **NSW Government** will provide an additional \$30 million towards a new building for the **Westmead Millennium Institute**. The new facility will bring together all of the Westmead Millennium Institute into one location. The proposed development, which will house high technology

centres in genomics, proteomics, cell imaging and flow cytometry, is expected to become operational in 2012.

The NSW Government is also supporting Westmead Millennium's application to the **Commonwealth Health and Hospitals Fund** for further funding towards the development of the new Westmead Millennium Institute building.

► [More information](#): Lee Davelaar 0418 269 508

Cancer money

Victorian cancer researchers and institutions will receive research grants of up to \$900,000 totalling \$6.8 million in funding through the **Victorian Cancer Agency**. Recipients include:

- **Dr Carl Walkley, St Vincent's Institute**, for identifying new approaches to understanding and treating osteosarcoma;
- **Dr Kara Britt, Monash Institute of Medical Research**, for investigating the influence of estrogen on mammary epithelial stem cell numbers and how this relates to breast cancer risk;
- **Dr Meaghan Wall, Peter MacCallum Cancer Centre**, for studies into myelodysplastic syndromes involving the molecular characterisation and investigation of novel therapies;
- **Associated Professor Andrew Roberts, Walter & Eliza Hall Institute**, for translational research in haematology.

► [More information](#): www.premier.vic.gov.au/minister-for-health/

Island chief wanted

The **Tasmanian Government** and the **University of Tasmania** (UTAS) are currently offering the position of Chief Scientist. The successful candidate will devote 60% of their time to the Chief Scientist position and 40% to the role of senior research leader. The Chief Scientist will provide the Government with independent advice on emerging issues in science, technology and innovation across multiple portfolio areas.

UTAS vice-chancellor **Professor Daryl Le Grew** says the senior research leader will be a professorial-level appointment and contribute to an area of strategic research importance within the university.

"The senior research leader will be expected to make a significant contribution to a research team, building on existing strengths and contributing new strategic relationships," he says.

Applications close Friday 1 May 2009.

► [More information](#): www.utas.edu/jobs.

Of cows & soils

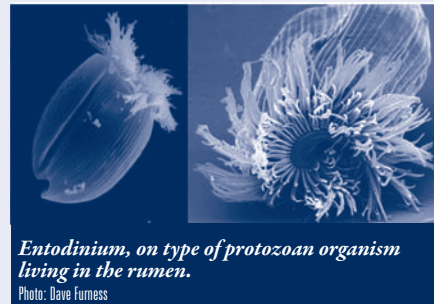
As part of the national research effort to reduce agriculture's greenhouse gas emissions, the **New South Wales Department of Primary Industries** (DPI) has received funding for several projects from the **Australian Government's** Climate Change Research Program, supplemented by additional industry funding.

The new projects include:

- Soil carbon research measuring carbon levels in a range of soils under different farming systems. The researchers will collaborate with the **University of New England** (UNE) and the **NSW Department of Environment and Climate Change**. Further funds were provided to the DPI by the **Grains Research and Development Corporation** for a collaboration with the UNE and the **University of Melbourne** to measure nitrous oxide emissions

from winter cereals in order to identify the impact different row placements and crop rotations have on nitrous oxide emissions

- Clean cow research into genetic variations in beef cattle herds that differ in methane production. The study will also look at reducing methane production by eliminating unicellular organisms, protozoa, from the rumen and through dietary supplements.



Entodinium, on type of protozoan organism living in the rumen.

Photo: Dave Furness

► [More information](#): www.dpi.nsw.gov.au/

Of East & West

The **New South Wales (NSW) Government** will collaborate with China on joint scientific research projects including the modern development of traditional Chinese medicine.

The China-NSW Collaborative Research Program will bring together NSW and Chinese scientists in research areas such as biotechnology, proteomics and also traditional Chinese medicine. It will build on the established **National Institute for Complementary Medicine** in Sydney and the Joint Academic Chair in Traditional Chinese Medicine between the **University of Western Sydney** and the **University of Sydney**.

NSW and China will each contribute the equivalent of \$500,000 for the first round of the program starting this year. While research projects can include partners from other countries the primary partners must be from NSW or China.

► [More information](#): Hayley Thomas, 0427 299 446

Clean expo

For the first time outside the UK, Victoria will host the All-Energy Expo on 7 and 8 October 2009 at the Melbourne Convention and Exhibition Centre. The UK expo has been running since 2001 in Aberdeen, Scotland, as Europe's largest all-renewable energy exhibition and conference.

The **Victorian Government** will be the principal sponsor of the All-Energy Australia Expo and Conference, which will bring together investors, researchers, academics, industry and government representatives from Australia and overseas to discuss and view the latest clean energy technology.

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

Well linked research centre

A new \$15 million research centre at the **Queen Elizabeth Hospital** in Adelaide has been opened. The centre accommodates approximately 130 health and medical researchers investigating serious and common health conditions, including cancer, cardiovascular disease, arthritis, kidney disease, diabetes, respiratory diseases and stroke. The new centre has strong teaching and research affiliations with the **Universities of Adelaide, South Australia** and **Flinders**, and incorporates the **Basil Hetzel Institute for Medical Research**.

► [More information](#): www.ministers.sa.gov.au/news.php?id=4410&page=3

Chemistry head

Curtin University of Technology has appointed **Professor Mark Buntine** as new head of its Department of Applied Chemistry as it prepares to move into its \$110 million Resources and Chemistry Precinct later this year. For the previous six years, Professor Buntine was head of Chemistry at the University of Adelaide. His research areas include laser chemistry and spectroscopy and computational chemistry.



Mark Buntine

All in the head

Professor Victor Flambaum, from the University of New South Wales, has been awarded the 2008 Lyle Medal by the Australian Academy of Science.

The Lyle Medal recognises outstanding achievement by a scientist in Australia for research in mathematics or physics. Professor Flambaum is head of the Theoretical Physics Department, with multiple research interests including atomic, nuclear, elementary particle, solid state physics and astrophysics. His other awards include the Lenin Komsomol Prize (USSR) and the Centenary Medal (Australia).



Victor Flambaum

Engineers' award

Professor Alex Grant has won the IREE Neville Thiele Award 2008 from Engineers Australia. Professor Grant is director of the University of South Australia's Institute for Telecommunications Research. His research is showing the way to cheaper, faster and more reliable wireless communications. He has made important contributions to the mathematical theory of information transmission in wireless digital networks, discovering new ways of transmitting and receiving information that are less susceptible to interference, and that offer greatly increased data rates.

Holy cow!

University of Western Australia researcher **Professor Jim Williams** has received the Endowed Hare Professorial Lecture Award, the oldest and most prestigious Award of the Indian Association for the Cultivation of Science (IACS). Professor Williams was awarded for his contributions to physics and his promotion of science. The award was established to honour the work of David Hare who laid the foundations for broad participation in education which led ultimately to the establishment of the IACS.



Jim Williams

Arafura appointment

Professor David Parry is the new head of the Arafura Timor Research Facility, a joint facility of the

Australian Institute of Marine Science (AIMS), the Australian National University and Charles Darwin University. He has joined AIMS from Charles Darwin University where he ran the Tropical Futures: Mineral Program on strong inter-disciplinary principles. Professor Parry was a foundation member of staff at the University College of the Northern Territory in 1986, forerunner to Charles Darwin University, and has been involved in teaching, research, leadership and management since then.

Chair collector

New chair of the Australian Wine Research Institute is **Dr John Stocker** whose career in science and business includes chair and chief executive of CSIRO, chair of Sigma Pharmaceuticals Limited and principal of Foursight Associates Pty Ltd.

Rehabilitator

Associate Professor Beth Hands has been appointed director of the Institute for Health and Rehabilitation Research at the University of Notre Dame Australia. A/Prof Hands is an Associate Dean in the School of Health Sciences and is currently the chief investigator of several significant research projects. The Institute will bring together staff from medicine, health sciences, the professions of nursing, physiotherapy and some of the disciplines within the Arts and Social and Behavioural Sciences disciplines, particularly counselling.



Beth Hands

Smart director

The director of the University of Wollongong's Intelligent Polymer Research Institute and executive research director of the ARC Centre of Excellence for Electromaterials Science, **Professor Gordon Wallace**, has been awarded the 2009 Smart Structures and Materials Lifetime Achievement Award. The award is from SPIE, the international optics and photonics society, founded in 1955 to advance light-based technologies. Professor Wallace's research interests include organic conductors, nanomaterials and electrochemical probe methods of analysis and the use of these in the development of intelligent polymer systems. He is currently using these tools and materials to develop medical bionics that will improve human performance.

ANSTO Board

Business woman **Christine McLoughlin** will join the ANSTO Board. Ms McLoughlin has had roles in major Australian public companies such as Optus Communications and AMP Limited and was general manager for the Office of the chief executive officer for AMP from 2002-2004. From 2005-2008 she headed Group Executive Strategy, People and Reputation for Insurance Australia Group (IAG). Currently Ms McLoughlin is a non-executive director of the AMP



Christine McLoughlin

Foundation and the Governing Council of Chief Executive Women.

Peer favourite

Dr Scott McCue from the School of Mathematical Sciences at Queensland University of Technology has been awarded the 2009 JH Michell Medal by his peers in the Australian Mathematical Society. The medal is awarded to researchers who are in the first 10 years of their career and recognises distinguished research in applied or industrial mathematics. Apart from mathematical biology, Dr McCue's areas of expertise include the mathematics of fluid flow and melting/freezing problems. He is currently part of a team developing a mathematical model of wound healing that could help doctors treat problems ranging from burns and scarring to chronic ulcers experienced by elderly patients and people with diabetes.



Scott McCue

Royal gongs

The Royal Society of NSW has announced two medal winners for 2008. **Professor Bradley Potts** of the University of Tasmania (UTAS) has been awarded the WB Clarke Medal and the Edgeworth David Medal has been awarded to **Dr Adam Micolich**, who is senior lecturer at the University of New South Wales (UNSW). Professor Potts was recognised for his long standing research on the evolutionary biology and breeding of eucalypts. Dr Micolich has made significant contributions in several fields of physics. He works in the area of nanotechnology and ultrasmall semiconductor structures.



Adam Micolich

It's time

The University of Western Sydney's Foundation Dean of Medicine, **Professor Neville Yeomans**, will retire in September this year. The university has launched a world-wide search for the next Dean of Medicine, who will build on the Foundation Dean's legacy and will lead the School in training tomorrow's doctors and in making important contributions to Australian medical research.



Neville Yeomans

Biota chair

Biota Holdings has appointed **Dr James Fox** as its new chairman. Dr Fox has significant experience in commercialising innovative technologies and growing a global business. He is a director of Air New Zealand Limited, Futuris Limited, MS Research Ltd and The Technology Partnership PLC, and was formerly chief executive officer of Vision Systems.

What's going on down there?

A comprehensive national atlas of groundwater-dependent ecosystems will be developed, supported by \$5.4 million in funding through the **National Water Commission's** \$82 million National Groundwater Action Plan.

In announcing the funding, Minister for Climate Change and Water **Senator Penny Wong** says there is little knowledge to date about the many ecosystems that depend on groundwater.

The National Groundwater Action Plan will provide a further \$1.3 million for a **CSIRO** project to improve management of groundwater supplies from aquifers. The project will develop two recharge reckoner tools and associated manuals that will enable water managers to improve their water balance models.

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

Weak wood

A collaboration of **CSIRO** and forest industry has completed a \$6 million research initiative resulting in 15 scientific findings and examples of their adoption which could generate between \$400 million and \$800 million of additional income from Australian pine plantations.

The JWI project has looked at how genetic and environmental factors determine juvenile wood quality and the transition from weak juvenile wood to the stronger mature wood. Project leader, **CSIRO Plant Industry's Dr Harry Wu**, says such research is essential for the design of new ways that can reduce or improve juvenile wood in radiata, slash and Caribbean pines. In the past pine breeding has focussed on growth and tree form which has reduced the rotation age (the time required for trees to reach harvest size) of Australia's radiata pine plantations from about 40-45 years to 27-30 years. As a trade off, there is now a higher proportion of juvenile wood not strong enough for structural products such as home building. This has caused concern in many countries and has led **ArborGen** – a joint venture of three international companies – to become a partner in the research initiative.

The project brought up new challenges such as the complex relationships between growth and wood-quality depending on site conditions and management decisions. Dr Wu says that rapid production for greater quantities of wood needs to be balanced against the need to produce strong wood to meet modern demands.

► **More information:** www.csiro.au/news/Media-Releases.html

Drilling success

Oil and gas company **InterOil** has discovered significant amounts of natural gas in a recently drilled well in Papua New Guinea, Antelope One.

A flow test has reported 382 million cubic feet of gas with 5,000 barrels of condensate per day, a total of 68,700 barrels of oil equivalent per day. The **CSIRO** Petroleum Resources Basin Studies group has worked in a close research alliance with InterOil since 2001, developing a basin 'sequence model' for Tertiary rocks in the region. The model is based on the highly specialised method of strontium isotope dating of limestones.



photo: InterOil

CSIRO Basin Group geoscientist, **Tony Allan** says the Antelope find is the first onshore Tertiary 'reef' type limestone reservoir to be successfully drilled and tested. "Similar limestone features in the Gulf of Papua are well known from a series of gas discoveries in the 1980's. The eastern Papuan Basin remains under-explored and there is significant potential for finding more isolated reef structures like Antelope, and other carbonate reservoirs", he says.

► **More information:** www.csiro.au/news/Media-Releases.html

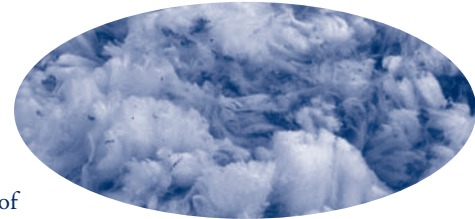
Cooling wool

The **Australian Wool Testing Authority (AWTA)** intends to close its Sydney Raw Wool Testing Laboratory by the end of

the 2008/09 wool selling season. It is a result of the ongoing decline in the volume of Australian raw wool production, according to AWTA managing director **Michael Jackson**. "The short to medium term outlook offers little prospect of a recovery in the volume of Australian wool production and so, for the foreseeable future, the two remaining laboratories will be able to cater for all Australian wool testing requirements," he says. By the end of the current 2008/09 season it will have conducted approximately half the number of tests that it did when Australian wool production peaked during the late 1980's and early 1990's.

The **Sir William Gunn Laboratory** currently employs 78 full-time, part-time and casual employees and also houses the AWTA Ltd's Research & Development Division, which will relocate to Melbourne later in 2009.

► **More information:** **Michael Jackson**, 03 9371 4101, 0407 051 450, michael.jackson@awta.com.au



'Foot in mouth' - disease

Minister for Agriculture, Fisheries and Forestry **Tony Burke** has clarified the position of the **Australian Government** on the importation of live foot and mouth disease virus for scientific purposes. The recent Beale review on Australia's Biosecurity System had recommended permission of such import, which resulted in substantial concerns expressed by some community groups.

He says: "...the Government would only consider importing the live virus if an outbreak had already occurred." The Government would not permit the import if advised at the time that it was not required for an eradication program, he says. "However, if we were advised that we could more effectively eradicate the disease through the importation of a pure live virus to a laboratory, then we could consider the option."

► **More information:** www.maff.gov.au; See also ARDR 'Opinion' p.10 this issue

Structure of FMD

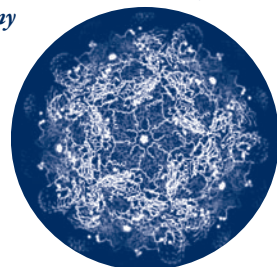


image: David Stuart/Univ. Oxford, Wellcome Images

Positive trade offs

A new report by the **Australian Bureau of Agricultural and Resource Economics (ABARE)** suggests that the combined effects of increased water trading and farmers adopting practices to better utilise available water have helped irrigators in the southern Murray-Darling Basin to deal with historic drought conditions.

The analyses of water trading data for the 2007-08 irrigation season and case studies of 10 irrigators across the southern Basin found that water trading had a positive influence on businesses by providing greater

flexibility in the management of water requirements in times of water shortage. In 2008, 235 gigalitres of water were traded interstate which had benefits for buyers who could reduce the drought impact on farm production while generating income for sellers who were unable to produce viable crops.

Trade into South Australia accounted for 63% of total interstate trade, with a net benefit of water trade into South Australia in 2007-08 estimated to be \$35 million, according to ABARE's executive director **Phillip Glyde**.

► **More information:** Peter Gooday, 0419 682 641, pgooday@abare.gov.au

Carbon sucker soil

Soil has the capacity to store more carbon than forests and research into this potential will now receive \$20 million in funding under the Climate Change Research Program, which includes the **Australian Government**, industry and research bodies. Further \$12 million in funding will support projects into agricultural nitrous oxide emissions, which account for almost 4% of Australia's total greenhouse gas emissions in 2006.

According to Minister for Agriculture, Fisheries and Forestry **Tony Burke**, the initiative will be the most comprehensive research effort into soil carbon and emissions ever in Australia and will, for the first time, create national standards for sampling and analysing soil carbon and nitrous oxide emissions. In addition, the research has the potential to boost food production and benefit farmers, he says.

Nine soil carbon research projects will sample a range of agricultural systems, including cereal crops, sheep and beef grazing, sugarcane and vegetable farming, irrigated and non-irrigated dairy, and sites which have changed from one farming system to another. Key priorities will include:

- measuring carbon levels in a range of agricultural systems;
- understanding impacts of management practices on soil carbon; and
- understanding the role Australian soils could play in sequestering carbon dioxide from the atmosphere.

Nine nitrous oxide research projects will monitor emissions from soils in five key farming systems – sugar cane, cotton, dairy pasture, non-irrigated and irrigated cereal cropping.

► **More information:** www.daff.gov.au/farmingfuture

Coordinated warming

A collaborative initiative, involving all the rural Research and Development Corporations, all state governments, the **Australian Government**, and the **CSIRO**, has agreed to fund for a period of 5 years a national coordination, communication and collaboration network for climate change research on primary industries, the **Climate Change Research Strategy for Primary Industries (CCSRPI) program**.

The CCSRPI program is the first strategy to be implemented as part of the **National Research Development and Extension (RDE) Framework**, an initiative endorsed by the **Primary Industries Ministerial Council** and the Research and Development Corporations to develop national RDE strategies in 14 commodity sectors and seven cross-sectoral themes. The National RDE Framework recognises the importance of the national strategies to maximise outcomes from limited research resources and to address the challenges of global food security and the need to improve agricultural productivity growth, particularly during the global recession. The CCSRPI has identified climate variability and seasonal forecasting as key research needs to help producers adapt to climate change.

► **More information:** 02 6263 6000, www.lwa.gov.au/ccsrpi

CCS offshore areas

The **Australian Government** has released details of 10 offshore areas designated specifically for the assessment of their greenhouse gas storage potential. The initial release areas are located across five offshore basins adjacent to Victoria, South Australia, Western Australia and the Northern Territory. They were selected as having the best potential in terms of geological suitability and current industry needs and are underpinned by technical data from Geoscience Australia, says Minister for Resources, Energy and Tourism **Martin Ferguson**.



image: adapted from Department for Resources, Energy and Tourism

“Geoscience Australia's technical expertise will be made available to potential applicants through my department's website (www.ret.gov.au) and meetings with interested parties. I encourage potential applicants to work closely with Geoscience Australia to gain a full appreciation of the potential of these areas and their storage opportunities in the future.”

The release follows on from new legislation for greenhouse gas storage last year, the Australian Government's \$500 million investment in low emissions coal technology, and its establishment of the Global Carbon Capture and Storage Institute to drive 20 CCS demonstration projects by 2020. Mr Ferguson says that the Institute now includes dozens of countries including the US and companies around the world.

Regulations and guidelines to support the new legislation are under development and will be finalised in the third quarter of 2009. The acreage release bidding will remain open until two months after the completion of the regulations.

► **More information:** Tracey Winters, 0439 991 730; www.ret.gov.au

New rural rocks (a lot)

The **Australian Bureau of Agricultural and Resource Economics (ABARE)** estimates the value of Australia's new and emerging agricultural industries at \$912 million in 2006-07, with an export value of \$465 million or six per cent of total Australian agricultural exports. The report *Emerging Animal and Plant Industries – Their Value to Australia (2nd Edition)* covers a range of industries including game birds, kangaroo, goat meat, Asian vegetables, olives and macadamias.

In releasing the study, **Rural Industries Research and Development Corporation (RIRDC)** managing director **Dr Peter O'Brien** says the value of new industries has grown by nearly \$240 million since the last analysis in 2003-04. He says this is a conservative estimate which covers only a subset of Australia's new and niche industries ranging from the exotic tropical fruit industry, which is in its infancy, to more established industries, like goat fibre. Some industries have been around for hundreds of years but are only now emerging as nationally significant industries (olives) or are re-emerging in Australia due to market changes or technological advances (coffee).

► **More information:** www.rirdc.gov.au



Have been around but are now an emerging industry down under: olives

Masters of light

International research aiming to control multi-coloured light could lead to the development of computers and forms of communication many times more powerful than those currently in existence.

“The speed of light sets the maximum possible limit for the speed at which information can be transmitted,” says co-author of the study, **Professor Yuri Kivshar** from the ANU College of Physical Sciences.

The researchers from the ANU and the **University of Jena**, Germany, discovered an essential step to influence coloured light comparable to how we influence electrons. While electrons are charged particles and can be controlled through an applied electric field, the researchers used tiny channels in glass and observed the effect of ‘dynamic localisation’, which could be followed by the appearance of tiny rainbows followed by their recombination back into white light.

The effect could be used to shape multi-colour beams, emitted for example by so-called white-light lasers, in order to transmit many data streams at the same time. This could open the way for applications in optical data processing and storage, photonic devices that can be used in optical communication networks, and integrated photonic signal processors.

► **More information:** <http://news.anu.edu.au/?cat=22>

Young and (cable) free

Young Australians are increasingly choosing not to connect a fixed line phone when moving out of their parental home, relying instead on mobile technology. A new **Australian Communications and Media Authority** report, *Australian household consumers’ take-up and use of voice communication services*, presents the research findings into the attitudes and behaviours of household consumers concerning their voice communications. It indicates that while 90% of consumers use both mobile and fixed line phones to stay in touch, many Australians aged 18 to 24 are abandoning the traditional phone in favour of more flexible technology.

According to **Chris Chapman**, ACMA chairman, the level of mobile service take-up in this demographic is among the highest in the country, at 95% of 25- to 35-year-olds. “Young Australians are leading the charge to choose technology that suits their lifestyle, rather than copying their parents,” Mr Chapman says. “The report’s findings nonetheless underscore the on-going importance of the traditional phone service to the lives of older Australians, even with the high rate of mobile phone use.”

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

Satellite communication

ITC Global, a leader in networking solutions, will support **RMIT University** students and researchers in accessing to cutting-edge satellite communications technology.

The company has provided the School of Electrical and Computer Engineering (SECE) with an industry standard two-way earth terminal to access its global communications network via a number of geosynchronous satellites. Communication engineering program director **Michael Manb** says ITC Global’s sponsorship will give RMIT students the chance to gain a practical understanding of the challenges involved in operating live

satellite links. “We can now conduct teaching and research experiments that involve actual uplinking to working satellites”, he says.

► **More information:** www.rmit.edu.au/news

Super-calculated weather

The **Bureau of Meteorology (BoM)** and **The Australian National University (ANU)** have selected **Sun Microsystems** to deliver two supercomputers capable of processing the vast amount of data that is needed to meet the needs of the community in forecasting extreme weather events and climate. The supercomputers will be used to develop the **Australian Community Climate and Earth System Simulator** – a new project to tie together weather forecasting as well as climate and ocean forecasts. The funding for the National Collaborative Infrastructure Project comes primarily from ANU, **CSIRO** and the **Australian Government’s** National Collaborative Research Infrastructure Strategy (NCRIS). The new supercomputers will be located in Canberra and Melbourne and are expected to be operational in 2009.

► **More information:** (BoM) David Grant, 0439 452 424, (ANU) Martyn Pearce, 02 6125 5575, 0416 249 245

Parkinson’s online

A new online educational program will provide doctors with instant access to the latest developments in the treatment of Parkinson’s disease, a degenerative disorder of the nervous system that can result in trembling, stiffness of limbs and loss of coordination.

The program will provide a complete overview of Parkinson’s disease including assistance with decision-making, advice about medications and the treatment of related factors such as depression, anxiety and lifestyle changes. The **Australian Government** is supporting the project with \$90,000 in partnership with **Parkinson’s Australia**, which has contributed \$132,000.

There are no blood or laboratory tests that are known to assist in its diagnosis, which is largely based on a patient’s medical history, together with a neurological examination.

► **More information:** www.health.gov.au/internet/ministers/publishing.nsf/Content/mr-yr09-jm-jm005.htm?OpenDocument

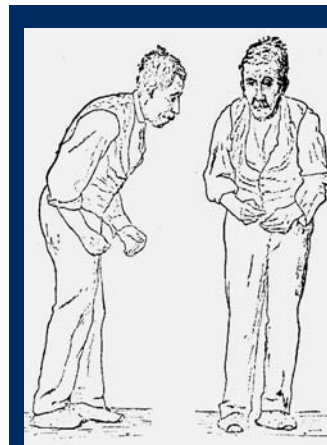


Illustration of Parkinson's Disease drawn in 1886 by Sir William Richard Gowers, neurologist, researcher and artist.

Lets talk 3.6 GHz

The **Australian Communications and Media Authority (ACMA)** has released a discussion paper on the impending release of the 3.6 GHz band (3575-3700 MHz) for wireless access services (WAS) in regional and remote areas of Australia. The paper considers a number of technical issues and outlines also regulatory and other policy issues associated with the release of the 3.6 GHz band, such as licensing arrangements and allocation mechanisms. The licences for WAS in the 3.6 GHz band are expected to be released later in 2009. The closing date for comment is 15 May 2009.

► **More information:** Donald Robertson, 02 9334 7980.

The sand option: energy from silicon

Silicon and carbon have almost identical energy densities so that, for fuel purposes, a lump of silicon can be thought of as an emission-free lump of coal. From this follows the tantalising prospect of silicon serving as a coal substitute which could allow renewable energy to become a globalised commodity for base load power generation. Yet few will think of this potential when silicon is mentioned, as most associate it with highly refined materials for applications like computer chips and solar cells.

Very much like hydrogen, often thought of as the ideal alternative energy carrier, silicon is abundant in nature in its oxidized form, the silica that makes up the sand of beaches and desert dunes. And like hydrogen, silicon requires a primary energy source, ideally a renewable energy source, for its production but shows then compared to hydrogen superior properties as an energy vector for transporting renewable energy around the world.

Indeed, a global silicon energy economy can be envisaged as a very promising equivalent to a high-tech and complex hydrogen economy. It is particularly in the transportation and storage of energy where the hydrogen economy falters because expensive pressurised containers are required for the task. In addition, an intricate delivery infrastructure is needed to get the hydrogen to filling stations and hydrogen vehicles require on-board storage and robust fuel cells for conversion back to electricity.

By contrast, the much simpler silicon energy economy would be similar to exporting coal for power generation. The bulk silicon would be shipped in ocean freighters and then transported by rail to silicon-fired base load thermal power stations, avoiding long transmission lines. Because silicon fuel would be consumed as a fine powder, similar to coal, it should not be too difficult to retrofit coal power stations. A requirement here is that the silicon particles be small enough for complete oxidation at temperatures that are not so high that expensive special materials are required. There would also need to be efficient extraction of the copious volumes of fine silica fly ash. This could be either shipped back to source to complete the cycle or used locally for glass production or land fill.

The final stage is supplying the silicon-derived electricity increment via existing national grids for uses such as electric cars and home heating.

It might be argued that shipping of silicon would itself add to carbon emissions. However, silicon is also an ideal fuel for a new era of steam-powered global shipping as oil diminishes. We have been here before with the coal steamers of old and silicon bunkering facilities would appear in optimal locations like Suez and Singapore.

Any energy vector system is inevitably inefficient and costly, and significant silicon production will have a high capital cost. However, zero-emissions aside, silicon has special strategic appeal in that it can be permanently stockpiled outdoors with no loss of fuel value. The recent gas supply disruption in Europe showed that multi-nation energy transmission is no substitute for maintaining security of supply from within one's own national borders.

This leaves, however, the sticking point, how can it be produced using

renewable energy sources?

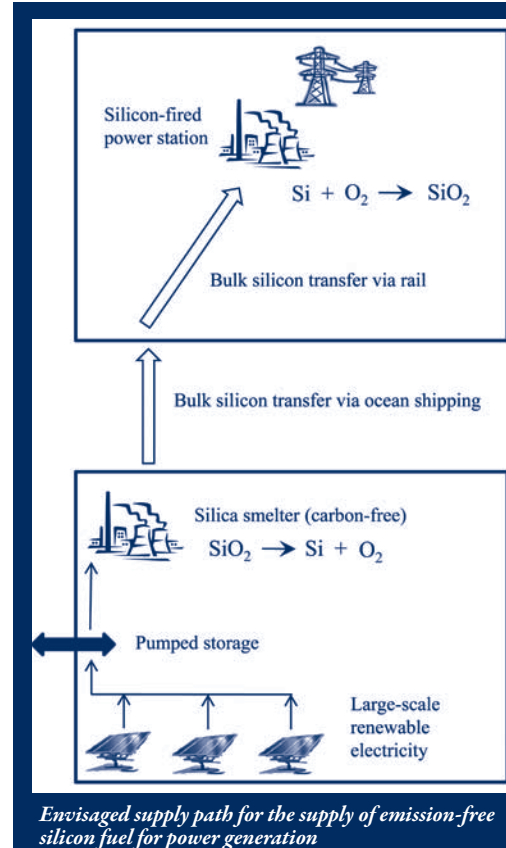
Indeed, the one significant technological breakthrough required is development of an efficient carbon-free process for industrial production of low-grade silicon. The current absence of such a process is not necessarily a reflection of inherent difficulty. Rather, there hasn't been any necessity because the small volumes of silicon needed for high-tech applications can be easily produced by the traditional dirty method using carbon. Consequently, there is a lack of electrolytic silicon research reflected by an important 1988 review paper having been cited just three times to date.*

One industrial-scale alternative might be electrolytic production of silicon along the lines of aluminium smelting, but avoiding carbon emission. It might seem unrealistic to expect that silicon production from something akin to a large aluminium smelter could be maintained by power from intermittent wind or solar sources. However, the necessary large energy storage buffers could be achieved using pumped storage schemes. Where major desert solar power systems are involved there will be little available fresh water and pumped storage might better utilize ocean water – already verified by a trial scheme on the Japanese island of Hokkaido.

In 2006, Auner and Holl** were the first to suggest silicon as a coal substitute and my own contribution was a 2008 paper expanding the idea into a global energy economy. Why hasn't this option been noticed before? The answer to this may lie in the particular attention hydrogen has received as an alternative energy carrier, dating more than hundred years back.

So is it possible that silicon could suddenly appear from left field as a world-saver? It is still early days for silicon and it would be desirable to establish a working group to quickly review the practicalities of all facets of silicon as a green solid fuel. The obvious beneficiaries of a global silicon trade would be Australia and the nations of the Middle East and North Africa with their large renewable energy resources. If the potential of silicon is confirmed then perhaps this grouping could set up a silicon energy association to fund the required technological developments so we can finally start using less coal.

*Elwell, D., Rao, G.M., 1988. *Electrolytic production of silicon. Reviews of Applied Electrochemistry*, v.18, p.15-22.
**Auner, N., Holl, S., 2006. *Silicon as energy carrier – facts and perspectives. Energy*, v.31, p.1395-1402.



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Events & Reports

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

The ARC College of experts will have their first meeting for 2009 from 6-8 April 2009. Nominations for the 2010 College of Experts will be in August/September.

National Innovation System Review. The Federal Government will consider the NIS Review's recommendations and release a White Paper in early 2009.

More information: www.innovation.gov.au/innovationreview/

2009 Prime Minister's Prizes for Science - nominations close on 8 May 2009.

More information: <https://grants.innovation.gov.au/SciencePrize/Pages/Home.aspx>

2009 Eureka Prizes – nominations close on 1 May 2009.

More information: <http://amonline.net.au/eureka/>

2009/10 VESKI Innovation Fellowships to undertake Research in Melbourne are now open closing 5pm 22nd May.

More information: <http://www.veski.org.au/NewsView.aspx?id=134>

Grants and programs

NHMRC:

Programs Grants - close July 09

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

European Molecular Biology Laboratory (EMBL) - close Aug 09

Australia-China Exchange (Postdoctoral) Fellowship - close 1 May 09

NHMRC Building capacity:
Postdoc Fellowship – close 1 May 09
Development Grants – close 30 June 09
Australia Fellowship – close 10 July
Postgrad Scholarships – close 31 July 09
More information: www.nhmrc.gov.au

ARC:

Discovery Indigenous Res. Development - close 13 May 09
More information: www.arc.gov.au

Linkage Projects (Round 1; commencing Jan 2010) – close 13 May 09

Linkage Infrastructure, Equip & Facilities – close 20 May 2009

Linkage Projects (Round 2; commencing July 2010) – close 18 Nov 2009

More information: www.arc.gov.au/media/important_dates.htm

Clean Business Australia:

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

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

Green Building Fund (\$90m over 4 years) Round - closes 30 June 09. Round 2 closing date TBA.

More information: www.ausindustry.gov.au

National Rural and Remote Health Infrastructure Program (NRRHIP) Round 3 - closes 17 April 09.

More information: www.health.gov.au

Conferences

4th International Symposium on Spray Dried Dairy Products
15 to 17 April 2009, Melbourne, VIC

GEOFLUIDS VI
15 to 18 April 2009, Adelaide, SA

The Fifth International Somatechnics Conference: The Technologicalisation of Bodies and Selves

16 to 18 April 2009, Sydney, NSW

Australasian Forest Genetics Conference

20 to 22 April 2009, Perth, WA

Monitoring climate change impacts: Establishing a Southern Ocean Sentinel program

20 to 24 April 2009, Hobart, TAS

2nd Adelaide Conference on Mathematical Evolutionary Biology

20 to 24 April 2009, Port Elliot, SA

3rd Annual HSE Excellence Forum in the Oil, Gas, Chemical and Petrochemical Industries
22 to 23 April 2009, QLD

EcoForum Conference & Exhibition
28 April 2009, Sydney, NSW

Mine Site Emergency Management 2009
28 to 30 April 2009, Brisbane, QLD

BioPartnerships 2009
29 to 30 April 2009, Sydney, NSW

PharmaSales World 2009
29 to 30 April 2009, Sydney, NSW

Redesigning the Healthcare Workforce 2009
29 to 30 April 2009, Sydney, NSW

Medical Device Law & Compliance Conference
29 to 30 April 2009, Sydney, NSW

ANZCA Annual Scientific Meeting
3 to 6 May 2009, Cairns, QLD

EDUCAUSE Australasia Conference: Innovate, Collaborate & Sustain
3 to 6 May 2009, Perth, WA

Excellence in Investment: Life Sciences Asia Pacific 2009
4 to 5 May 2009, Gold Coast, QLD

2009 Australian Vegetable Industry Conference
4 to 6 May 2009, Melbourne, VIC

Beef Australia 2009
4 to 9 May 2009, Rockhampton, QLD, Australia

FMA ideaction 09: ideas in action
6 to 8 May 2009, Melbourne, VIC

National Vegetable Expo
7 to 8 May 2009, Werribee, VIC

Symposium: Evolution of the Universe, the planets, life and thought
8 May 2009, Canberra, ACT

Teamwork for Better Health Conference 2009
8 to 9 May 2009, Melbourne, VIC

Generic Medicines Australia 2009
12 to 14 May 2009, Sydney, NSW

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

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

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

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

Designbuild 2009
21 to 23 May 2009, Sydney, NSW

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

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

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

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

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

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

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

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

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

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

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

Pharmacy Expo
12 to 14 June 2009, Sydney, NSW

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

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

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

JOBS

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[Manager - Health Safety and Environment](#)

[Foundation Professor of Rural Health Care](#)

[Research Professor/Research Winthrop Professor](#)

[Lecturer - Physics](#)

INSTITUTION

CLOSING DATE

INSTITUTION	CLOSING DATE
CSIRO-BOM VIC	01 May
University of New South Wales NSW	20 Apr
University of Western Australia WA	08 May
University of New South Wales NSW	24 Apr
CSIRO-BOM VIC	01 May
CSIRO NSW	19 Apr
University of Wollongong NSW	19 Apr
University of Western Australia WA	17 Apr
Monash University - Experimental or Theoretical Physics VIC	01 May

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