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Success by degrees

Frances O'Connor from stage to screen

Square Kilometre Array

Radio astronomy to unravel mysteries of the Universe

The university art gallery

A treasure trove of education and culture

Cite (sɔit) *v.* To put forward thought-provoking arguments; to offer insightful discussion and new perspectives on topics of social, political, economic or environmental relevance; to report on new thinking. Sight (sɔit) *n.* A feature or object in a particular place considered especially worth seeing. *v.* To frame or scrutinise community, research and business initiatives; to present points of view on current issues. Site (sɔit) *n.* The location of a building or an organisation, esp. as to its environment. *v.* To place or position in a physical and social context.

cite

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CHRISTA SOMMERER AND LAURENT MIGNONNEAU, EAU DE JARDIN © 2004

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SAM PROCTOR

CURTIN'S commitment to serving the community through innovative teaching and learning programs and cutting-edge research is illustrated in this twelfth issue of *Cite*. From the humanities to the sciences, I invite you to read about the diverse ways we remain relevant, both locally and globally, in a rapidly changing environment. Some stories celebrate the successful achievements of individuals within our University community, while others provide an insight into important and exciting research initiatives. All stories exemplify our hands-on and forward-thinking approach to what we do.

Moving forward with radio astronomy, Curtin and joint partner The University of Western Australia will lead the new multi-million-dollar Centre of Excellence for Radio Astronomy and Engineering recently announced by the West Australian Premier, Alan Carpenter. The announcement is part of a significant effort by the State to help Australia secure the world's largest radio astronomy project – the $2 billion Square Kilometre Array (SKA). Curtin is committed to boosting Australia's chances of winning the SKA project and the new Centre of Excellence will move us into the best possible position to win the SKA site bid, expected to be announced in 2011. 'Back to the Future' highlights our contribution to this revolutionary project and explores how and why the SKA is set to revolutionise science and what we know about the evolution of the Universe.

Sustainability is a critical challenge facing us in the 21st century. Leading Curtin's research into this vital area is world-renowned sustainability expert Professor Peter Newman, and in 'City Views' he tells us what we need to do to address the issue and how he came to specialise in an area 30 years before 'sustainability' entered the vernacular.

The sustainability – and viability – of university art galleries is addressed in 'Cultural Capital'. As a public space that invites people to connect with visual art, art galleries not only highlight the contributions of artists, but also contribute to the cultural capital of a city. This year, the John Curtin Gallery celebrates its 10th anniversary, and we look at its function as an educational resource and contributor to the arts.

Actor and Curtin alumni Frances O'Connor shares her journey to success in the competitive US market and how she has navigated her way from unknown amateur to a red-carpet regular. As an actor based in New York City, Ms O'Connor discusses the influence her university lecturers had on equipping her for a future on the stage and screen.

Professor Jeanette Hacket
VICE-CHANCELLOR
CURTIN UNIVERSITY OF TECHNOLOGY

JAMES ROGERS

Joint winner of the Calibre Prize for an Outstanding Essay Rachel Robertson

SAM PROCTOR

Acclaimed author Elizabeth Jolley's books go online

HANS VERSLUIS

Former Vice-Chancellor Lance Twomey

High calibre

Doctor of Creative Arts student Rachel Robertson shares this year's Calibre Prize for an Outstanding Essay, offered by the *Australian Book Review* and Copyright Agency Limited.

'Reaching One Thousand' is Robertson's autobiographical essay about the impact maths and numbers has had on her life, from a child with parents who are mathematicians through to the present time with her autistic child, who also has a strong interest in numbers.

"I wrote this from the point of view of a daughter of two mathematicians who dislikes numbers and then finds her own son is quite into numbers," Robertson says.

The winning essay will form part of the major thesis of her degree; a series of autobiographical essays around the issues of parenting but told from different angles.

"I chose Curtin deliberately for the DCA, firstly because you explore a single research question in two ways – through the creative writing as well as the academic process – and secondly because of the supervision," Robertson says.

"The supervision has been highly professional and the support from the Humanities faculty for postgraduate students is really excellent. I am really enjoying my experience."

Surprised and thrilled at winning the award, she says the prize money of $5,000 will enable her to attend the International Association of Biography and Autobiography conference in Honolulu later this year, and return home via the UK to undertake much needed research into the place of her childhood.

"I also see the prize as recognition that my work is of publication standard, and now I can aim to raise the rest of the work to that standard," Robertson says.

Jolley good show

The work of award-winning Australian author Elizabeth Jolley has been made accessible to a global audience, with the launch at Curtin of the Elizabeth Jolley Research Collection online.

The collection is available as a completely searchable online database and in PDF format. It is the culmination of a collaborative effort of more than 20 years by staff from the Curtin University Library, and Associate Professor Barbara Milech and Emeritus Professor Brian Dibble.

Curtin librarian Imogen Garner says it is a unique and worthy testament to Elizabeth Jolley's rich life and literary works.

"The collection is a valuable, virtual research resource for general readers and scholars of Jolley's work," she says.

At the heart of the collection is *Elizabeth Jolley: A Bibliography 1965-2007* which consists of the author's published works, and includes stage and film adaptations, media interviews and articles on her work, from profiles to book-length studies.

The collection also includes a brief online biography, a full list of the awards and honours Jolley received, and many of the artworks associated with her life and work.

Well known to Curtin, Elizabeth Jolley was invited by Professor Dibble to teach on a part-time basis in 1978 at the then Western Australian Institute of Technology (now Curtin). Jolley later became writer-in-residence and a tutor, who endeavoured to impart her well-earned experience to many a student.

"Elizabeth enjoyed a happy and rewarding relationship with the University, spanning almost four decades," Dibble says. "She valued a 'room of her own' in which to think and write."

Another honoured moment

Former Curtin Vice-Chancellor Professor Lance Twomey was awarded an Honorary Doctorate of Technology at the graduation ceremony for the Faculty of Health Sciences at the Bentley campus earlier this year.

Honoured for his outstanding work in physiotherapy and education, and for his contribution to the University and the broader community during his long academic career, Twomey was also awarded the title of Emeritus Professor.

In his acceptance speech, he said of his 37 years at Curtin that it was "wonderful, exciting employment, with a multitude of challenges and a great deal of joy and satisfaction".

He also said that contrary to media opinion, he believes Australia's health care systems are held in high regard worldwide.

"Our health care professionals are superb, we fight well above our population weight when it comes to the quality and quantity of health and medical research, and Australian graduates in all health disciplines are eagerly sought as employees in most foreign countries," he said.

Curtin's position strengthened both nationally and internationally during Twomey's Vice-Chancellorship. Through his entrepreneurship and strong belief in partnerships, he improved accessibility to higher education for regional Western Australians by establishing regional campuses and innovative online learning opportunities. He worked tirelessly to promote Indigenous education within Australia and, with the establishment of a campus in Sarawak, Malaysia, in 1999, new educational opportunities emerged for the University.

BACK TO THE FUTURE

STORY Kitty Drok
ILLUSTRATION Emma Thomson

The Square Kilometre Array is a mega-fast radio telescope set to revolutionise science and technology; unravelling the mysteries of the Universe and providing the next big wave of technological advancement, with significant economic benefits for Australia.

WHAT do mobile phones, wireless networks and supercomputers have in common with pulsars, black holes and the cosmic microwave background of the Universe? Developments and improvements in the former have resulted from research carried out in radio astronomy, a science studying the Universe and its origins. According to Professor Peter Hall, Curtin's newly appointed Professor of Radio Astronomy Engineering, radio astronomy has always returned technology to industry.

"This is because the demands of radio astronomy are so tough," he explains.

"The receivers have to be so sensitive, data transmission has to be so fast, computers have to be so advanced – and all of that is directly applicable to other industries."

Associate Professor Mervyn Lynch, of the Department of Imaging and Applied Physics at Curtin, agrees: "The astounding thing is that you can now get a mobile phone for free. Zero dollars for all of that technology! But wireless technology has arisen from radio frequency engineering, and the cutting edge of that happens in astronomy."

A recent example is the 802.11 wireless technology that underpins several current Wi-Fi standards. It was patented by a CSIRO group in 1996, working on a radio astronomy initiative.

The next big wave of technological advancement is likely to come from the development of the Square Kilometre Array (SKA), set to become an iconic mega-science instrument of the 21st century. It regularly makes media headlines because the scope of the project is truly enormous, and it might be built in Western Australia.

The SKA has a nominal €1.8 billion (AUD $3 billion) price tag, and annual operating costs of €100 million (AUD $1.69 million) over a projected 50-year lifespan. It will be a new-generation radio telescope, 50 to 100 times more sensitive and 10,000 times faster than any radio telescope available today.

It will essentially be a vast network of individual antenna stations, with a total signal-collecting area of one square kilometre. But the telescope itself will be much bigger than a square kilometre. Much, much bigger. The individual antennas, numbering in the thousands, will be grouped in a few hundred locations known as stations. Approximately half of the collecting area will be concentrated in an inner array spread over an area of about five kilometres. Another 25 per cent of the collecting area will be placed within a diameter of 150 kilometres, and the remainder as far away as 3000 kilometres or more. If the SKA is sited in Western Australia, some antennas may be as far away as New Zealand, or even South Africa – but still be part of the one instrument. This distribution of antennas gives a combination of ultra-high sensitivity for the detection of very faint (and therefore very distant) objects, and very high resolution, to provide images with a large amount of detail.

The concept for the SKA was first developed in 1991, with an International Working Group (now comprising 17 countries) formed in 1994. Professor Hall (then of CSIRO and until recently the International Project Engineer for the SKA) and Professor Ron Ekers, now an adjunct professor at Curtin but then the Director of the CSIRO Australia Telescope National Facility, began Australia's research and development involvement in 1999. Their foundation work resulted in Australia being shortlisted in 2005 as a proposed site for the SKA. The field has since been narrowed to only two sites, Western Australia and Southern Africa, with a final decision expected to be made in 2011. Phase 1 of construction will start in 2012, and part of the array will be available for research by 2015. Complete construction and operation of the SKA is expected by 2020.

IMAGE CREDITS CLOCKWISE FROM TOP LEFT: ROB MILLENAAR, SETI INSTITUTE, XILOSTUDIOS, NRAO, T.A. OOSTERLOO/ASTRON, XILOSTUDIOS, W.J. KLEPPE, ASTRON, ATA.

UNDERSTANDING THE MYSTERIES OF THE UNIVERSE

The SKA will address five key astronomy areas:

ONE
Evolution of the early Universe
Determining star formation, galaxy evolution, clustering and the development of the large-scale structure of the Universe.

TWO
Dark energy
Through studying the clustering of galaxies over cosmological time, 'dark energy', believed to compose 70 per cent of the current energy density of the Universe, can be measured indirectly.

THREE
Search for life in the Universe
Studying the processes of planet building around young stars, identifying Earth-like planets, and probing for 'leakage' radio emissions from other civilisations.

FOUR
Einstein's theory of general relativity
Pulsars are the Universe's most accurate 'clocks', and are very sensitive to gravitational and relativistic effects. Through identifying and timing many of the pulsars in the galaxy, Einstein's theory can be tested at the ultra-strong field (high gravity) limit, transforming our understanding of gravitational physics.

FIVE
Cosmic magnetism
Magnetic fields fill interstellar space, are essential for the onset of star formation and affect the evolution of galaxies and clusters, but their origins and evolution are unknown. Three-dimensional maps of cosmic magnetism will be generated across different Universal epochs, for comparison with the predictions of various models.

Due to its unprecedented sensitivity, speed, and wide field of view, the SKA will be able to map vast areas of the sky very quickly, in much more detail than was previously available. By detecting very faint objects it will allow astronomers to see much further back in time, receiving signals from the early Universe, and revealing how distant stars and galaxies formed after the 'Big Bang'.

Using the SKA, scientists will be able to probe the most fundamental questions in the physical Universe (see inset left).

AUSTRALIA'S bid to host the SKA has been recently bolstered by a Western Australian Government pledge of $20 million to establish an International Radio Astronomy Research Centre in the State. Premier Alan Carpenter said that the Centre would "add to Western Australia's already significant radio astronomy research capability, and will be a comprehensive centre for pure radio astronomy science as well as developing new ICT and engineering systems". The Centre will involve Curtin University of Technology, The University of Western Australia (UWA), CSIRO, research institutions and industry, with involvement from other national and international research institutions and industry partners.

Curtin and UWA, via the new Curtin Institute of Radio Astronomy (CIRA), will also lead a $2.3 million Centre of Excellence for Radio Astronomy and Engineering. The Centre will help to establish Western Australia as a major science and engineering hub for the development and deployment of the SKA.

Given that construction of the SKA will require unprecedented amounts of money, time and breakthrough technologies not yet developed, the international partners in the SKA project are currently undertaking a range of 'Pathfinder' projects, to smooth the path of its development. Pathfinder projects aim to develop and prove the innovative technologies needed for the SKA, and will be used to help finalise the SKA design. Pathfinders are demonstrating what the technology can deliver and what it will cost to implement. Once built they will be used to undertake some fundamental science experiments. Several questions about the Universe still need to be answered before the SKA design can be finalised. As Hall explains, "sometimes you need enough information to be sure of the right questions to ask, before you can build the instrument capable of answering them".

The SKA Pathfinders, while mitigating the risks (both economic and scientific) of the SKA project, will also have lives of their own. As powerful new-generation telescopes, they will be used in the longer term for research in their own right (see inset right).

The proposed Australian site for the SKA, the Murchison Radio-Astronomy Observatory (MRO) at Boolardy Station, 300 kilometres north-east of Geraldton, is hosting a number of Pathfinder projects, with Curtin playing a significant role in most of them. ASKAP, the Australian Square Kilometre Array

Pathfinder, is an international collaboration led by Australia to build an array of dishes using wide field-of-view, phased array feed technology.

"It is quite pivotal to the development of the SKA," Hall says.

"It is one of only two projects worldwide trying to prove this reference design technology, and will give us a lot of information about building and operating this type of instrument in a hostile environment."

If the SKA is built at the MRO at Boolardy Station, the economic benefits for Australia will be enormous.

"A consortium of 17 governments will be contributing the funds to build this instrument," says Professor Steven Tingay, Professor of Radio Astronomy, from the Department of Imaging and Applied Physics at Curtin.

"But Australian companies will be in a unique position to tender for a lot of the infrastructure work – there will be thousands of kilometres of fibre optic cable to be laid, buildings to construct, and site works for all of the antenna stations, power systems and communications, not just supply and installation of high-tech electronics. The project is just so big, it's a bit like building the entire Perth CBD from scratch over 10 years."

Lynch concurs: "It will take teams of people, engineering and design studies – the works. Entire businesses can come and go over that timeframe. And the ongoing maintenance and technical support once the SKA is built will also have a huge economic impact for the host nation. For example, the SKA will be driven by one of the biggest supercomputing centres in the world – just running that will be a huge business. And the influx of people, talent and expertise that will be attracted to Perth as a result of the SKA will have enormous benefits for our local industries and institutions – it's hard to put a value on that."

Regardless of where the SKA is built, Australia will be able to tender for development, supply and installation of many of the components for the SKA, and will directly benefit from the technological advances made along the way. With improvements in supercomputing, managing and archiving massive data sets, data mining, fibre-optics, communications, wireless networks, engineering, construction and manufacturing, development of the SKA is set to revolutionise the science and technology that affects us every day.

And, as always, advances in our fundamental understanding of the Universe may lead to as yet unimagined real-world applications. So next time we look up at the night sky, who knows what brave new world we might envisage? c

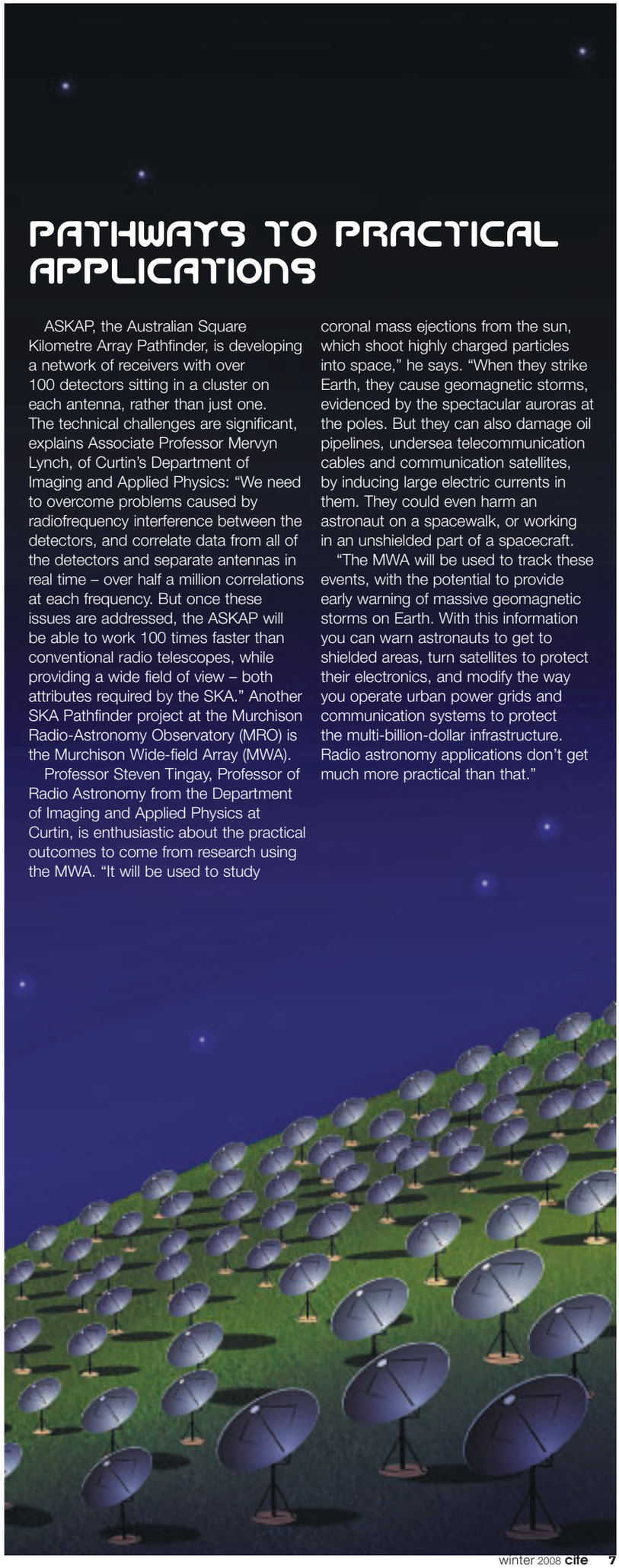
For more information:
astronomy.curtin.edu.au

PATHWAYS TO PRACTICAL APPLICATIONS

ASKAP, the Australian Square Kilometre Array Pathfinder, is developing a network of receivers with over 100 detectors sitting in a cluster on each antenna, rather than just one. The technical challenges are significant, explains Associate Professor Mervyn Lynch, of Curtin's Department of Imaging and Applied Physics: "We need to overcome problems caused by radiofrequency interference between the detectors, and correlate data from all of the detectors and separate antennas in real time – over half a million correlations at each frequency. But once these issues are addressed, the ASKAP will be able to work 100 times faster than conventional radio telescopes, while providing a wide field of view – both attributes required by the SKA." Another SKA Pathfinder project at the Murchison Radio-Astronomy Observatory (MRO) is the Murchison Wide-field Array (MWA).

Professor Steven Tingay, Professor of Radio Astronomy from the Department of Imaging and Applied Physics at Curtin, is enthusiastic about the practical outcomes to come from research using the MWA. "It will be used to study coronal mass ejections from the sun, which shoot highly charged particles into space," he says. "When they strike Earth, they cause geomagnetic storms, evidenced by the spectacular auroras at the poles. But they can also damage oil pipelines, undersea telecommunication cables and communication satellites, by inducing large electric currents in them. They could even harm an astronaut on a spacewalk, or working in an unshielded part of a spacecraft.

"The MWA will be used to track these events, with the potential to provide early warning of massive geomagnetic storms on Earth. With this information you can warn astronauts to get to shielded areas, turn satellites to protect their electronics, and modify the way you operate urban power grids and communication systems to protect the multi-billion-dollar infrastructure. Radio astronomy applications don't get much more practical than that."



STORY Glenys Haalebos
PHOTOGRAPHY Shutterstock

A Curtin researcher is developing the humble lupin grain into a range of food products with all the attributes of junk food minus the health risks.

healthy junk food?

THERE'S a lot to be said about junk food – and none of it's good. Combined with increasingly inactive lifestyles, our love affair with junk food is wreaking havoc on our bodies and our health.

Despite continuing public programs promoting healthy eating, Australians are consuming increasing amounts of junk food. According to the Australian Bureau of Statistics (ABS), in 2003 and 2004, expenditure on fast food and meals out was the highest single component of Australian households' weekly food and non-alcoholic beverage bill. At $42, this compared to $10 spent on fruit and nuts and $11 on vegetables.

Fruit and veggies are low on the menu. In *Australia's Health 2006*, the Australian Institute of Health and Welfare revealed that 93 per cent of males and 89 per cent of females consumed inadequate amounts of vegetables, and 58 per cent of males and 44 per cent of females don't eat enough fruit. The report estimated that insufficient fruit and vegetable consumption is responsible for three per cent of Australia's total disease burden and contributes to our increasing obesity.

Underlining that statement is the ABS 2004-05 National Health Survey which showed that 62 per cent of men and 45 per cent of women were overweight or obese. Perhaps even more disturbing is that we are busily creating heavy future generations, with up to one-third of children aged between six and 11 overweight in 2003-04.

In a world where, paradoxically, thinness bordering on the skeletal is peddled by the fashion media as ideal, being overweight is not just a matter of aesthetics. Often-preventable chronic conditions, including diabetes, cardiovascular disease and osteoporosis, are associated with excess weight.

Junk food has poor nutritional value, containing high levels of fat, salt, sugar and food additives, and lacking proteins, dietary fibre and vitamins. Yet an American survey found that junk food is popular because "it's convenient, people like it, (it's highly flavoursome and has strong visual appeal), it's heavily advertised, more affordable and people don't know which foods are healthy".

So, how do we deal with the junk food epidemic?

Curtin's Program Leader of Food Science and Technology, Associate Professor Vijay Jayasena, in the School of Public Health, is taking a different approach to solving the problem. He's seen the lack of behaviour modification from public education programs – "even my eight-year-old daughter knows what food is good and what's bad, but she doesn't want to eat the good food," he says – and recognised an opportunity.

Jayasena has developed a range of lupin-based food products which he believes can revolutionise the junk food industry.

He is a big fan of lupins – with good reason.

"One thing about lupins which no other grain can match," he enthuses, "is their 30 per cent dietary fibre content and low (almost zero) starch content. They are also high in protein (30-40 per cent), low in oil (six per cent) and low in Glycemic Index (GI)."

Research has shown consuming lupin-enriched foods can reduce cholesterol levels, reduce weight, lower hypertension, suppress appetite and improve bowel health. This mini miracle food is a legume like soya beans but delivers a bigger health punch for about half the cost. And it's home-grown – Western Australia produces about 80 per cent of the world's lupins.

> "Putting all this together, I thought we could use lupins to make a popular 'junk food' look-alike product, to keep the same attractiveness," Jayasena says.

"This way, kids and teenagers will eat it without realising it's good for them."

Jayasena's research team has produced a range of high protein/high fibre lupin-based foods, including breakfast bars, muffins, biscuits, lupin crisps, noodles and pasta. Lupin-enriched bread and breakfast snacks are already available in WA supermarkets.

"Eating 100 grams of lupin crisps will provide kids (12 to 18 years) with 100 per cent of their Recommended Daily Intake (RDI) of dietary fibre, 60 per cent protein, 50 per cent magnesium, 30 per cent potassium, 25 per cent phosphorus, and eight per cent calcium," Jayasena says.

"We're keeping the appearance, texture and taste similar to popular foods already in the market, while dramatically increasing protein and fibre, and reducing sugar and fat. In fact, fibre content is increased by 200 to 300 per cent."

And the taste?

Jayasena has blind-tested products containing varying percentages of lupin.

"People only begin to spot a difference in most of the products when the lupin content is greater than 30 per cent, although some products with 75 per cent lupin are also acceptable, so we're expecting a good market response to the commercial product," he says.

HELPING to commercialise some of the new wonder foods is Sam Chisari, managing director of Belmar Foods Pty Ltd, whose current focus is getting the right percentage of lupin blend for the pasta products and working on colour and texture.

"We've been working with Curtin on developing healthy food products for almost three years and this is a very exciting project," he says.

"I'm thrilled by the quality and amount of protein and dietary fibre in lupin. And using lupin is also cost-effective."

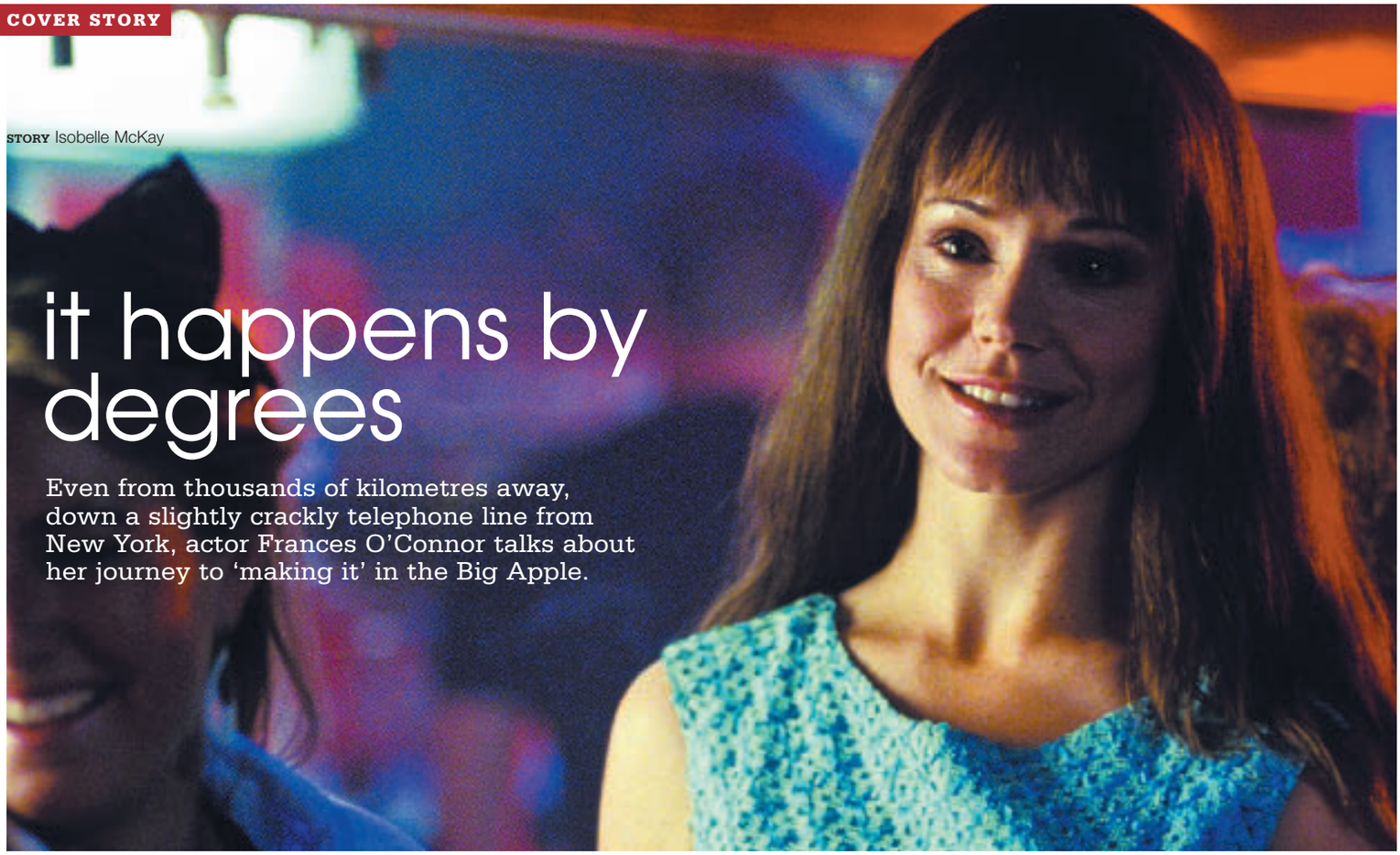
Chisari and Jayasena believe their products could be ready for commercial production in about a year.

Says Jayasena: "We've only been working on lupin food development for two to three years, so going from development to production in four years would be a great achievement." c

APPROXIMATE COMPOSITION OF COMMERCIALLY AVAILABLE POTATO CHIPS AND LUPIN CRISPS

Contents	Potato chips*	Lupin crisps	Increase (decrease)
Protein	8%	35%	300%
Fat	30%	20%	(- 30%)
Starch	40%	1%	(- 95%)
Dietary fibre	3%	25%	700%
Energy/100g	2100kJ	1400kJ	(- 30%)

* values on a commercial brand, pre-packed potato chips package



STORY Isobelle McKay

it happens by degrees

Even from thousands of kilometres away, down a slightly crackly telephone line from New York, actor Frances O'Connor talks about her journey to 'making it' in the Big Apple.

FRANCES O'Connor's lifelong passion for acting may have started in high school, but, by her own admission, when she started studying creative writing, literature and theatre arts at Curtin in the 1980s, she still had a lot to learn.

"We did *Animal Farm* and I played Molly, the horse – I was very excited," she says, chuckling at the memory.

"I remember doing *Look Back in Anger* in the theatre upstairs, but I don't think I was very good, actually, in that production. It was a little bit of a challenging role for someone who's about 18."

O'Connor has since risen to become one of acting's rarest creatures: a critically acclaimed and consistently working actor, who deliberately shies away from the gaze of the paparazzi.

Born in Berkshire, England, educated in Perth and now a jetsetter who splits her time between London and New York, she is a long way from the wide-eyed young undergraduate she once was. However, she fondly remembers her tentative first steps into the acting industry, under the watchful eye of her lecturers at Curtin.

"It was a great course to do when you're straight out of school," O'Connor says.

"I did a film unit too that I really loved – that also sparked my interest and broadened my perspective about film."

However, it was working in Curtin's theatre department which Tony Nicholls had set up with Barbara Dennis that ignited O'Connor's passion for the stage.

"From my perspective they seemed very sophisticated and worldly – Barbara had been an actress in England and Tony came from Britain as well. They were the real deal," O'Connor says.

"That was the first time I was ever exposed to what theatre really is and can be. They took the students seriously and that's kind of nice when you're 18 years old."

After a year working in Japan, O'Connor went on to study acting, singing, voice and movement at the WA Academy of Performing Arts before following in the footsteps of many young graduates by 'heading east' to pursue her career. At that point, she says, if someone had told her she'd one day be traipsing the red carpet in glamorous dresses and in the company of mega-wattage stars, she would have scoffed.

"Now it's kind of surreal. It's even surreal to be living in New York," she says.

"At the times in my career when I've had a lot of exposure, I've never really been very comfortable with it, I don't really court it. But these things happen by degrees, so by the time you get there it feels kind of natural, because it's not like it's just happened overnight."

Curtin's Head of Communication and Cultural Studies, Dr Ron Blaber, is justifiably proud to count a "shining star" like O'Connor among Curtin's graduates.

To date, O'Connor has enjoyed lead roles in 17 films and been nominated for a swathe of industry awards around the world. A favourite for period pieces on account of her porcelain, delicate features, she was nominated for a Golden Globe Award for her role in the BBC's *Madame Bovary*. She also starred in the Michael Crichton-inspired film *Timeline* and played Brendan Fraser's love interest in *Bedazzled*. But she says scoring her first lead roles in films on three continents is among her proudest achievement: *Love and Other Catastrophes* in Australia, *Mansfield Park* in Britain and *Artificial Intelligence* in the US.

O'Connor is also an accomplished stage actor, having been nominated for an *Evening Standard* Theatre Award in the Best Actress category for her role in *Tom and Viv* in London's West End, where she also starred in *Cat on a Hot Tin Roof*.

But it was *Cashmere Mafia*, a US television series based in New York and described as a "thinking woman's *Sex and the City* mixed with the wit of *The Devil Wears Prada*", that seemed destined to catapult her into the stratosphere. Also starring fellow Australian actor Miranda Otto and 'Charlie's Angel' Lucy Liu, the show premiered to much hype in the US this year, only for a spanner to be thrown in the works after seven episodes, with the crippling entertainment industry writers' strike. The future of the show remains uncertain.

Frances O'Connor as Tanya in the movie *Three Dollars*

O'Connor admits she was tempted into the role after a two-year hiatus caring for her son, Luka, now almost three, when she saw parallels between her character's life and her own.

"I thought the character and the concept of it was great – it was about women in the workforce, and the fact that my character was a mother as well was something I could relate to," she says.

Now philosophical about the short-lived experience – "being an actor, you can't really plan for the future," she says – O'Connor is already in talks for film and television projects in several continents. She is keen to work with cinematic greats, including Paul Thomas Anderson (*There Will Be Blood*), Sam Mendes (*American Beauty*) and Alejandro González Iñárritu (*Babel*), and wishes to one day also return to Australia, or at least work here more frequently.

One man who would be delighted for that to happen is her proud father, Brian O'Connor, a highly regarded Emeritus Professor of Physics, who worked in Curtin's Department of Applied Physics for 32 years.

In fact, O'Connor says, her father was one of her biggest fans, regularly turning up to performances on campus to cheer her on.

She laughs when asked if she thought her father harboured any secret desires for her to follow in his footsteps rather than inhabit the artistic world of her music composer mother, Jennifer O'Connor.

"I think he was really happy for me to be doing something from a different world. I was never very scientific-minded," she says. c

cultural capital

STORY Gail Robinson

In our search for meaning and mind-expanding experiences, Western Australians tend to travel the world. Yet much of what we're looking for can be found right here in the cultural treasure troves of our public art galleries, including the John Curtin Gallery which celebrates its 10th anniversary this year.

IT'S a secret less than a quarter of our locals have discovered, and former Director of the Art Gallery of WA, Alan Dodge, thinks that's because 'the arts' overall don't have a big profile in Perth.

"I do think people have an appetite for it though," he says, noting that the preference is often for the performing arts.

"People enjoy them because they can just turn up and get entertained. On the other hand, you have to work at gaining a dialogue with visual art."

This cultural conversation can be stimulated, suggests respected Melbourne-based artist Brook Andrew, when universities establish art galleries on campus.

"Universities are very important to our society, and to have a show at one is a pinnacle for an artist," he says.

"The work is seen by people who wouldn't normally see it in a gallery."

Andrew brought the world to Perth for his recent exhibition, held at the John Curtin Gallery (JCG). Eye to Eye, presented by the Monash University Museum of Art, is his contemporary take on Indigenous identity and history. He used neon lighting and powerful imagery, and linked visually loud spaces with others that were more subtle and contemplative. In short, the exhibition was a wholly physical experience of exactly the kind an art gallery should deliver, according to JCG's Dean of Art, Professor Ted Snell.

Snell feels that even in this era of global access to imagery, it is impossible to replicate the experience of standing in front of an artwork.

"The work we present is designed to be something you can't experience any other way," he says.

"Often the way JCG presents work is about engaging the viewer not just through the eyes but the ears."

He is passionate in his belief that "an art gallery can change your life, your perspective on the world".

While JCG's focus is on contemporary artwork, Snell says his comments apply to all forms of art, including the historical artworks and artefacts of which public art galleries are the custodians. Together with ideas, heritage sites, buildings and traditions, art galleries hold the secrets of our culture and society, and form the basis of our city's cultural capital, a resource we can draw on to better understand our unique identity.

One city that relies heavily on its university art gallery to shape its cultural landscape is Palo Alto, in California. Its Stanford University's family-friendly arts centre comprises 24 galleries, and each has a different focus on art from a collection that spans 4000 years. Dodge has visited it twice.

"It's an excellent example of an art museum driving the cultural capital of a city," he says.

"It's a very active part of the university community and the town. Everyone sees it as an asset."

It is barely surprising, given that Stanford's collection was created with an endowment of some $15 million and the same amount is raised again every year from donors. What is exciting is that Snell cites Stanford University as a benchmark for the international best practice that JCG is aiming for.

"Our vision is to be a leading museum presenting contemporary art in Australia and to have an international reputation for presenting work at an international standard," Snell says.

As part of the benchmarking process, JCG was instrumental in the formation of the University Art Museums Australia group, which links eight university art museums around Australia. Criteria for involvement ensures each member is building a significant collection (which is the role of an art museum as distinct from simply a gallery), and is a serious player focused on broadening their appeal to a wider public.

Dodge has experienced many university galleries in his international career. His observation is that some have a better reputation than others.

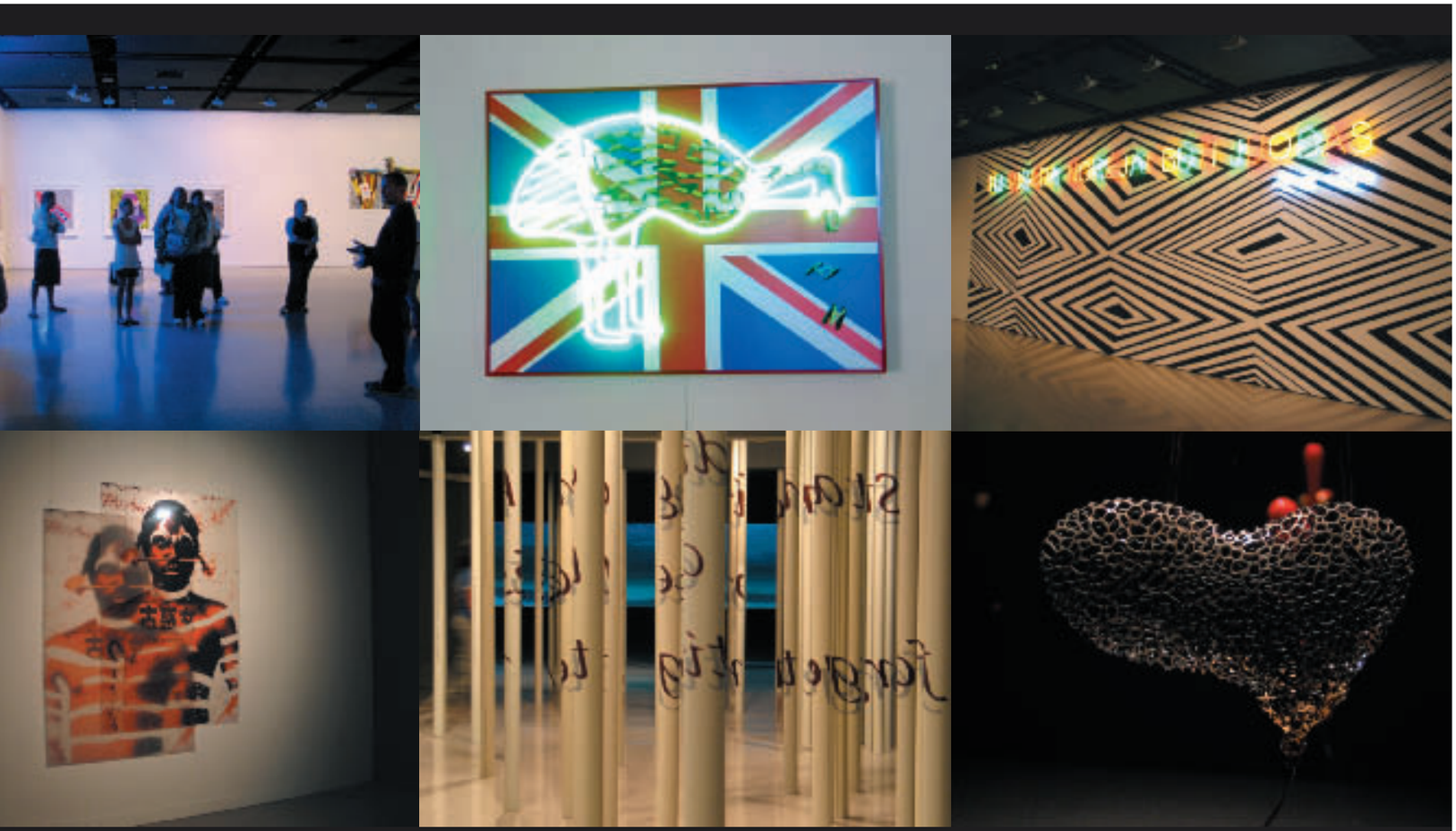
"That includes JCG," he says. "It's a state-of-the-art gallery, the spaces are beautiful."

Andrew concurs.

"It is an incredible space – it's big and has high walls, so I can really play with the work," he says.

"It allows the public to be seduced by the space. And the team (that worked to put the show together) is fantastic."

Curtin's former Senior Deputy Vice-Chancellor, Lesley Parker, would be proud. In 2001, three years after JCG was constructed at the hub of the campus, she was reflecting on what had been achieved. She wrote: "It was a visionary and ambitious project that identified Curtin as a different kind of university, one that was enterprising and valued culture; a 'Heart and Soul' University."



Clockwise from left: Matthew Ngui, *Swimming; at least 8 points of view*, 2007. Brook Andrew, *Emu*, 2004. Brook Andrew, *YOU'VEALWAYSWANTEDTOBEBLACK (white friend)*, 2006. Kim Stanley Medlan, *Masquerade*, 2006. Matthew Ngui, *Untitled/Standing on high ground, one looks down, forgetting the universe above*, 2008. Brook Andrew, *Sexy & Dangerous I*, 1996.

THIS year JCG celebrates its 10th anniversary and is producing a book showcasing exhibitions, major artists and key people who have been involved. It reads like a 'who's who' of the contemporary art world. Some of them are former art students of Curtin who, with the support of JCG, have proceeded to build international reputations. Others have come from around the world and across Australia. One is renowned Brisbane photographer Tracey Moffatt, who continues to keep in touch with the gallery from her current home in New York. In a recent email she wrote that "… to this day I have never seen my Hollywood montage films presented so well as in the show I had at Curtin in 2004".

This international reputation complements the international perspective of the University. It also, says Snell, broadens the horizons of students and their understanding of both their own and other cultures.

"This is vital in a global marketplace and is important if they are to operate professionally in the world," he says.

JCG's exhibition program has been set as far ahead as 2010, and is a fine balance of both international and Australian artists. Each exhibition has been chosen using just two criteria. Firstly, it must be cutting-edge contemporary art, and secondly it must complement another area of the University's teaching and research programs.

Building a bridge to other areas of its university is a vital component in ensuring a university art gallery retains its relevance as part of the institution's 'core business'. In JCG's case, a previous exhibition, IMAGinING Antarctica, was partnered with the Centre for Marine Science and Technology. Brook Andrew's show was partnered with Curtin's Centre for Aboriginal Studies (CAS).

The Centre's link with the exhibition was synergistic, according to its Director, Associate Professor Anita Lee Hong.

"We have an interest in anything to do with Indigenous culture and in supporting a fellow Indigenous person," she says.

"And even though art isn't represented in the program, talking about how our identity is represented in art is very relevant."

Lee Hong also thinks the students get more out of an exhibition when the Centre is sponsoring it.

"Having their name on it gives them a sense of ownership," she says.

This was demonstrated when students were taken for a tour of the exhibition and given a talk by Andrew.

"The students were blown away. Brook's contemporary style of work was really important, as it reinforced that Aboriginal art has a lot of different forms and mediums," Lee Hong says.

Students from CAS are also planning to use JCG's Access Gallery, a space dedicated both to student work and shorter exhibitions with a community focus. The students will show work they create using digital media to explore their own identities.

This isn't CAS's first association with JCG. The Centre partnered the earlier Indigenous Art & Healing exhibition and has previously loaned artwork in support of JCG's growing collection, which currently comprises 2200 objects.

The collection includes work by international artists, but the majority is Australian, with a focus on Indigenous art from the western half of Australia and WA art since 1968. It has been built by selected acquisition and through donations of artworks from private collectors. But the key to building a strong collection, says Snell, is to continue to target particular works for acquisition in order to fill gaps and tell a complete cultural story.

Some of the funding for these acquisitions comes from the University. While Snell says the contribution is generous, the additional cost of staging contemporary art exhibitions isn't always covered. In Andrew's show, for example, the neon lighting needed specialist technicians. And the geography which defines Perth as the world's most isolated capital city means shipping the best contemporary art across Australia is a real financial strain.

Unlike other public galleries, university art galleries must apply for any government funding. JCG has been successful in gaining some project grants from the Department of Culture and the Arts and the Australia Council for the Arts, but in order to maintain a commitment to excellence, JCG instead looks to private donors and the corporate sector for support.

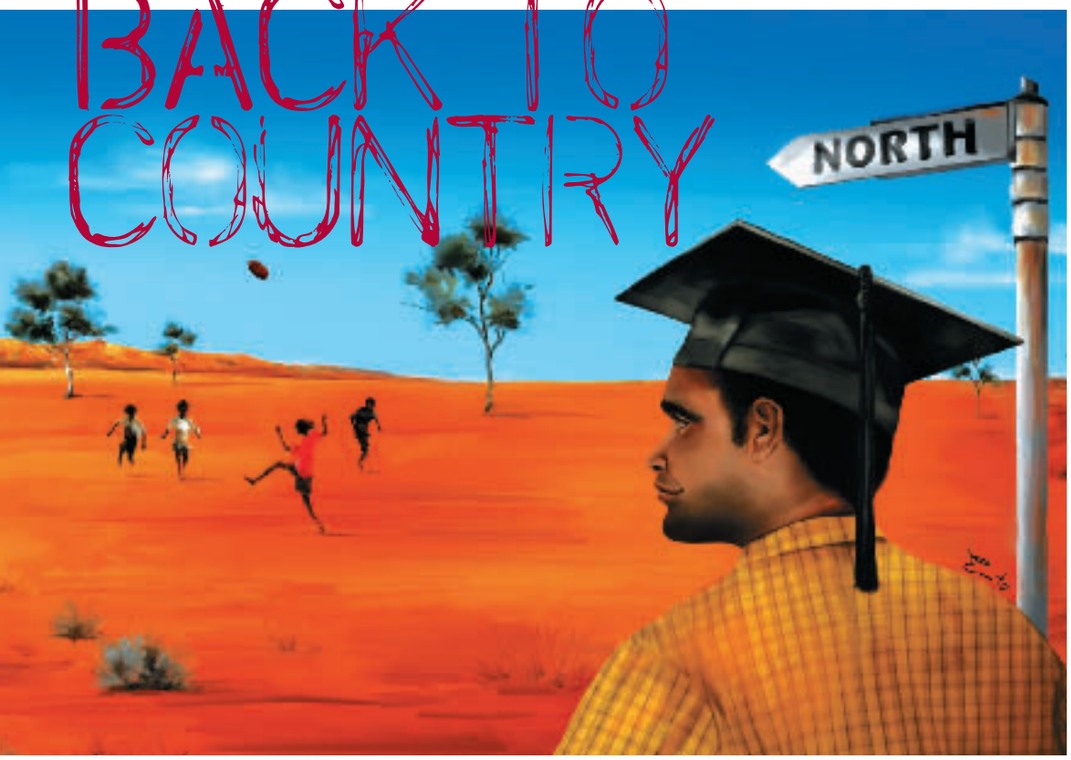
International education organisation Navitas Limited has been a major corporate sponsor for three years. Its agreement is coming up for renewal and chief executive officer Rod Jones says he sees no reason why it won't continue.

"While it gives the company a bit of exposure, and there is a logical link between the international operations of both entities, that's not what the sponsorship is all about. Our board is very community focused," he says.

"There's so much emphasis these days on success being measured by assets and money, but art can define a society." c

For more information:
johncurtingallery.curtin.edu.au

EDUCATION COMES BACK TO COUNTRY



STORY Jane Scott
ILLUSTRATION Emma Thomson

Indigenous graduates from Curtin's Bachelor of Education Conversion Course have headed north to teach in remote areas, and they are making a positive contribution to local students and schools, and the wider community.

REMOTE and rural areas of Western Australia are struggling to deal with the effects of a shortage of school teachers, particularly a lack of Indigenous educators. While the problem is apparent in many areas and schools across the State, the teacher shortage continues to hit hardest in the regional areas where placements are often difficult to fill. Thanks to Curtin's innovative Bachelor of Education Conversion Course (BECC), however, a large number of Indigenous graduates are now heading north to teach in schools in remote communities. In many cases these graduates are returning to their own communities – coming back to country.

BECC was developed in 2002 as a program to enable existing Aboriginal and Islander Education Officers (AIEOs) working in schools throughout the State to convert their qualifications to a Bachelor of Education. The program is an ongoing partnership between the Faculty of Education and the Centre for Aboriginal Studies (CAS) at Curtin, and the participating community schools whose support is fundamental to the program's success.

A major focus of the course is to support the philosophy of educating Indigenous people in their communities and training them for leadership. The program educates and trains existing AIEOs to become skilled teachers and leaders in Western Australian schools, and to be agents of change for their own communities and the wider community.

Associate Professor Anita Lee Hong, Director of CAS, says that the majority of the graduating BECC students have taken up full-time teaching roles this year, with a large number being placed at regional or remote schools.

"It is wonderful that there will be such a large number of Indigenous teachers going into the workforce and having the opportunity to teach their own people," she says.

The Indigenous population is significantly under-represented in Western Australian schools. Figures from the Department of Education, Employment and Workplace Relations for 2007 show Indigenous people constitute 3.2 per cent of the State population but comprise only 0.6 per cent of Department of Education and Training (DET) teachers. At the end of 2007, a total of 25 Indigenous BECC students graduated from Curtin, representing an 18 per cent increase to the 142 Indigenous teachers working in DET schools across the State.

Catherine Donaldson, BECC team leader, says the evidence supporting the ways in which the teaching graduates are contributing to their communities is still mostly anecdotal, although some quantitative data is now becoming available. For example, the full-time appointment of a BECC graduate to a primary school in Kalgoorlie has resulted in an increase in attendance of young Indigenous students at the school from 30 per cent to 80 per cent in the last 12 months.

The positive effects on the schools and rural communities of being provided with more Indigenous teaching graduates can be seen at One Arm Point Remote Community School (RCS), located some 218 kilometres north of Broome. The school is part of a coastal community situated on a narrow point of land, bordered by ocean on three sides, and serves a community of about 400 Bardi people.

Keith Bedford, one of BECC's recent graduates, has been placed at the school to teach physical education, technology and enterprise to students from pre-primary to Year 10. He is also the school's coordinator for their Languages Other Than English (LOTE) program.

With approximately 95 per cent of the students attending One Arm Point RCS being Indigenous, the appointment of a full-time Indigenous teacher is seen as extremely beneficial to the school community.

According to the Principal, Stephen Price, Bedford's appointment has brought a greater perspective of Indigenous issues and points of view to the school, and an increased Indigenous voice at decision-making and planning meetings.

Bedford's skills and experience are contributing positively to the school and the community, particularly in terms of his engagement and interaction with the students, and his cultural knowledge of family relationships. He has also overcome new difficulties and challenges in his role as the school's LOTE coordinator. Bedford is from Fitzroy Crossing, where the main Indigenous language spoken is Kriol, but he is coordinating the program at One Arm Point RCS in the local Bardi language.

As the first person in his family to graduate from university, Bedford says that his family members are extremely proud of his achievement.

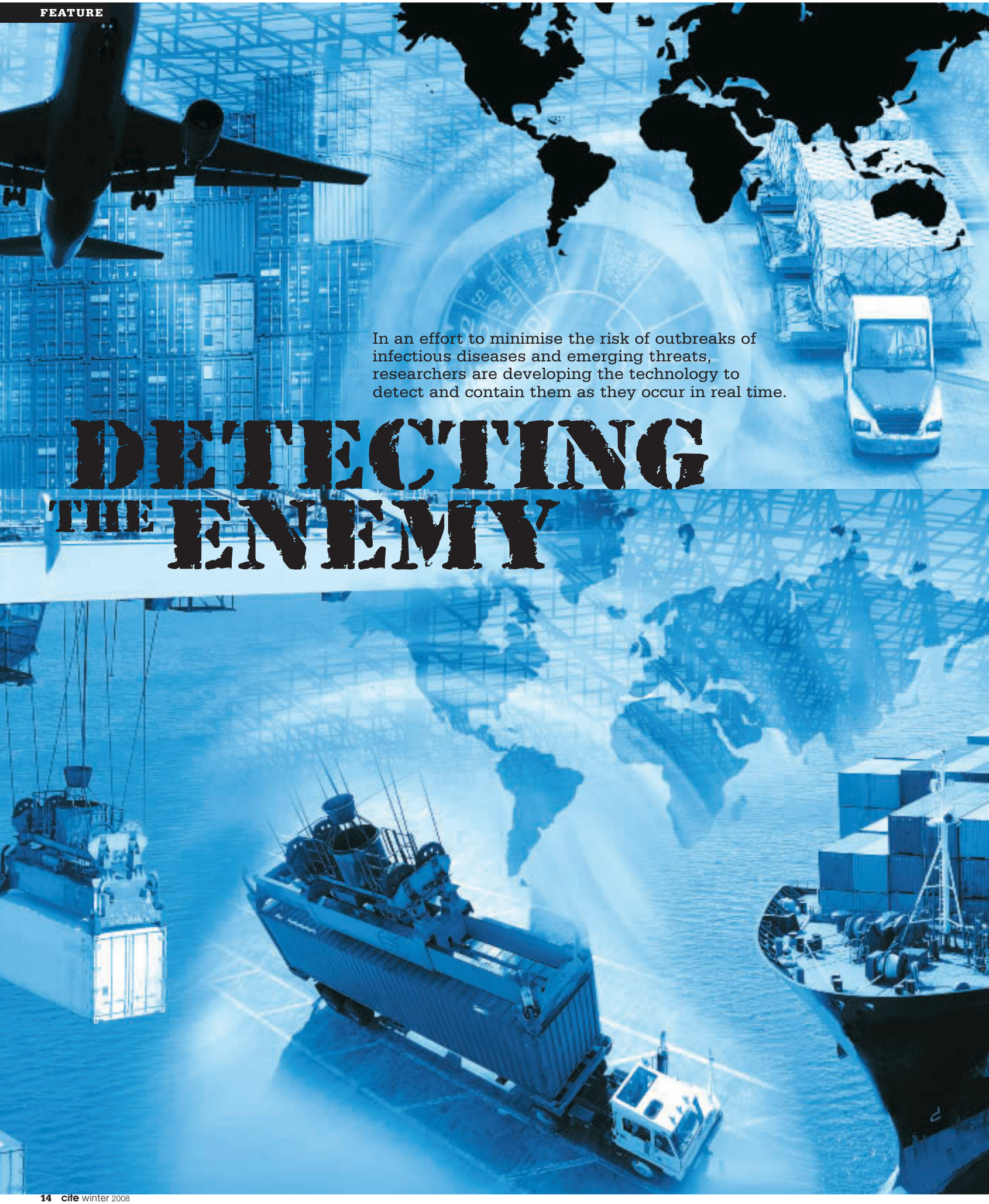
"I really hope this sets a good example for my kids and other children in my extended family, and that it encourages them to also go to university," he says.

His comments show the positive effects of providing qualified Indigenous educators to communities in rural and remote areas across the State. A culturally appropriate learning environment assists both Indigenous and non-Indigenous students to study, question and explore ways of learning and working. c

campus life

Curtin's Fitness Centre actively promotes healthy living to the community. It offers the latest gym facilities and enthusiastic staff who help people reach their health and fitness goals. Fitness professionals Sue Turnor and John Bontempo sometimes go the extra mile. They dressed up as fruit and vegetables during Eat Fit Week, handing out fresh snacks to promote the message that a good exercise program and healthy eating habits provide greater health benefits when combined, rather than practised one without the other.

JAMES ROGERS



In an effort to minimise the risk of outbreaks of infectious diseases and emerging threats, researchers are developing the technology to detect and contain them as they occur in real time.

DETECTING THE ENEMY

STORY Isobelle McKay
PHOTOGRAPHY Shutterstock

IT'S 2003 and the headlines are screaming. Communicable infectious disease experts are flooding into Hong Kong and Hanoi after reports that a mystery flu-like illness has killed a 48-year-old American-born man within days of his presenting at hospital in Vietnam, and left scores of health workers critically ill in his wake. The outbreak sweeps Asia, with about half of the reported cases developing into deadly pneumonia.

Curtin research fellow Professor John Mackenzie, then Professor of Microbiology and acting CEO of the new Australian Biosecurity Cooperative Research Centre for Emerging Infectious Disease (AB-CRC), at the University of Queensland, receives a phone call from the World Health Organization (WHO).

His brief is to lead a team into China to investigate the possible source of this baffling disease and, particularly, to investigate strong rumours it had emerged in Guangzhou province. The illness – severe acute respiratory syndrome (SARS) – was quickly contained, but only after a worldwide panic which cost US $100 billion in our region alone.

Today, Mackenzie warns that the threat of an influenza pandemic with far worse consequences remains acute.

"We're certainly due, because they happen every 15 to 40 years," he says.

Asian flu occurred in 1957 and disappeared after 11 years, but not before it killed about two million people; a relatively small number compared to the Spanish Influenza pandemic of 1918-19, which killed up to 50 million people – about 1.4 per cent of the world's population. Fears of a new pandemic were heightened in 2005 after the WHO raised concerns that the H5N1 virus which caused Avian influenza was becoming more adept at infecting people, and was developing resistance to drugs.

However, Mackenzie says no evidence of sustained human-to-human transmission has yet occurred and, as time goes by, it is beginning to look less likely.

But should a new pandemic viral strain with a similar high mortality rate emerge, he says, the results could be devastating.

Working with colleagues at the AB-CRC, from its Perth headquarters at Curtin, Mackenzie has helped to develop a risk assessment model for emerging infectious diseases in northern Australia – the country's 'gateway' to Asia. He was also involved in writing the technical brief for the WHO Bi-Regional Asian-Pacific Strategy for Emerging Diseases, and remains a member of its Technical Advisory Group. The strategy is aimed at capacity-building in the region to enable countries to respond to outbreaks of emerging infectious diseases, following the introduction of the new WHO International Health Regulations which came into effect in June last year.

"They are a real quantum leap compared to the previous regulations – in the old ones, from 1969, we only had to report on four diseases – cholera, yellow fever, plague and smallpox," Mackenzie says.

"The new regulations are much broader and encompass all diseases which are considered to be 'public health emergencies of international importance'.

"There are a lot of expectations on countries to undertake all the necessary responses, but most countries can't – they don't have the labs to diagnose the new disease, or the epidemiological wherewithal to investigate outbreaks."

A part of WHO's Global Outbreak Alert Response Network since its inception, Mackenzie has been called on twice to assist in emergencies – for SARS and, in 2004, for tsunami relief in Banda Aceh. He has provided advice to the Department of Foreign Affairs on aspects of surveillance for detection of biological weapons, and has assisted in rewriting the guidelines for the United Nations Secretary-General's response to allegations of the use of chemical or biological weapons.

But it's emerging diseases – either novel diseases which have not previously been encountered, or known diseases which are spreading or have the propensity to spread – which present the biggest threats to human health.

These almost always result from human activities in some form or other, and may be as diverse as the development of multi-drug resistance or outbreaks of severe disease from wild animals, such as fruit bats or water birds. It may be even more complex.

"A mosquito can unknowingly be exported from Asia in old car tyres, or in nooks and crannies of ships, and enter the country and then become widely established," Mackenzie says.

"Next, someone may return to Australia infected with an exotic disease and these newly established mosquitoes can then bite this individual, and so transmit the disease to others.

"Indeed, this scenario happened just last year, in Italy. The Asian tiger mosquito, *Aedes albopictus*, had become widely established, and when a traveller returned from India infected with a tropical disease called chikungunya, rather like our Ross River fever, an epidemic resulted, with over 300 people infected."

The work of the AB-CRC is critical in preventing such outbreaks of diseases in Australia.

Curtin senior research fellow David Williams admits he has some fairly big shoes to fill as he takes over from Professor Mackenzie as principal investigator of the virus research group of the AB-CRC at Curtin. He is, however, well equipped for the task.

For the past two years, Williams has devoted much of his time to setting up two new, state-of-the-art biosecure laboratories at Curtin's Bentley campus. Within the labs, researchers are working in collaboration with a leading virus research laboratory at Columbia University, in New York, to develop new diagnostic technologies to detect the genetic material of several different existing and emerging viruses.

"Columbia are really at the cutting edge: they've developed three new technologies that can be used for detecting entirely new types and species of viruses," Williams says.

"We're looking at one technology in particular called mass-tag PCR, which builds on a technique that has revolutionised molecular biology by amplifying DNA to levels that are detectable and workable, even if they occur in very small amounts."

The research team is using the technique to develop tests for diseases relevant to Australia, such as Japanese Encephalitic viruses and Murray Valley Encephalitis.

As well, Williams is investigating the genetic relationships and evolution of certain species of mosquito-borne viruses, and studying the infection of cells by emerging species of enteroviruses which cause epidemics of encephalitis and hand, foot and mouth disease in children throughout South-East Asia.

With South-East Asia being the 'cradle' of many emerging viruses, says Williams, the threat of diseases being easily able to spread into Australia is very real. Which is why, locally, Curtin's Dr Rochelle Watkins is concerned with how to make more effective use of streams of routinely collected data in identifying and managing outbreaks both of diseases that we already know about, such as hepatitis and food-borne illnesses, and emerging threats.

"Basically, we don't have really well developed methods to make good use of this data that we spend a lot of money to collect," Watkins explains.

In a project that began more than three years ago, in partnership with the late Professor Aileen Plant, Watkins has been developing algorithms able to analyse data as it comes in, to alert epidemiologists to outbreaks of disease. It is hoped to develop a test which can be applied to diagnostic data – where, for example, a GP has reported the information – and 'syndromic surveillance' for unusual activity.

"SARS, for example, would result in an unusually high number of people with specific symptoms arriving at an emergency department – it just stands out as unusual, even if you don't know exactly what it is," Watkins says.

Her work in the 'pandemic preparedness' of small business through a study funded by the National Health and Medical Research Council has also revealed a troubling picture of community attitudes to the threat of disease.

"Our focus groups and surveys in WA and NSW provided some of the first real data on just how poorly prepared some of the community is. People were aware of the issue but many believed the information was sensationalised and didn't represent a credible threat," she says.

"Basically, their attitude is that we'll deal with it when it happens. So it's about how you communicate that it's a serious threat, but also how you can do some sensible things to minimise the risk."

To minimise that risk, Watkins has designed a geographic information system based on postcodes, in collaboration with Curtin's Department of Spatial Sciences, to develop a simulator for diseases relevant to Western Australia, which is monitored in real time.

"We're simulating hepatitis A outbreaks at the moment (and) what it gives is a robust way to test the algorithms we're developing because you're allowing for a lot of natural variation," she says.

"A lot of algorithms exist, but none that does everything well. You want to be able to detect with 100 per cent sensitivity the events that you're interested in, with few false alarms.

"The tests are certainly showing promising results in the trials we've done so far." **c**

For more information:
abcrc.org.au

PHOTOGRAPHY Adrian Lambert

ambassadors of education

Curtin's student ambassadors have an active life motivating Western Australian high school students for the university experience. At high schools and expos, and on campus tours, the ambassadors tell students and parents what they like about studying at Curtin.

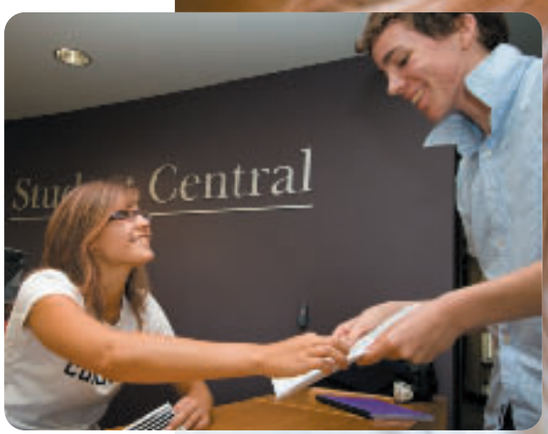
"Curtin provides many opportunities for students. I received an undergraduate scholarship, I'm involved in different clubs and societies, and soon I'll be studying abroad as an exchange student." **Yolanda Zaw**

"I've really liked being a Curtin engineering student and can't wait to be a part of the industry – I've already got a job lined up for when I graduate at the end of the year. The best thing about being an ambassador is answering questions. I would have appreciated hearing someone talk about uni life when I was in high school." **Mike Smith**

"I moved from Geraldton to continue studying commerce at Curtin. I live in the student village on campus, which is really handy and has an excellent inbuilt social life. Coming from the country to study was not the daunting experience I thought it would be." **Brodene Straw**

"There's far more to uni than studying. Outside of pharmacy, I make the most of the opportunities offered, and I encourage others to do the same. Organisations such as Curtin Volunteers, the student guild, and sport and recreation groups offer plenty of scope to get involved outside the classroom." **Cameron Wright**

"I thought uni was going to be a really serious life. You do want to learn and do well, but sometimes you need to chill. I let students know about the student guild – they're very proactive people and they create a lot of spirit around campus." **Luke Webster**



SAM PROCTOR

"I really enjoy studying occupational therapy. We do a lot of prac in the local community, which is great for getting us ready for a career when we finish uni, and gives us the chance to help people." **Kate Keisler**

SAM PROCTOR

STORY Glenys Haalebos
PHOTOGRAPHY Robert Frith

tools for teachers

Research focused on understanding the issues impacting on rural education has found that providing relevant support to teachers is the key to improving student outcomes.

THEY do it tough in the bush. And while the majority of regional and remote residents choose to live there and enjoy the lifestyle, the vagaries of climate, the distances, the high cost of goods and services, and issues of access to health care and education impact on their lives in ways city dwellers can't even imagine.

With education such a strong predictor of future life chances, it's a major concern to governments and educators that regional and remote students – who comprise approximately one-third of Australia's student population – are not achieving the same academic levels in science, mathematics, and information and communications technology (ICT) as their metropolitan counterparts.

Results of both international and national student assessments dramatically demonstrate this disparity.

The OECD's Programme for International Student Assessment (PISA) undertakes a triennial survey of the knowledge and skills of around 400,000 15-year-old students from 57 countries in science, mathematics and reading. The 2006 PISA results showed Australian students performed well above the OECD average in science, placing the nation eighth. However, when the regional and remote area scores were extracted, leaving only the capital city and large provincial results, the score zoomed, placing Australia third internationally. Scores for the remote and smaller centres dropped in science, mathematics and reading, highlighting their poorer academic performance compared with metropolitan schools. Similarly with mathematics, where Australia's overall score placed it thirteenth globally, the capital centre component placed the nation at fifth and, again, scores dropped for remote and smaller centres.

For younger children coming through the system, the same metropolitan/non-metropolitan divide exists, with a further inequity apparent between non-Indigenous and Indigenous students.

The National Report on Schooling in Australia 2006 looked at benchmarks for reading, writing and numeracy of students in Years 3, 5 and 7. From the category showing the highest results in numeracy – metropolitan – there is a progressive decline in results from provincial to remote to very remote areas in all three years assessed.

Attempting to redress these inequities, in 2004 the then Federal Department of Transport and Regional Services funded the establishment of the National Centre of Science, ICT and Mathematics Education for Rural and Regional Australia (SiMERR Australia). SiMERR's challenge was to achieve improved education outcomes for rural students in science, mathematics and ICT, and to reduce the professional isolation of teachers. It was the first national project of its kind, involving about 40 academics from nine universities, divided into eight state/territory hubs, and directed by Professor John Pegg of the University of New England.

In 2005 a team of Curtin academics, whose individual areas of expertise dovetail with the project's parameters, won a competitive application to become the Western Australian hub.

The WA hub's first activity was to participate in SiMERR Australia's National Survey in Science, ICT and Mathematics Education in Rural and Regional Australia, and to conduct case studies with teachers, parents and students in widespread WA locations, to understand the issues impacting on rural education outcomes.

Curtin's Associate Professor Sue Trinidad, SiMERR WA's ICT education coordinator, explains what they found: "The case studies highlighted key themes, many of which are interrelated. These include living environment, professional environment, community relationships, student transience, teacher attraction and retention, distance and isolation, curriculum leadership, teacher content knowledge, school-created curricula, integration of ICT, allocation of resources and teacher professional development. What we've since done is develop WA projects based on these findings."

As Curtin's Associate Professor Len Sparrow (the WA hub's Mathematics Education and Inclusive Education coordinator) points out, it's addressing teachers' needs that really makes the difference.

"They're the ones we can access more easily and work with, rather than trying to work with a whole class of children – we don't have the time or facilities for that, so we've focused on improving student outcomes by providing relevant support to teachers," he says.

Driving the development of SiMERR WA projects has been its research showing that professional development for teachers must be relevant to the local context, flexible and evolving, and provide 'people' professional support.

Says the WA hub's coordinator, Associate Professor Sandra Frid: "One size does not fit all. So many things happen in these schools – staff changes, student absenteeism, fluctuating student numbers. Having pre-set ideas just won't work. And it's not always more equipment teachers need, it's also people support and partnerships. It's about networking and breaking down that sense of isolation."

THE hub's work has shown there is vast potential for ICT innovations to benefit remote teachers and learners. For teachers, ICT can ameliorate their sense of personal and professional isolation and be a stimulating teaching tool. For students, ICT is improving engagement, attendance and behaviour.

One project led by Sparrow at Laverton School, a 120-pupil, K-12 school almost 1000 kilometres north-east of Perth, was a whole-school, action learning professional development program, which aimed to support teachers in learning to use interactive whiteboards to enhance science, ICT and mathematics teaching and learning. Deputy Principal Steve Soames, who had experience with interactive whiteboards in the UK, introduced the technology to the school and approached SiMERR WA for support with implementing professional development programs for staff.

For Laverton School science teacher and Curtin graduate Hannah Nagle, using these interactive whiteboards has changed her classroom, her teaching style, and her students' attitudes to learning and their grasp of complex concepts.

"The first thing I saw was how engaged my students became. They love using it and watching other students working on it," she says. "Because they're more engaged, their behaviour and attendance have improved.

"I'd struggled for weeks to get molecular theory across, but when I presented the information visually, using a video animation on the whiteboard, the students picked it up in one lesson.

> "Before we had this technology, my lessons were more 'chalk and talk', with me directing. Now, I put up the activity, explain what to do, and they take control of it. It's really changed the way I teach – for the better."

In Cybercells, another major SiMERR initiative led by Trinidad, the hub is working with State Government Telecentres and two small remote communities to examine ICT's potential to develop innovative approaches to supporting education.

Trinidad says that the WA Government's promised "Statewide Broadband Network Strategy to provide reliable, high-speed and affordable broadband access, no matter where people live" will tie in with the Telecentres and vastly improve ICT services to regional and remote communities.

"Videoconferencing is a great way to provide face-to-face professional development and professional information exchange without the expense of travelling to Perth," she says.

"This technology can potentially improve staff retention by connecting teachers and overcoming their sense of geographic and social isolation from peers, colleagues and support mechanisms."

In the past two years, SiMERR WA has completed more than 10 projects across the length and breadth of Western Australia, all of which have been highly successful. They have resulted in increased participation by teachers in their own professional learning, the sharing of successful learning activities for students, the development of resources for teachers and students and the development of professional networks. c

For more information:
simerr.wa.curtin.edu.au

SAM PROCTOR

Clyde McGill

A bright artist breaking borders

Curtin sessional lecturer and Fremantle artist Clyde McGill has received a 2008 Fulbright Scholarship, one of the largest, most prestigious educational awards of its kind in the world today.

McGill was presented with a postgraduate scholarship in visual and performing arts and will undertake his Master of Fine Art at Hunter College, at the University of New York. A Curtin honours graduate and lecturer in Art, McGill says he was overwhelmed to receive the scholarship and is looking forward to pursuing his work in the US because it is a vibrant and innovative leader in contemporary art.

"The opportunities this scholarship provides for me are almost infinite in the many facets of my work," he says.

As a contemporary artist, he uses a range of different mediums that best suit the idea or project, such as drawing, print making, performance, artists' books, video, photography and installation. His Master studies will focus on exploring the cultural implications of the ambiguity of contemporary borders, including the Australian American Pacific Border.

"My work is concerned with the borders that exist between people, sometimes called personal space, at the individual level – this zone of exclusion is evident at many levels of interpersonal relationships," he says.

"It is such a joy and a privilege to be an artist. I feel very blessed just being able to pursue my passion."

McGill has received a number of awards for his study and art, including the Libris National Artists' Book Award, as well as, from Curtin, Vice-Chancellor's List membership (awarded to the top one per cent of students, university-wide, in a semester of study), Dean's Commendation, and a Curtin University and Honours Art Studio Academic Excellence Award. He was one of just 24 talented Australians who were recognised as a 2008 Fulbright Scholar at a formal presentation earlier this year.

Healing words

Mary Terszak has found healing in writing about her experience as a child of the Stolen Generation. Terszak's brave and frank account gives an insight into a world of wrongs, and into the battles that continue to affect members of Australia's Stolen Generation.

Orphaned by the Colour of My Skin was developed from Terszak's Master's thesis, *Who is Mary Rose? A Sister Kate's Home Kid*.

"My Master degree was a way in which I could find myself and how I fit in the black and white world that I live in," she says.

The book is an autobiographical journal of the experiences of Mary Terszak (Woods) and her life at Sister Kate's Children's Home after she was taken from her mother at the age of two, under the Government's 1905 *Aborigines Act*. It describes her search for family, her identity and her psychological breakdown after being institutionalised for 18 years. The first section of the book consists of her journals, while the second part uses her story as a case study for a critical analysis of the experience of dealing with forced institutionalisation.

"I hope that my book will encourage wider community understanding of the experiences of the people who were part of the Stolen Generation, and how being institutionalised affected us in later life," Terszak says.

The book was launched recently at Curtin's Centre for Aboriginal Studies.

SAM PROCTOR

Mary Terszak

losing locks for charity

Amanda Low

MAUREEN MEREDITH

To boldly go bald like you never have before takes courage and dedication to a worthy cause, and student Amanda Low has both in great measure.

At Curtin's Bentley campus recently, Low gave her waist-long locks the final flick as she offered her head up for the Leukaemia Foundation's annual World's Greatest Shave.

The World's Greatest Shave is one of Australia's biggest fundraising events, with more than 100,000 people shaving or colouring their hair to raise money for the Leukaemia Foundation. The Foundation uses all money raised to help patients and families living with leukaemia, lymphomas, myeloma, and related blood disorders.

Initially it was a shock for Low to lose her long hair, but she has enjoyed the mornings where she doesn't have to do anything with it.

"This year I conquered my fear of losing my hair, and hopefully we will raise a lot of money for a great cause," she says.

Australia-wide, the event has raised almost $11 million, of which Curtin's contribution over the last seven years has been close to $50,000.

Upholding John Curtin's values of vision, leadership and community service, the University has raised $400,000 for a variety of charities since 1996, and encourages students to contribute to the community wherever possible.

KLAUS SCHMECHTIG

Managing the big issues on carbon

Australia has ratified the Kyoto Protocol and the Federal Government is readying us for a carbon trading scheme, due to be implemented in 2010. The need for action on climate change is affecting the nation at all levels: government and business, the mining and agriculture sectors, and the individual.

Curtin's Carbon Management Forum held in April raised some big questions associated with carbon management; for example, carbon pricing, the future shape of cities that will have drastically reduced energy use, and how business is responding to the new reality that is upon us.

The forum's four key speakers spoke to the major issues relating to carbon management. Tony Owen, Professor of Energy Economics at Curtin, compared the merits of carbon taxes and tradeable carbon emission permits, demonstrating how the two may differ in their impact. Professor of Sustainability Peter Newman discussed the acceleration of changes in urban forms and the place of electric transit and electric vehicles. He also stressed the importance of ensuring the poor were not excluded from new eco-city developments.

The inevitability of radical changes in business approaches were discussed by managing director of Western Power Doug Aberle, who explained that for businesses that have a key role in emission reductions, non-traditional thinking on policy is required. Rob Hogarth, head of KPMG's Sustainability and Climate Change Advisory Services, highlighted the need for businesses to rethink supply chain management.

Curtin's strengths in energy-related research, spanning exploration geosciences, energy economics and regulation, and renewables contributed to the success of the forum. The endeavour also demonstrated the University's close ties with industry and government and their collaboration on practical research endeavours.

LEIGH BRENNAN

up coming events

SHUTTERSTOCK

RESEARCH ACTION ON LANGUAGE LAG

The ability to communicate well is one of our most important developmental accomplishments, and is widely regarded as the foundation of success in life.

However, an estimated seven per cent of children – those with normal hearing and intelligence, and no other developmental problems – do not develop language skills with ease, and this may limit their educational achievement and social participation.

Researchers at Curtin's Centre for Developmental Health have found that, contrary to recent hypotheses, the mother's level of education, income or her parenting style – or other factors in the child's family environment – are not responsible for a delay in a child's early acquisition of language skills.

Based at the Telethon Institute of Child Health Research, Associate Professor Kate Taylor and Professor Stephen Zubrick have been collaborating with researchers at the University of Kansas and the University of Nebraska in the US to reveal indeed why some children have difficulty developing language and, later, have trouble with reading.

The Looking at Language project – funded by the US National Institutes of Health – is investigating the language skills of both singletons and twins to determine the genetic and environmental factors that lead to language and reading disorders.

The research team hopes the study will lead to the early identification of children at risk of developing communication disorders, and more effective intervention strategies. A paper based on the research so far recently won an award from the US *Journal of Speech, Language, and Hearing Research*, as the most outstanding article of 2007.

John Curtin Gallery

dOFa08

20 June – 1 August 2008

If past years' experience is anything to go by, dOFa08 will be a spectacular event. It will showcase the work of postgraduate students from various disciplines of art, ranging from painting and mixed media, to electronic and new media, books and paper constructions, and textiles. This annual exhibition will offer an exciting collection, bound to please everyone.

House of Tarvydas and Looking Out: The Internationalisation of Western Australian Fashion

22 August – 10 October 2008

House of Tarvydas will be a major survey of Western Australian fashion designer Ruth Tarvydas' work, from her first collection in 1968 to the present. Tarvydas' career and significance to the local industry will be illustrated through the presentation of key works, images and media.

Supporting the exhibition, Looking Out: The Internationalisation of Western Australian Fashion will present other key contemporary Western Australian fashion designers, whose work has an international focus. The exhibition also reflects the dynamic and innovative nature of fashion design in WA.

Phone: +61 8 9266 4155
johncurtingallery.curtin.edu au

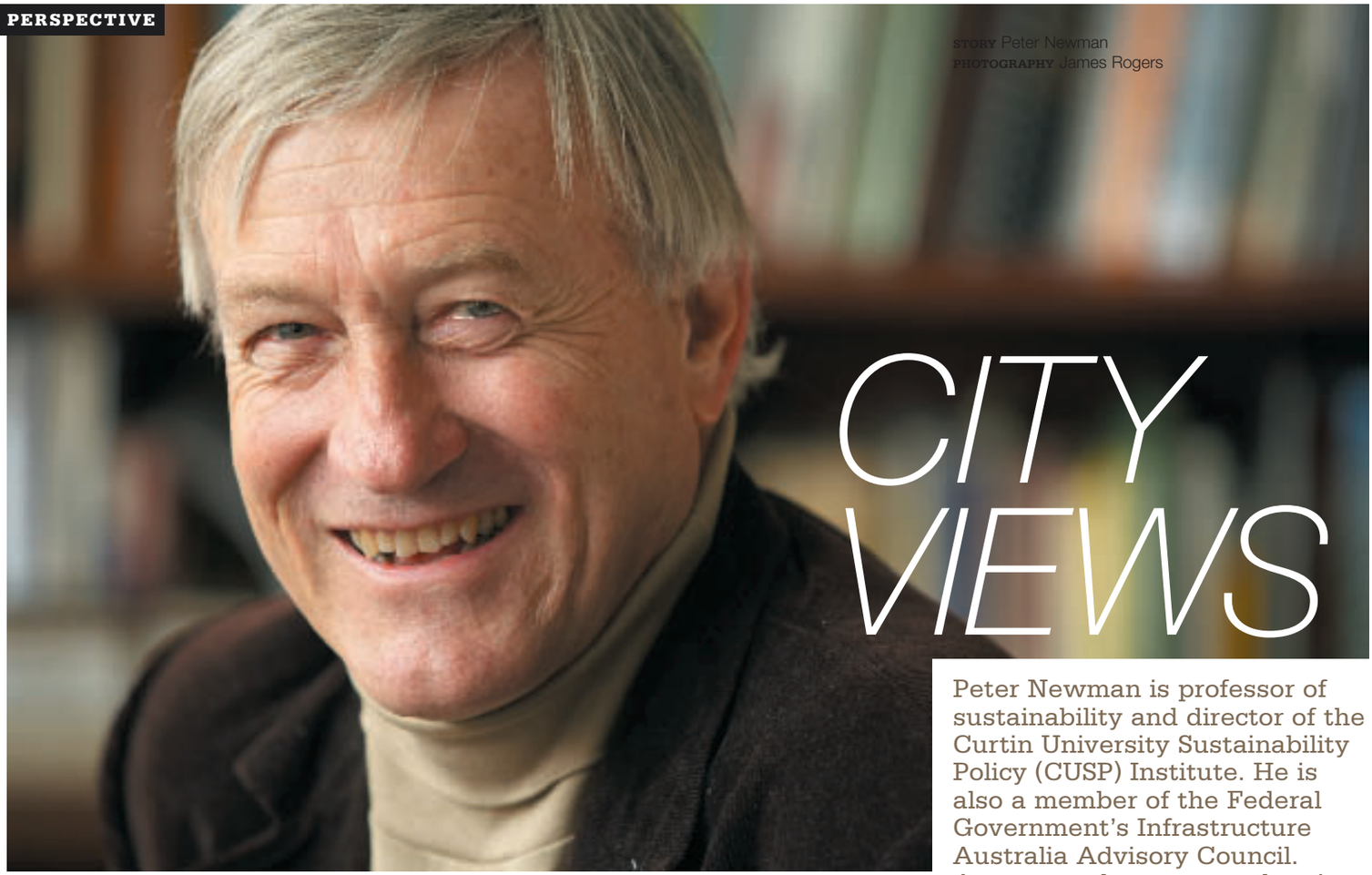
Hayman Theatre

Sunday Night Theatre
Two one-act plays for $10

Each Sunday in August 2008

Upholding a tradition of more than 20 years, Curtin's Hayman Theatre will present shows ranging from comedies, classics and contemporary Australian and international plays, to new works – all performed and directed by young theatre artists. The performances are often raw, fresh and exciting. Contact Hayman Theatre for the August program.

Phone: +61 8 9266 2383
haymantheatre.curtin.edu au



STORY Peter Newman
PHOTOGRAPHY James Rogers

CITY VIEWS

Peter Newman is professor of sustainability and director of the Curtin University Sustainability Policy (CUSP) Institute. He is also a member of the Federal Government's Infrastructure Australia Advisory Council. A renowned expert on planning for cities, he has been telling the world for more than 30 years about the challenges facing us today.

IN 1973 I was enjoying life at Stanford University in California when the US was suddenly confronted by the first oil crisis. Oil was four dollars a barrel when OPEC tripled the price overnight and cut back on exports to the US and the Netherlands. There was widespread panic in the San Francisco Bay area and across America. People queued for hours to top up their cars; petrol stations were held up by armed drivers; some people had their petrol tanks broken into and siphoned. But in the Netherlands communities went on as usual on bikes and on foot – they even closed their intercity freeways on weekends and allowed people to rollerskate on them.

This was a life-changing experience. I'd lived in the Netherlands the year before and fell in love with cities where people could walk to most things and had plenty of scope to live without a car. Now I was seeing that perhaps cities built around cars would not be sustainable.

I trembled when I realised how vulnerable Australian cities were and decided that making more sustainable transport options for car dependent cities would be my life's work.

The cause of the first oil crisis was 'peak oil', I discovered. The person who came to lecture us at Stanford was M King Hubbert, a retired geophysicist who had predicted in 1956 that US oil production would peak in about 1970 and would then be dependent on ever-growing imports. He was exactly right – despite economists saying that depletion of oil wells would not be subject to the laws of geology and physics, but to the laws of supply and demand. I was starting to recognise the limitations of academic knowledge on these highly significant matters.

Hubbert said the big problem would be when we reached the global peak in oil production, likely to be early in the 21st century. That seemed a long way off, but I could see it would take a long time to get our cities ready for that constraint.

Back in Perth, my colleague Dr Jeff Kenworthy and I began collecting data on cities, to compare how ready they were. Our work opened the way for policy debates about funding priorities and town planning decisions. If we wanted cities to be less vulnerable to oil then we had to stop building freeways and start building public transport, and ensuring new development was close by – not scattered around the urban fringe. It was hard going, however. Most people asked why we should change the direction of our cities when Australians clearly like their large blocks, and driving is the main preference.

But we banged away with our writing and data collection and eventually published it internationally under the new concept of 'automobile dependence'. Our ideas were greeted with such derision that we became quite famous and, unwittingly, our opponents popularised the very ideas they were attacking. Now the idea of avoiding car dependence in town planning and transport planning is dominant across all planning schools, and is the basis of most strategic plans drawn up by cities.

Not every city, however, has taken the ideas through to implementation. Vast, sprawling US cities like Atlanta and Houston are stuck in their car dependence and are showing some real pain. Whole suburbs built a long way from jobs and centres and without transit are collapsing; people can't sell houses in such locations, and many streets have every house boarded up. On the other hand, cities like Portland and Boulder have responded over the past 30 years, and have much more resilience for the peak-oil future.

IN Perth I had the chance to put my ideas into practice. When the then State Government closed the Fremantle railway in 1979, at the height of the second oil crisis (the fall of Iran and the sudden rise of oil to more than $60 a barrel), I started the Friends of the Railways campaign and wrote a strategy of how Perth should build a modern electric railway system. The ideas took off and before we knew it we had a chance to rebuild and electrify, and extend north then south. It amazes me to look back and see how close it was for Perth to have had no rail system at all.

The Perth rail revival is a global success story. Ten per cent of Perth people now use public transport for work – better than all US cities – and the new southern line carries 40,000 people a day, or the equivalent of three lanes of traffic each way. By the time the Southern Railway opened, the debt for the whole rail system had been paid – and almost no one in Perth says it was a mistake to have invested in rail, especially with oil at more than $130 a barrel.

No city in the world is ready for the impact of peak oil, which is going to cause a lot of serious pain. Perth has improved but still needs an ambitious strategy. I'd like to see light rail (modern trams) linking across the rail corridors and reaching centres that can't take any further car growth anyway. We need to do much more about cycleways, TravelSmart (household education to help people reduce their car dependence), electric bikes and gophers, plug-in hybrid cars, and converting all freight to use CNG (carbon neutral gas) rather than diesel.

There is hope for a more sustainable city, because we've seen in Perth what can happen in a few decades of focus on sustainable transport options. Now we need the visionary ideas for what would work best, and a clear strategy, with Federal support, to make viable the next stage of oil-proofing our cities. c

About *Cite*

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About Curtin

Curtin University of Technology is Western Australia's largest and most diverse university. Curtin strives for excellence in teaching and offers a wide range of courses in business, engineering and science, resources and environment, health sciences and humanities.

The University is committed to building world-class research capability through partnerships with business, industry, government and community organisations. Curtin has a growing international presence, and an offshore campus in Sarawak, East Malaysia.

The University is named after John Curtin, Prime Minister of Australia from 1941-1945, and strives to honour his values of vision, leadership and community service.

curtin.edu.au

The great university... should look ever forward; for it the past should be but a preparation for the greater days to be.

John Curtin

PRIME MINISTER OF AUSTRALIA (1941-1945)

Curtinnovation

Curtin aspires to be a leading edge university of technology. To fulfil this vision, we strive to be innovative and forward-looking in everything we do. It's in our approach to teaching and learning. It's in our research. It's in our staff. It's in our students. It's in our graduates. It's in the way we think and act. It's what we call Curtinnovation.

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