

# Bulletin

**TIM FLANNERY ON  
SUSTAINABILITY  
EDUCATION**



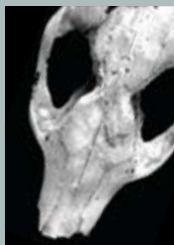
**SKIPPY'S  
ANCESTOR**  
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MICROCHIP  
WITH COSMIC  
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Research for  
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The 25-million-year-old skeleton of one of the earliest known kangaroo predecessors might offer clues to the animal's survival under the pressure of modern climate change – page 8.

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# Miner obsession wins national award

**M**ORE THAN 25 years of research led by La Trobe University's Dr Michael Clarke into the behaviour and ecology of Bell Miners, Noisy Miners and the endangered Black-eared Miner has been recognised by the Royal Australasian Ornithologists' Union.

Dr Clarke, an Associate Professor in Zoology, won the 2007 D L Serventy Medal, the most prestigious award for professional ornithologists in Australasia, honouring those who make an outstanding contribution to the scientific literature in the field of ornithology.

Dr Clarke's interest in Bell Miners was sparked by their unusual social organisation, and particularly the species' attentive behaviour in rearing their young – sometimes involving up to 30 different adult birds in raising a single brood of chicks. He has used a wide range of scientific approaches from field studies to the latest molecular and genetic techniques to understand the evolution of this cooperative behaviour.

He has also studied the Noisy Miners' often-observed habit of hyper-aggression and the links between this behaviour and environmental degradation, including eucalypt dieback and rural tree decline. Dr Clarke's work aims to generate guidelines that will help land managers restore degraded habitats.

He is concerned to avoid extending the habitat for the aggressive and despotic Noisy Miners at the expense of other smaller,

insectivorous birds – through revegetation.

Dr Clarke has an international reputation for his studies in conservation biology. His group's research on the

endangered Black-eared Miner has been hailed as critical to much of the recovery effort directed at saving this threatened species.

Dr Clarke and members of his laboratory also carry out studies into processes that threaten and degrade the habitats of birds. He recently began a major collaborative project with Dr Andrew Bennett from Deakin University to identify the properties of fire-affected mallee landscapes that most influence the survival of wildlife: birds, mammals, reptiles, invertebrates and plants.

The D L Serventy medal citation also praised Dr Clarke's skills as a teacher and mentor. When three of his postgraduate students were selected to present their research to an international ornithological congress in Beijing, they were one of the largest contingents from any single ornithological laboratory.

Dr Clarke has been chairperson of the Scientific Advisory Committee to the Victorian Minister for the Environment in relation to the Flora and Fauna Guarantee Act, and has a long-standing involvement with three scientific advisory bodies overseeing the conservation of nationally endangered honeyeaters.

The honour for Dr Clarke continues a tradition of excellence in ornithological research at La Trobe. His colleague, Dr Richard Zann, was awarded the Serventy Medal in 1998. ●



More 'People' page 14

# \$230m deal for world-class Biosciences Research Centre

The University has finalised an agreement with the State Government to build a \$230 million world-class agricultural Biosciences Research Centre (BRC) on its main Melbourne campus at Bundoora.

Minister for Agriculture, Mr Joe Helper and La Trobe University Vice-Chancellor, Professor Paul Johnson announced this at a press conference held late last year at the AgriBiosciences Centre, a joint La Trobe - Department of Primary Industry (DPI) research facility for Australia's agricultural and biotechnology industries.

The new venture is being funded by a \$180 million contribution from the State Government and \$50 million from La Trobe. Up to 400 scientists from DPI, La Trobe, and the private sector will work at the centre, which

is scheduled to be ready for occupation by the end of 2011.

Mr Helper said the centre would open up new opportunities for farmers by providing access to cutting-edge research to improve productivity, help fight disease and reduce environmental impact. 'It will focus new-

generation biosciences research on challenges including climate change and biosecurity preparedness,' Mr Helper said. 'The work undertaken will improve Victoria's international competitiveness by facilitating the development of new crop varieties increasingly

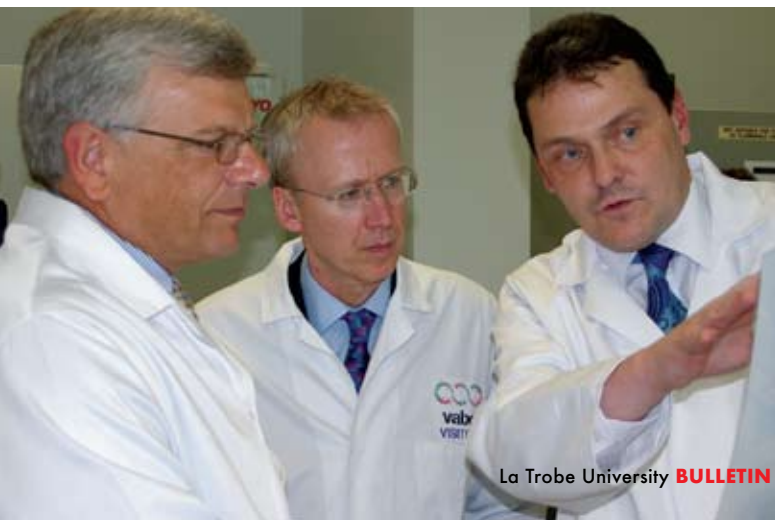
'This major initiative recognises La Trobe University's international standing in biosciences research,' Professor Johnson said.

'The Biosciences Research Centre will put the University within the top tier of Australian universities, and will boost



Minister Helper and Vice-Chancellor Johnson shake hands after signing the agreement.

Professor German Spangenberg, Research Director of the AgriBiosciences Centre, right, shows Mr Helper and Professor Johnson examples of the type of frontier research that will be carried out at the new BCR for Australia's agricultural and biotechnology industries.



focused on drought tolerance and bioenergy.

'It will also enhance our capacity for preparedness, rapid detection, response and management of plant and animal pest and disease outbreaks, which threaten Victoria's \$8.4 billion agricultural sector.'

Vice-Chancellor Johnson said the University was delighted to be working in partnership with DPI and the Victorian Government towards developing a sustainable Victoria.

the national and international profiles of both the University and Melbourne's North.

'The new centre will give La Trobe University students and staff new opportunities to work with the world's leading scientists within a state-of-the-art research facility.

'It will attract and retain leading national and international scientists and collaborators, and further strengthen the State's international reputation for plant, animal and microbial bioscience, bioprotection research and diagnostics.' ●

# New program trains Muslim leaders

A LEADERSHIP TRAINING program for young Muslims – the first of its kind in Australia – has produced its inaugural graduates.

The program is conducted by La Trobe University's Centre for Dialogue on the main Melbourne campus at Bundoora in association with the Islamic Council of Victoria and the strong support of the Victorian State Government.

Its aim is to equip young Muslim leaders with the confidence, skills and leadership qualities to help deal with the social and cultural challenges facing people of Islamic faith in Australia.

The first twenty graduates, aged between 18 and 30, recently received their awards from the Victorian Premier Mr John Brumby and La Trobe's Vice-Chancellor Professor Paul Johnson at a ceremony at Parliament House attended by Islamic, civic and community leaders.

The program is running again this year. It involves three months of intensive workshops, lectures, training, field trips and study tours to familiarise participants with Australian social, economic, political and cultural life, including Australia's role in the Asia-Pacific region and the rest of the world.

Students attend briefings by academics, politicians, diplomats business, religious, indigenous and other community leaders as well as journalists. They also take part in lectures, tutorials, and workshops. The program has been designed by leading international relations scholar, Professor Joseph Camilleri, who is Director of the Centre for Dialogue.

Vice-Chancellor, Professor Johnson said the program highlights the University's active role in the community, particularly through its Centre for Dialogue, in what he hopes will be enduring partnerships with the Islamic Council of Victoria and the State Government.

'Of the many challenges we face as a nation, none is more important than making this society one which values and nurtures its rich cultural and religious diversity.

'Australia's Muslim communities, representing one of the world's great religious traditions, have much to contribute,' he said.

'Much has been said in recent years about a looming "clash of civilizations" between Islam and the West. During a period marked by international and sometimes local tensions, Australian Muslims have been subjected to powerful pressures and often less than flattering media attention.

'We need young Muslim leaders who can speak clearly and confidently about the issues confronting people of Islamic faith in Australia today – and play a full and constructive role in shaping Australia's future.

'This program aims to equip people with the skills they will need to do that,' said Professor Johnson.



## Back to the 'Silk Road' in troubled times



It was 'time to restore the Silk Road', the historic route for trade and culture bridging East and West.

That symbolic suggestion came from Professor of Politics and Director of La Trobe University's Centre for Dialogue, Joseph Camilleri, left, in his closing comments to a major two-day international

conference which examined the impact of events such as September 11, the Iraq War and the War on Terror on international relations.

Professor Camilleri said consensus emerged on at least one issue: the need for renewed Europe-Asia dialogue over relations with the United States and the Muslim world.

The conference—titled *Europe and Asia – Between Islam and the United States: the lessons of Afghanistan, Iraq, Lebanon and Iran*—was held at La Trobe's Institute for Advanced Study on the main Melbourne campus at Bundoora.

It was organised by the Centre for Dialogue, the

*Continued page 15*

From little things... La Trobe's Dr Hai (Harris) Le, Project Manager and Chief Designer, holds the 'cosmic' microchip on a ballpoint pen.

At the Innovation Award ceremony, Mr Andrew Brawley, left, Executive Director of Peregrine Semiconductor Australia, and Dr Hai (Harris).



# Microchip with cosmic potential

**E**LECTRONICS ENGINEERS and researchers from La Trobe University's Centre for Technology Infusion, Peregrine Semiconductor Australia and the CSIRO's Australia Telescope National Facility (ATNF), have jointly won an international design award for a prototype microchip with cosmic capabilities.

The three partners received the 2007 *EDN* Innovation Award for best Application of Analogue Design by international electronics publisher *EDN* magazine, for a Low Noise Amplifier (LNA) integrated chip – a chip so small it is barely visible, yet so powerful it could help detect signals from the birth pangs of the universe.

The chip is now undergoing rigorous performance testing to meet the requirements of

the world's next generation listening device for monitoring the sounds of the universe. If it meets these requirements, it could be an integral part of the \$1.8 billion multinational mega-science project known as the Square Kilometre Array, or SKA, the world's first global radio telescope.

Involving 17 countries and more than 50 research institutions across five continents, SKA will comprise a network of thousands of antennas straddling 3000 kilometres, with half the antennas concentrated in a five-square-kilometre radio-quiet location yet to be decided, but likely to be in mid-west Western Australia or South Africa.

More than 50 times more sensitive than any existing radio telescope, the SKA will allow astronomers to detect

the faintest signals from space, from the immediate aftermath of the 'Big Bang' to the death of galaxies – and all things in between, including intelligent life on other planets, if it exists, pulsars, magnetic fields, black holes and dark matter.

The project will provide science with its most technologically-advanced listening post on the planet for new answers to the riddles of existence.

In inverse proportion to its size (2.3 x 1.9 mm), the award-winning LNA microchip has been designed to address one of the SKA's most critical challenges: minimising unwanted noise in the receiver system so that radio astronomy signals from space can be more clearly distinguished.

Fitted to the front end of hundreds of super-sensitive radio receiver circuits inside the SKA radio telescope's antennas, the chip would amplify the tiniest of intergalactic hums from outer space by 25 times, operating with very low power consumption – an extremely difficult set of electronic engineering specifications.

According to the Director of La Trobe University's Centre for Technology Infusion, Professor Jack Singh, designing the amplifier

presented a formidable challenge.

'The big challenge – and the innovative design in this – is to overcome the inherent noise in an integrated circuit, and to produce an amplifier with the lowest noise possible, with broad frequency band and high gain,' Professor Singh said.

'To overcome the inherent noise, the La Trobe team used with great ingenuity the unique features of the Ultra CMOS process, using very high-linearity, high-speed transistors in combination with high Q indicators.

'The result is an excellent example of collaboration between the rare and brilliant design skills of our group at La Trobe, the domain expertise in radio astronomy at CSIRO, and a leading-edge technology process from Peregrine Semiconductor.'

After three months in design at the University's Centre for Technology Infusion, Bundoora, the chip was fabricated at Peregrine's foundries in Australia and the United States. It was then put through its paces in performance testing at CSIRO's ATNF facilities at Marsfield.

Only stringent testing

*Continued page 15*



## Antarctic scientist on first flight to Davis

**A** La Trobe University physicist was among the first three scientists to fly to Davis Station using the new Australian air link to Antarctica.

He is Research Fellow Mr Theo Davies who was on the aircraft that followed Environment Minister Peter Garrett's recent official inaugural flight carrying scientists south.

Mr Davies said the University has built and operates two pieces of scientific equipment in Antarctica – and is planning to add a third.

La Trobe research in Antarctica, using radio, magnetic and optical remote sensing, goes back to the 1960s. About 15 students and staff have taken part in scientific expeditions to the frozen continent during that time.

Mr Garrett's flight was to Wilkins Runway, about 70 kilometres from Casey Station in Antarctica.

'I was on the next flight, with two physicists from the Australian Antarctic Division (AAD),' said Mr Davies. 'We continued by connecting flights in smaller aircraft from

Wilkins Runway on to Davis Station, about another 1,500km – and also set a record for the fastest time from Hobart to Davis.'

It was Mr Davies' sixth visit to Antarctica. He said last time the journey by ship took 13 days. 'This time we did it in fifteen and a half hours.'

Mr Davies said the new travel arrangements raised some amused eyebrows among seasoned Antarctic expeditioners; business class seats, a former Virgin airlines hostess, plastic cutlery and plenty of room to stretch your legs. For safety reasons, passenger numbers on flights to Casey were limited to 25.

However, after the first part of the flight, which seemed much like normal international travel, he said expeditioners put on their survival kits.

'Shedding our summer clothes we donned thermal underwear, freezer suits, felt-lined boots and assembled our boot chains and balaclava helmets, to ensure everything was at hand.

'The aircraft temperature was then reduced so that we would not overheat in our Antarctic kit before we landed and walked out onto the ice –

at minus 15 degrees centigrade.'

Mr Davies remained in Antarctica for six weeks, working with scientists from AAD Ice Ocean Atmosphere and Climate research on a long-running La Trobe project headed by Professor Peter Dyson. The program collects data about the thermosphere 140km above the surface of the earth, on the edge of space.

'La Trobe,' says Mr Davies, 'has two Fabry Perot Spectrometers in Antarctica – one at Mawson and one at Davis – with which we measure winds and temperatures in the thermosphere.

'The data we gather can be further analysed to give information about tidal movements in the upper atmosphere and waves which come up from the atmosphere below, as well as helping us understand how energy is stored in the thermosphere and how the thermosphere is affected by energetic particles and radiation from the sun.'

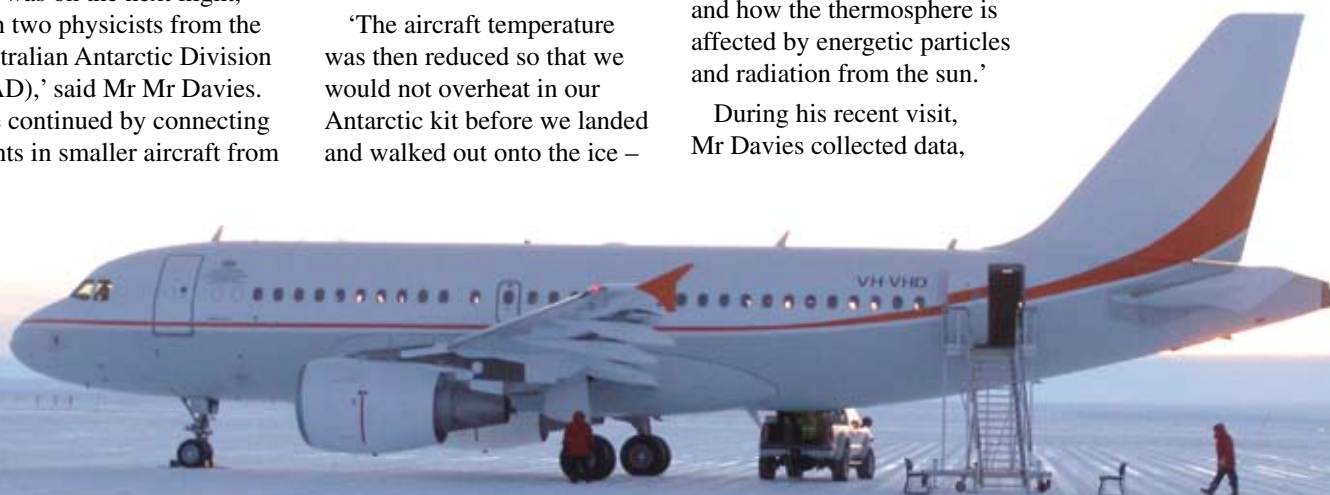
During his recent visit, Mr Davies collected data,



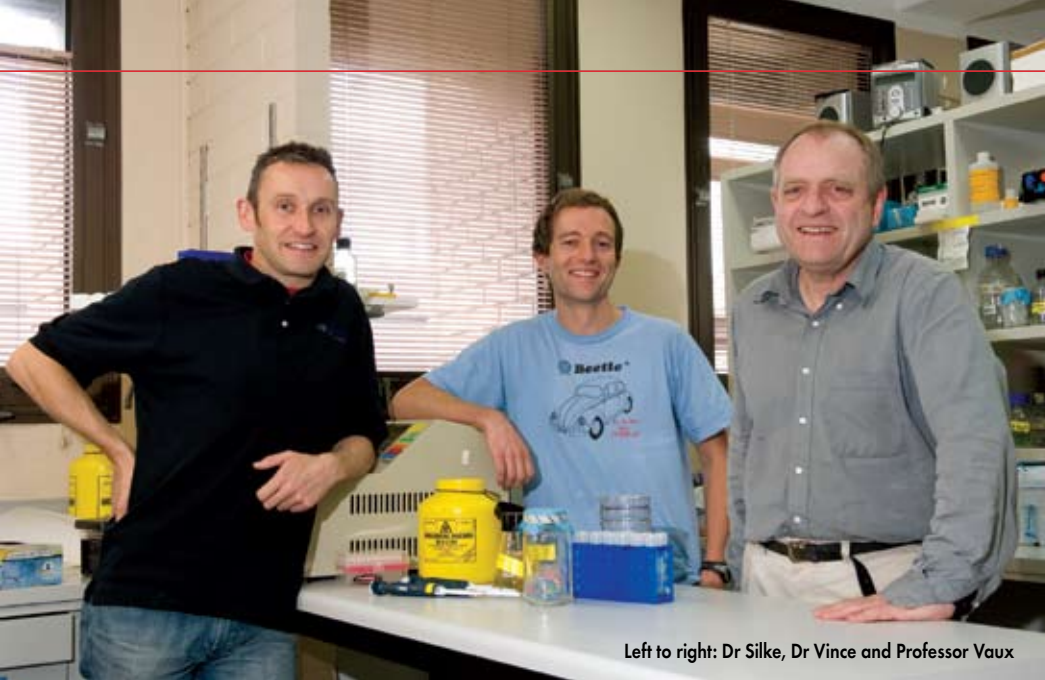
wrote and installed software upgrades and carried out tests to improve the time resolution of the spectrometer.

After leaving Davis for his 25 day journey back to Australia by ship, Mr Davies visited Mawson Station to make preliminary arrangements for installation of a third La Trobe Antarctic spectrometer.

The second spectrometer was installed last year, also at Mawson, with the assistance of Callum Anderson, a PhD researcher who developed the software that controls it. The most recent of a long-line of La Trobe postgraduate researchers to visit Antarctica, Mr Anderson remained there over winter '07, with 14 other expeditioners, to operate the spectrometer. ●



The Airbus on Wilkins Runway.



Left to right: Dr Silke, Dr Vince and Professor Vaux

## Cell death research into **novel anti-cancer drug**

Scientists at La Trobe University have discovered how a new drug that targets proteins that inhibit the normal process of cell death (a process known as apoptosis) kills cancer cells.

The research has important implications for the next generation of cancer treatments and highlights the key mission of the University's new Australian Institute for Molecular Medicine.

A research team led by Dr John Silke and Professor David Vaux has discovered that a new drug targets a cell death inhibitor protein (cIAP1) and can cure laboratory mice bearing human cell cancers.

The research is a culmination of a decade of basic research into inhibitor of apoptosis proteins (IAPs), which were first found in viruses that infect the cells of caterpillars. The viruses carry genes for IAPs to stop the caterpillar's cells from killing themselves, giving the viruses more time to replicate.

Professor Vaux's laboratory showed that these insect viral IAPs can also inhibit the death of human cells. This led the researchers to identify similar IAP genes in mice and humans.

They later discovered an inhibitor of the IAPs – a protein known as 'Smac' or 'Diablo' – which can effectively neutralise the IAPs, causing the cells die.

As abnormally high levels of IAPs have been found in several types of human cancers, this suggested that cells in these

cancers might depend on IAPs for their survival.

Based on this research, TetraLogic Pharmaceuticals, in Pennsylvania USA, produced a drug that mimics Smac to inhibit IAPs in cancer cells. Together with the team at La Trobe, they have now shown that this 'smac-mimetic' IAP antagonist drug targets cIAP1, leading to production of a cytokine called Tumor Necrosis Factor that kills the tumour cells.

### More intelligent approach to combating cancer

These latest findings were published recently in the prestigious international scientific journal, *Cell*, along with a another research paper from Genentech Inc., which has independently developed another IAP-antagonist drug, and commenced testing it in Phase I human clinical trials.

Dr Silke says: 'Although we won't know if these new drugs will work in humans until the clinical trials have been completed, they illustrate a much more intelligent approach to combating cancer – by identifying the genes that cause cells to become cancerous, and then developing drugs to specifically target those genes to kill the cancer cells.'

Professor Vaux says these results show how investment in basic research – 'in something as obscure as insect viruses'

– can potentially lead to important new treatments for human diseases. 'They also reveal the global nature of collaboration in medical research.'

Professor Vaux holds one of the nation's newest and most prestigious science awards – an Australia Fellowship from the National Health and Medical Research Council valued at \$4 million over five years. In the 1980s Professor Vaux discovered the first molecular components of the mechanism involved in cell death, known as 'apoptosis'. He is now recognised internationally as a leading researcher in what has become one of the hottest fields of bio-medical science.

The international scientific teams are headed by John Silke and David Vaux. They include James Vince – lead author of the research paper published in *Cell* – Lynn Wong, Nufail Khan, Rebecca Feltham, Afsar Ahmed, Diep Chau, and Bernard Callus (La Trobe University); Chris Benetatos, Sri Chuduru, Steve Condon and Mark McKinlay (TetraLogic Pharmaceuticals, USA); Rob Brink (Garvan Institute, Sydney); Martin Leverkus (Germany) Vinay Tergaonkar (Singapore) Pascal Schneider (Switzerland) and Frank Koentgen (Ozgene).

The research was funded by the Australian National Health and Medical Research Council (NHMRC), the Australian Research Council (ARC), and the US-based Leukemia and Lymphoma Society. ●

The Australian Institute for Molecular Medicine (AIMM) is based at La Trobe University's main Melbourne campus at Bundoora. It is a partnership between La Trobe University and the Co-operative Research Centre for Biomarker Translation with close links to researchers at the Walter and Eliza Hall Institute and the Co-operative Research Centre for Cancer Therapeutics located on the La Trobe Biosciences Precinct at Bundoora. AIMM plans to build a facility at the University in 2009 dedicated to research into the molecular basis of human diseases.

The articulated hind feet of the Nambaroo. The bones show that it may have galloped rather than hopped and may even have climbed trees.  
Below: Dr Kear at the Riversleigh dig site.



# Skippy's ancestor a galloping kangaroo?

**T**HE RECENTLY-UNVEILED near-complete 25-million-year-old skeleton of one of the earliest known kangaroo predecessors might offer clues to kangaroo survival under the pressure of modern climate change.

Paleontologist Dr Ben Kear – a La Trobe University Research Fellow and Research Associate at the South Australian Museum – is working with Associate Professor Mike Westerman of La Trobe's Genetics Department on a long-term study using the latest DNA technologies to piece together kangaroo evolution and the impact of climate change on kangaroo biodiversity past and present.

Their work, which attracted media attention world-wide, was first published in the November 2007 *Journal of Paleontology*, where Dr Kear and fellow authors Dr Bernie Cooke (Queensland Museum), Professor Michael Archer (University of NSW) and Professor Tim Flannery (Macquarie University) described the oldest known kangaroo skeleton as 'an important piece in the evolutionary jigsaw'.

'This new species, *Nambaroo gillespieae*, is not quite a kangaroo,' says Dr Kear. 'It's a representative of the Balbaridae, an extinct group of ancient kangaroos that seem to have been replaced over time by the ancestors of today's lineages.'

'We were blessed with a near-complete skeleton from the internationally-renowned fossil mammal riches of the Riversleigh World Heritage Area in northern Queensland. It's from just after a major blank spot in the Australian mammal fossil record – just like the Dark Ages – where we have no rock deposits with kangaroo fossils.'

The size of a small dog, *Nambaroo* had canine 'fangs' that it probably used for display – perhaps to scare competitors or attract a mate. Its most intriguing feature, its hindlimb bones, show that it probably did not hop but galloped or bounded on all fours like a brushtail possum.

Its opposable 'big toe' and flexible foot suggest it may have had limited climbing ability, like today's tree kangaroos. These characteristics suggest an evolutionary adaptation to life in tropical forest and scrub, eating leaves, fruit and fungi.

'It would be another ten million years or so before grasses started to spread across the Australian landscape, and with it kangaroos adapted to grazing and evolved to hop on their hind legs,' says Dr Kear.

The skeleton of *Nambaroo gillespieae* was found in a limestone boulder at the 'Quantum Leap Site' in the Riversleigh World Heritage Area. Its body seems to have been washed together with other animal remains by an ancient river system.

There was no 'Eureka moment' for Dr Kear, unlike the dramatic discovery of magnificent opalised plesiosaurs – now prominently displayed at the SA Museum – part of his other research on Mesozoic marine reptiles. The *Nambaroo* skeleton had to await his lengthy computing of evolutionary comparisons before its significance was teased out. *Nambaroo* is part of the Queensland Museum's fossil collection.

'It's a marvellous find – previously we were fortunate to discover so much as a jaw or even single tooth – but that only scratched the surface,' Dr Kear says. 'We are now able to more clearly compare these ancient roos to today's species. There's a world of work ahead but indications are that we can use fossil kangaroos as climate markers by tracing evolutionary relationships against environmental alteration on a continent-wide scale.'

The species name '*gillespieae*' honours Anna Gillespie, fossil preparator at the University of NSW. You can't excavate Riversleigh fossils with a brush and a dental pick like some TV scientists, says Dr Kear. You must blow the very hard limestone rock apart, very precisely, with detonation cord and then soak the blocks in acid from three to six months to dissolve the rock. ●

# Studies for safer crop pest control

**R**ESearch into a series of circular proteins – first found in plants used by African women to help accelerate childbirth – may lead to a new class of natural, more ecologically friendly insecticides.

This possibility is highlighted by a La Trobe University study carried out in association with the University of Queensland, and published in January in the prestigious US journal, *Proceedings of the National Academy of Sciences*.

The proteins, cyclotides (a group of very stable cyclic mini-peptides), have also attracted attention for their pharmaceutical applications, as a possible platform for new ways of drug delivery for human diseases.

The new research involved detailed biochemical and microscopy studies. It reveals how plant cyclotides disrupt epithelial cells in the midgut of lepidopteran larvae. Lepidoptera are insects such as butterflies, moths and skippers which, during their larval phase, can cause substantial crop losses.

The work was carried out by La Trobe biochemists Ms Barbara Barbeta, PhD student Amanda Gillon and Professor Marilyn Anderson in association with zoologist Dr Alan Marshall from the University's Analytical Microscopy

Laboratory, and Professor David Craik from the Institute for Molecular Bioscience, University of Queensland.

The project examined both the way in which larvae react to different amounts of the cyclotides in their diet as well as the importance of the circular structure of the protein.

Professor Marilyn Anderson heads the La Trobe University biochemistry laboratory at which much of the research was carried out. She says cyclotides are found at high levels in the leaves, stems, and roots of several plant species such as Rubiaceae and Violaceae.

## Initial work by a Norwegian Red Cross worker

The cyclotides used in this study were first isolated from the plant *Oldenlandia affinis* in Africa the 1970s by a Norwegian Red Cross worker, Dr Lorentz Gran. However, it was not until 1995 that the circular nature and the structure of one of the cyclotides, known as 'kalata B1', was solved by Professor Craik.

Professor Anderson says the project began six years ago when a La Trobe PhD student fed the kalata B1 cyclotide

to a lepidopteran larva and noticed that it stopped growing. Subsequent studies found that cells in the larval gut, responsible for absorbing nutrients, were either damaged or destroyed.

More work indicated that higher concentrations of cyclotides destroyed these gut cells, while lower levels led to the shedding of the cells, a process that could be reversed when the protein was withdrawn from the larvae diet because the cells regenerated.

The new study shows that while control larvae doubled in size, larvae on high-concentration kalata B1 diet did not grow and consumed very little food.

'Ingestion of cyclotides caused marked changes in the midgut of lepidopteran pests and provides an explanation for the observed insecticidal activity of cyclotides,' Professor Anderson says.

'At the highest concentration of cyclotide very little diet was consumed but the larvae did not die, which suggests the cyclotide is not highly toxic – and that the failure to grow was probably caused by the lack of nutrient intake.'

Turning to their work on the molecular structure of the cyclotides, the researchers say: 'Because a break in the peptide backbone was sufficient to neutralize kalata B1 activity in this study, we suggest that the circular backbone is important in maintaining framework stability, which, in turn, is essential for insecticidal activity.'

All of which, Professor Anderson says, is very significant information for biological scientists and agricultural industries seeking new, more environmentally friendly forms of pest controls. ●



The La Trobe research team, from left, Professor Anderson, Dr Marshall, Ms Barbeta and PhD student Amanda Gillon.

# Equal prey in prehistoric times?

## Ancient tool kit raises questions about gender roles

RESEARCH INTO A 14,000 YEAR OLD tool kit found in an excavation in Jordan – described as one of the most complete and well-preserved of its kind – has provided rare insights into the daily activities of prehistoric people.

The work, by senior lecturer in Archaeology Dr Phillip Edwards, was published in the latest issue of the prestigious international journal, *Antiquity* and featured on Discovery Channel.

The ancient tool kit, believed to have been a hide or wicker bag carried over the shoulder, contained items including a sickle, flint spearheads, core for making more spearheads, smooth stones possibly used as in a slingshot and gazelle toe bones used to make beads.

Dr Edwards' research explored questions such as whether the toolkit belonged to an individual or a group of foragers – and whether it was used for short trips or longer journeys to seasonal sites.

'Did an individual perform all the functions implied by the bag's contents, that is to say flint knapping, point shaping, retooling, hunting, reaping and bead production?

'And if so, were gathering activities – often attributed as a female role in hunter-gatherer societies – and those of hunting and tool-making – often ascribed to males – carried out by individuals of either gender?

While questions about gender roles, and individual versus group provisioning, remain elusive, Dr Edwards told *Discovery News* that the owner of the bag was well equipped for obtaining meat and edible plants in the wild, such as wild wheat or barley.

Dr Edwards attributes the tool bag to the Natufian culture, from an archaeological site called Wadi Hammeh 27, where he was working during December and January when news of the find circulated world-wide following the article in *Antiquity*.



From left, Dr Edwards surveys the site of the former homelands of the Natufian people; the 'showpiece' sickle with its twin blades; and the entire contents of the tool kit, as found at the dig in Jordan.



He told *Discovery News* from Jordan that such bags rarely had compartments. 'The owner probably protected valuable items by wrapping them in rolls of bark or leather before placing them at the bottom of the bag.'

The sickle, made from two carefully grooved horn pieces, was fitted with color-matched tan and grey bladelets. 'It would have been a marvel of form and function for its day – and is the only tool of its kind ever linked to the Natufian people,' he said. The rest of the items were designed to immobilise and then kill game such as aurochs, red deer, hares, storks, partridges, owls, tortoises and the major source of

meat, gazelles.

'A lone hunter or a group of hunters might wait for gazelles to cross their path while waiting behind a low hide made of twigs and brush,' Edwards explained.

'They might have worked on making bone beads to wile away the time. Then a hunter could get off a shot while the animals were off their guard. A first shot might

wound, but not kill, and then a hunter or a group of them will track the wounded animal.'

Dr Edwards added: 'We don't know if Natufian hunters had the bow and arrow, or just spears.'

Mountain gazelles targeted by the Near Eastern hunters probably weighed between 39 and 55 pounds, so a strong adult 'could carry an entire carcass over his shoulders without much trouble.'

But the bag's owner wasn't necessarily a man. Dr Edwards said women were thought to have been in charge of plant gathering. The tools, therefore, either belonged to a woman hunter-gatherer, or work activities during prehistoric times were more 'gender-blind' than we thought, Dr Edwards theorised.

The Director of the French Research Center in Jerusalem, Dr Francois Valla, told *Discovery News* that similar ancient clusters of tools had been excavated, but that this was 'the most spectacular of them all'.

'The clustering of these items is due to a decision made by some Natufian individual,' Dr Valla said. 'As such, it is a rare testimony of the behaviour of a person 14,000 years ago.'

The showpiece item of the toolkit – a replica of the double-bladed sickle – is now on display at the Australian Institute of Archaeology, on the main Melbourne campus at Bundoora (Mont Park Estate). The Institute, a resource for the study of the Ancient Near East, was opened in February. ●

# AWARD FOR HEALTH PROMOTION

EXILED NUNS AND DROUGHT-affected families are among those to benefit from the work of La Trobe University's award-winning health promotion student, Julie Priest.

Ms Priest, a registered nurse who is completing a Masters of Health Science at La Trobe's Bendigo campus, has been awarded the Australian Health Promotion Association 2007 Victorian Health Promotion Student of the Year Award.

Ms Priest was recognised for her work in providing health kits to Tibetan nuns, helping create a community network to support families in Central Victoria, and for her role in planning a Community Expo in Bendigo to showcase community care options for older or disabled people who want to stay in their own homes.

While it may seem that there are few similarities between the work she did in Nepal and her work in Central Victoria, Ms Priest says the values and concepts underpinning health promotion remain the

same – social justice, equity, meaningful participation, inclusive partnership and appropriate access.

It was Ms Priest's long-standing interest in Buddhism that led her to undertake a month-long meditation retreat in Kathmandu in 1999, and the idea to work with the nuns in the exiled Tibetan community at Kopan soon followed.

'The nuns don't have much at all,' Ms Priest says. 'I wanted to do something tangible.' On her return to Australia she partnered with Women's Health Loddon Mallee and local women to create health promotion kits to distribute to the 400-strong nunnery.

'The kits included items we take for granted here in the west: toothbrushes, toothpaste, soap, antiseptic, bandages and first aid items, articles the nuns could use on a daily basis to promote health.'

Ms Priest is also proud of her involvement in the development of the Mount Alexander Community Children's



Network, to promote better health for children and their families. She says the drought has made the network even more vital.

'It affects the way parents parent and the way communities come together and help each other. When you have stress in families there is also an increased risk of anxiety and depression impacting on the ability of families to function effectively.'

'The network is looking at ways to better support families in the shire, perhaps with something as simple as establishing a playgroup in an affected area.'

Ms Priest says the award will help her to steer her career towards international health promotion work at both grass roots and policy development levels.

She says health promotion is gaining an increased profile with greater community awareness of issues such as obesity, physical activity, smoking, diabetes, hypertension and social isolation.

She says her studies have helped in her health promotion and community development role at Castlemaine District Community Health Centre. ●



## Easing the strain of print

Maysa Abouzeid, a La Trobe university student entering third year of a Bachelor of Arts, has lived more in a world of speech than text. She has an

outstanding flair for mimicry and an ear for accents. She can stand up and deliver a monologue to an audience of hecklers and even turn insults to her advantage.

But, due to visual impairment from birth, she has trouble keeping up with the reading required for university students. Now, thanks to a program introduced

at La Trobe for students with a print disability, Maysa is able to undertake her university studies to the point of dealing with the complexities of international politics and the subtleties of Hedda Gabler.

Maysa accesses her university materials via alternate formats such as large print, Microsoft Word documents and DAISY (Digital Accessible Information System) talking books.

Her materials are converted to alternate formats by a small team of people from the University's Alternate Format Service who dedicate hundreds of hours per

semester to assisting students with a print disability. Maysa gave delegates at a recent conference at La Trobe an insight into how they can help students with a print disability.

The University hosted the inaugural Alternate Format Conference in January at its Bundoora campus. The conference brought together tertiary-sector practitioners of alternate formatting from 29 institutions from across Australia and New Zealand, says La Trobe Accessibility Resource Officer, Anthony Earl, who organised the event. ●

# Teachers need to **span** knowledge gap for **CIT** generation

LA TROBE UNIVERSITY Professor Margaret Robertson sees a world of education without borders – where the internet and Google have left teachers goggle-eyed, worried about how they can develop skills quickly enough to meet the learning needs of young people in this rapidly changing society.

Professor Robertson is Research Director in the Faculty of Education. She carries out international research on sustainable development, geographical education and the latest digital information and communication technologies.

Her work includes the introduction of teaching and learning with global positioning systems, associated geographical information systems and online connectivity – areas, she says, that are arguably at the frontier of mainstream information access.

She works in partnerships with teachers and young scientists, and is team leader and chief investigator of e-learning research funded

though a variety of bodies including an ARC Linkages project with the Victorian and Tasmanian Departments of Education.

A former researcher at several overseas universities – most notably at the University of Cambridge where she continues her links with UK-based colleagues – Professor Robertson also has associations with the universities in Helsinki, Finland, NIE in Singapore and Songkla in Thailand.

Professor Robertson says research in Britain – ‘Childwise’, the latest survey of children’s online behaviour – reported 85 per cent of five to 16-year-olds accessed the internet, and more than a third (including a quarter of five to six-year-olds) owned a computer or laptop.

‘On average, they go online over four times a week, two

Professors Robertson, left, and Galton



hours each time. Research in Australia mirrors this trend. And teachers’ working lives are further complicated by increasing demands to convert all assessment and curriculum reporting to online formats.

‘These research trends – of young people’s behaviour and management demands – highlight the importance of professional development for teachers critical for effectiveness in our digitised society.

‘Our research highlights the gap in teachers’ knowledge to meet these demands for our future citizens. One can only imagine that this knowledge-gap compounds the feelings

of frustration of many teachers in their attempts to maintain parity with other members of the workforce.’

To help address this issue, Professor Robertson in January hosted a visit to Australia of British colleague

Professor Maurice Galton for a series of summer schools. Research Director from University of Cambridge’s School of Education, Professor Galton’s classroom-based research spans three decades.

His findings highlight the pedagogical challenges facing teachers and gaps in their expertise to make these changes.

Professor Galton has also carried out joint studies on the working lives of teachers, to be published by Sage, titled, *Teachers under Pressure: The impact of the workforce remodelling agreement.* ●

## Teaching with a **Swedish** gloss

The education of school teachers at La Trobe comes this year with a Swedish gloss, thanks to an exchange program between the University’s Bendigo campus and the University of Umea.

Twelve 4th year Bachelor of Education (Bendigo) students are spending three weeks in the snowy north of the country observing how their Swedish counterparts educate the next generation.

Emphasis in the early years of Swedish schooling is on teaching children social skills and social responsibility, says La Trobe literacy lecturer Debra Edwards.

‘Scandinavian schools have a history of welfare and children’s rights and responsibilities,’ she says. ‘Subjects such as reading start in the first year of school when children are aged seven, but formal goals are set for the end of the 5th and 9th year, rather than every year as in Australia and there is no formal assessment until after the 8th Year.’

By contrast, schools in Australia have a more academic focus, she says. Children are expected to be reading by the end of Prep when the curriculum becomes increasingly delivered in

written form and those who are not proficient readers tend to fall behind.

‘We’ve lost a lot of the developmental play and oral language from the early years of school,’ Ms Edwards says, ‘by focusing so heavily on the academic skills of numeracy, reading and writing.’

Swedish children, she says, learn to problem-solve with others. Most of their early learning is negotiated with students selecting from a list of tasks.



‘This encourages independent learning right from the beginning.’

The La Trobe exchange program is aimed at opening teachers’ minds to the social and emotional sides of education emphasised in another culture. ●

## Germaine Greer visit for Austen conference

**A**BOUT 500 people took part in a two-day international conference on Jane Austen and comedy held recently by La Trobe University's English Program and the Victorian Association for the Teaching of English.

Speakers came from Australia, the UK, India, the USA, Switzerland, Japan, New Zealand and Italy. The gathering built bridges between university scholars

and teachers of literature in the senior years of secondary schools.

The opening lecture was given by Professor Germaine Greer. Professor Greer said Austen's *Mansfield Park* demonstrated the strength of young women's passions and dramatised the way nineteenth-century society drove these passions underground.

The resilient vitality of the Austen heroine, Professor

Greer said, derived from the way she learned the wisdom of not wearing her heart upon her sleeve. Jane Austen's enduring popularity, she added, may have something to do with the continuing usefulness of reticence and reserve as a female survival strategy.

Social events included a comedy performance by Julia Zemiro, host of *RocKwiz*, and a gala dinner at Montsalvat Café. ●



Professor Greer in conversation with Vice-Chancellor Professor Paul Johnson at the conference.

### Electronic engineering link with Thailand

Electronic engineers from La Trobe University are helping boost research in Thailand by teaching techniques for analysing semiconductors at Udon Thani Rajabhat University to make solar cells.

The initiative is headed by Dr Brian Usher and sponsored by Australian Business Volunteers. With La Trobe recently acquiring a new X-ray diffraction facility, Dr Usher sent his former system to the Physics Department at Udon Thani. He spent two months there over the summer vacation – accompanied by Saowalak Saengkae, a Thai Masters' student – installing the equipment and training staff how to use it.

The donation followed an earlier visit when Dr Usher spent a month at the Thai university teaching about semiconductor materials and devices. 'With this equipment they will develop a deeper understanding which will facilitate their entry into solar cell research. Udon Thani will also fund one of its staff to carry out PhD research at La Trobe,' Dr Usher said. ●

## Shot in the arm for **intelligent** machines

THEY MAY BE FAST AND smart, but will 'intelligent machines' ever compensate for their lack of consciousness?

La Trobe University scientists in Melbourne have joined forces with colleagues in India, Singapore and Japan in a privately-funded venture to develop 'emotionally intelligent' information and communication technologies that can interact with humans in an emotionally intelligent manner.

La Trobe experts in business management and IT and information technology specialists from Singapore-based Aadyana Holdings Pte Ltd

are working on emotionally intelligent systems for a range of applications – to improve recruitment and benchmarking decisions in human resources, patient assessment in pre and post-operative health care, and decision-making in managing critical events, security, biometrics and law enforcement.

The University has filed to patent its core technology as a 'Method and System for Monitoring Emotional State Changes'. Chief inventor and Associate Professor in Business, Dr Rajiv Khosla envisages the joint venture will also incorporate other technologies – developed

and proven in the market by industry partners into human-centred systems, and business intelligence applications originally developed at La Trobe.

Dr Khosla says the emotionally intelligent recruitment and benchmarking system can generate 'organisation-based benchmarks and profiles to determine emotionally and culturally fit employees'.

The University – through its School of Business in the Faculty of Law and Management – and Aadyana Holdings will launch the joint

venture company, Human Mind Innovations Pty Ltd, to research, develop and license their technology globally. The company also aims to develop a Research Centre of Excellence and promote research and training in emotionally intelligent and human-centred systems and technologies.

The partners intend their joint venture will initiate, nurture and develop strategic alliances with industry and research institutions in Australia, Singapore, India, Japan and USA. ●



Professor Flannery addresses staff and students during a multi-campus lecture hook-up.

## Call for greater role by universities in **sustainability education**

**H**OW DO we find ways over the next 50 years for nine billion people – most aspiring to a western standard of living – to co-exist on this planet with dignity and sustainability?

Speaking at La Trobe University in February, environmental scientist and author Professor Tim Flannery said universities were a core element in the social response to climate change and sustainability. Their role in effecting such change today was as important as that of the social justice movement in the 19th century, when slavery and child labour were considered the norm.

Universities helped build future generations of leaders, and young people were very aware of the need

for sustainability, he said. ‘Governments should also rank universities on the basis of sustainability audits, and I believe students will look very closely at that as a key performance indicator.’

Professor Flannery said teaching sustainability was central not only to science education and the training of technocrats. ‘It is also about a philosophy of life, a change in philosophical orientation and our place in the world.’

La Trobe University, Professor Flannery said, provided him with a broad and liberal education. ‘It was an enriching and wonderful experience. The 21st century is about building a sustainable society, and it is good to see this University, my old alma mater, taking that challenge seriously and,

perhaps, it could be a leading institution for this Australia.

‘It is up to places like this University and its alumni to produce people who can rise to the great challenges of this century and produce truly revolutionary and wonderful outcomes.’

See ‘How green is your campus?’ page 16.

### **Alumni Award for Tim Flannery**

Former ‘Australian of the Year’, conservationist Professor Tim Flannery, and Australia’s Ambassador to China, Dr Geoff Raby, are among winners of the 2007 La Trobe University Distinguished Alumni Awards, which will be presented at a ceremony in March. ●

## **Head of new Dental School**

Professor Peter Wilson – a former specialist and educator in restorative dentistry at the University of Melbourne – has taken up his post as head of La Trobe University’s new Dental School in Bendigo.

The La Trobe School is the first to be opened in Victoria since 1904, and only the second in Australia in more than 60 years. It enrolls its first 50 students this year. When they graduate in 2012, Professor Wilson says they will begin to alleviate the national shortage of dentists, particularly in rural and regional areas.

A leading figure in the discipline of Prosthodontics, Professor Wilson has helped shape international standards



for dentistry. He graduated from the University of Newcastle upon Tyne in 1984, training in hospitals and working in general practice in the UK before gaining a Fellowship in Dental Surgery and Diploma in Restorative Dentistry from the Royal College of Surgeons of Edinburgh in 1987.

He became a lecturer in restorative dentistry at the University of Melbourne in 1991, completed his PhD there, and went on to develop its graduate program in Prosthodontics, turning it into the leading program in Australasian. For the past 13 years he also played a key role in revising the University of Melbourne’s undergraduate dental curriculum.

### **Honorary degree for leading sociologist**

The University has awarded the degree Doctor of Letters (honoris causa) to Professor Jeffrey Alexander of Yale University, USA in recognition of his contributions to sociology and cultural theory and close association with the Sociology and Anthropology Program at La Trobe. Professor Alexander, one of the world’s most influential sociologists, visited the University as guest lecturer of La Trobe’s new Centre for Cultural Sociology. The Centre – formerly known as Thesis Eleven Centre for Cultural Sociology – has been expanded to include Critical Theory and Historical Sociology, co-ordinated by Dr Trevor Hogan and Professor Peter Beilharz; Culture and Religion (Dr John Carroll and Dr David Tacey) and Nations and Identities (Dr Stefan Auer and Dr Anthony Moran).

## OAM award to Michael Torney

Director of Student Services and CEO of the La Trobe University Guild, Michael Torney, has been awarded a Medal of the Order of Australia (OAM) in the latest Australia Day Honours list for service to the community, particularly through the La Trobe University Students' Union, and to tertiary sector professional associations. Mr Torney joined La Trobe in 1973 and was formerly General Manager of the La Trobe University Union. He is also a founding member of the Australasian Campus Union Managers' Association which sponsors an annual award named in his honour. ●

*Continued from page 4*

## Back to the 'Silk Road' in troubled times

Innovative Universities European Union Centre and the University of Melbourne's Contemporary Europe Research Centre, and opened by La Trobe Vice-Chancellor, Professor Paul Johnson.

The conference featured more than twenty papers by speakers from twelve countries. They analysed the way Europe and Asia were handling issues of identity, religion and culture in global and regional geopolitics.

A conference organiser, international relations researcher Mr Ben Zala, said French international relations scholar, Professor Bertrand Badie, emphasised the changing nature of power in world politics. Professor Badie said social groups, terrorist cells, warlords and religious leaders were more active in international affairs, while states, militaries and diplomats were increasingly reacting to events rather than setting agendas.

Former Chinese Ambassador to Iran, Hua Liming, discussed

the Iran nuclear dispute. He said he was deeply worried by possible escalation of the conflict, and stressed the need to focus on non-proliferation rather than regime change. He argued that the United States, Russia, the European Union and China were unified on nuclear non-proliferation, but differed in their approach. These differences have given Iran room to manoeuvre.

Professor of Politics at the University of San Francisco, Stephen Zunes, told the conference US policy makers had overemphasised military power, thereby seriously mishandling complex political, social and economic problems. He said the result has been a more anarchic international order in Afghanistan, Iraq, Lebanon and Iran – making legitimate counter-terrorism efforts more difficult. ●

*Continued from page 5*

## Microchip with cosmic potential

will reveal whether the performance of the LNA is as good as the design model suggests. Buoyed by the results so far, the LNA team are now considering as their next project the design and implementation of a fully-integrated receiver system using the same advanced Peregrine process.

According to Mr Andrew Brawley, Managing Director of Peregrine Semiconductor Australia, the LNA will serve not only as a prototype for developing a world-leading integrated receiver design, but – because of its capacity to operate at milli-Kelvin temperatures – will also offer prospects for the Quantum Computing Project (a multi-million dollar research quest for a supercomputer that operates at near-zero temperatures). ●

# Smart meters could be smarter

Victoria is to be one of the first places in the world to introduce 'smart meters' to try and control the spiralling drain on its electricity grid – with air-conditioners, according to La Trobe University PhD student, Andrew Mackie, high on the list of worst offenders when it comes to electricity consumption.

Mr Mackie, who has been an engineer for 20 years, says the meters will be read electronically every half hour. This type of smart meter is called an 'interval meter' and enables consumers to be charged more at critical peak periods to reduce demand.

'An airconditioner,' he says, 'might only cost a consumer \$400, but for each unit electricity supply authorities have to spend about \$4,000 on upgrading network capacity to prevent the grid collapsing.'

Mr Mackie is investigating ways of helping solve this problem by simulating the way meters are read remotely. 'We need a new communication system that is cheap and has a high data rate,' he says.

This, in turn, would enable power bills to 'send better price signals' to consumers and help manage power demand.

Mr Mackie is using the capacity of La Trobe's unique co-generation plant on the main Melbourne campus at Bundoora, the sub-station under the Thomas Cherry building and local power points to develop such a system.

'La Trobe is like a suburb. Electricity – which in the University's case is generated by a gas-fired turbine – is distributed through 22,000 volt lines and then converted into 240 volts for local use.'

Mr Mackie has done a mathematical model of the distribution system so that

he can predict what a signal from a socket looks like at the sub-station. He has established that the carrying capacity of electricity lines is, in theory, 10,000 bits per second, yet available technology runs at only 60 bits per second.

'There is a huge gap between what is possible and what is implemented,' he says. There are some sophisticated channel access schemes available that have been developed for cellular phones. But there seems to be no incentive for developing these so we can have cheaper ways of reading electricity meters.'

He says the State Government has insisted on using proven technology in its rollout of smart meters, yet this is a new application with new requirements.

'Although the Government's approach may not result in the cheapest possible infrastructure, a cost to be born directly by the customers, the rollout of interval meters is still a good idea.'

'The interval meters will undoubtedly result in electricity customers flattening their demand. If you are being charged, say fifty dollars an hour to run your air conditioner during a critical peak, you are quite likely to switch it off and put up with some discomfort.' ●



# How green is your campus?

IT'S BEEN A SUCCESSFUL YEAR for 'Green' initiatives at La Trobe University – culminating in the inclusion of environmental sustainability in the University's new Strategic Plan, launched from the start of this year.

During the past 12 months the University has gained WasteWise Accreditation from the State Government and achieved a large reduction in waste that goes to landfill.

It has negotiated computer and mobile phone recycling agreements and appointed 90 staff environmental reps in many academic and administrative areas on its campuses to achieve new environmental goals during the coming year.

Mr Barry Inglis, Director Buildings and Grounds, said La Trobe has committed more than \$367,000 to sustainable transport initiatives. This includes the building of a new \$270,000 bike centre near the Bundoora campus library and continued support for 'ride to work' and car pooling initiatives. ●

## Fifteen years of energy saving at La Trobe

**B**ETWEEN seven am on Monday and eleven pm on Friday La Trobe University's main Melbourne campus at Bundoora produces its own electricity.

The campus has its own natural gas-fired co-generation power plant which supplies almost all the electricity that the University uses. The plant is highly efficient, converting 70 per cent of gas into energy, almost double that of traditional coal-fired generators.

'Co-generation' refers to the production of two or more forms of energy from one fuel source. Because the total quantity of fuel is reduced, this creates cost savings and cuts greenhouse gas emissions.

'Waste heat' – a by product of electricity generation – is used to produce thermal energy in the form of high-temperature water. This is then reticulated around the campus and used to produce heating, domestic hot water, sterilisation and run (reverse-cycle) cooling systems.

Deputy Director (Operations), Robin Young says the plant was installed in 1993 under an incentive package from the Victorian Government. At the time, the government wanted to reduce the need to invest in new power stations, reduce reliance on a few very large coal fired power stations and reduce greenhouse gases.

Mr Young says 'La Trobe's objectives were to cut energy costs, demonstrate a commitment to the environment – in particular to reduce greenhouse gas

emissions – and have a back-up power supply to reduce the effects of power outages. 'The plant can take over if the grid fails and vice versa. The plant also improves the quality of power and protects computer and laboratory equipment from interruptions to the power supply.'

Mr Young says that originally the plant was of vast economic benefit to La Trobe as much of the electricity created was sold back to the grid, but 15 years on, as the population of the campus has grown, so has the amount of power consumed.

'However, there is still a net economic benefit to the University and this benefit will increase substantially if a carbon tax is introduced, electricity prices rise or there is an increase in mandatory renewable energy targets.'

Mr Young says the plant has given good service and is scheduled for a possible upgrade in 2011, the extent of which will depend on the economic and environmental benefits at the time. ●