

Never Stand Still



WHEN THE WAR IS OVER

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military's bid to head off an epidemic
of post-traumatic stress disorder**

THE BUSINESS BRAIN

Are some of us hard-wired
for financial success

MEET THE BONE BUILDER

UNSW's new Chair in Biomedical
Engineering

BIG DATA

The big questions around the
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Maja Baska

YOUR TIME STARTS NOW ...

RÓNÁN MCDONALD, GLOBAL IRISH STUDIES CENTRE

Rónán McDonald is frustrated – his new office is too small for his book collection. His volumes on Samuel Beckett, James Joyce, Ireland and the humanities compete for space; only *The Life of Pi* juts out, a lonely offering of pop culture among the pillars of Irish literature.

“I can never find what I’m looking for,” he says, finally locating a well-thumbed collection of Yeats.

These books, many shipped around the globe, have informed McDonald’s academic career and helped trigger his passion for Irish literature.

“I gained a hunger for ideas and the connection between culture and society when I was at university,” he says. “I also realised that Ireland, despite its historical and political troubles, has given an unsurpassed literary legacy to the world.”

Dublin-born, McDonald completed a Doctorate in English Literature at Oxford. His first book *Tragedy and Irish Literature* was published in 2002, followed by *The Cambridge Introduction to Samuel Beckett* (2006) and *The Death of the Critic* (2007). He joined UNSW as director of the Global Irish Studies Centre in 2010.

McDonald says Australia can’t be fully understood without considering the significant contribution of the Irish.

“There’s a tendency to homogenise previous Australian settlement as simply white or Anglo-Celtic,” he says. “It underestimates the complexity of the collisions between Saxon and Celt that make up modern Australia.”

Experience of living in Sydney: It’s a privilege. I don’t feel like I’m in exile. I do think awareness of the historical connections with Ireland need to be raised. That’s why I’m passionate about teaching Irish–Australian studies in what’s sometimes described as ‘the most Irish country outside of Ireland’.

Aspects of Irish culture that make you proud: I’m fond of Ireland’s traditions of wit and storytelling, which have flowed into Australian culture, with its dark and irreverent humour. Conviviality and conversation, sometimes alcohol fuelled, is a part of Irish culture, but I dislike the equation of Irishness and drunkenness.

Book that changed you: It’s hard to specify just one, but *Notes from Underground* by Fyodor Dostoevsky blew open a door for me as an adolescent. It revealed the inner life of a deeply disturbed individual that captured my teenage angst.

Most vivid memory of Ireland: Rural Donegal, where my mother is from. That’s my sacred place. I love the ruggedness, the people and pace of life. We spent our summers there, which in memory seem like endless sun and sea, though in reality it was probably like a bad Sydney winter.

Favourite song to dance to: *Blue Monday* by New Order. It requires a very ‘electro’ style of dancing.

By Fran Strachan.

Hear McDonald recite the poem ‘September 1913’ by WB Yeats.



• GLOBAL LEADERSHIP

THE MANDELA LEGACY

WITH A NEWLY UNVEILED bust of Nelson Mandela at her side, Westpac CEO Gail Kelly delivered a personal tribute to the inspiring legacy and leadership of the father of modern South Africa, in the 2013 Wallace Wurth Lecture.

The Mandela bust was unveiled before a packed Clancy Auditorium by Mrs Kelly, Her Excellency Ms Koleka Mqulwana, the South African High Commissioner to Australia, and UNSW Vice-Chancellor Professor Fred Hilmer.

Part of an ongoing UNSW campus project to honour the world's most inspiring leaders, the Mandela bust was created by South African sculptor Maureen Quin. Its home is on the Library Lawn alongside a bust of Mahatma Gandhi.

Professor Hilmer said the University wanted to acknowledge and celebrate the legacy of the man known as Madiba, or "Father", by his people.

"There's a special class of leader, a global leader, whose influence extends beyond a nation," he said.

"Such a leader is Nelson Mandela. His courage and his leadership of the South African nation in the face of suffering and extreme hardship have been an inspiration around the world."

The High Commissioner thanked the University for commissioning the bust.

"We are thankful that you have decided to take Madiba as one of your own ... we are very happy not only because he is South African but because he is the son of Africa who has made his impact not only in Africa but in the world," she said.

Delivering the Wallace Wurth Lecture, South African-born Kelly gave a powerful tribute to Mandela and recounted her personal experience of growing up and working under Apartheid.

Kelly has been head of the Westpac Group since 2008. In 2002, she became the first woman to lead a major Australian bank when she was appointed CEO of St George.

"When I reflect today on the legacy that this extraordinary man has left us and his achievements ... I reflect on his leadership," she said.

Kelly said Mandela personified the qualities of conviction, courage, generosity of spirit and resilience.

She said conviction was an essential requirement for success in any leadership role. "Nelson Mandela had from his young years a clear vision, a clear sense of purpose and a strong commitment to that vision," she said.

Kelly quoted from his autobiography *Long Walk to Freedom*:

"I knew that people expected me to harbor resentment against whites. But I have none.

In prison my anger towards whites decreased but my hatred for the system grew. I wanted South Africa to see that I loved even my enemies while I hated the system that turned us one against the other."

Kelly said: "Nelson Mandela personifies courage."

"Mandela's courage [was] to rely on his own judgement, to make his own choices, to stand on his own two feet in pursuit of his vision."

On generosity of spirit, Kelly said it would be hard to find a better role model. She described his establishment of the Truth and Reconciliation Commission as "one of his lasting gifts to South Africa".

And on resilience, Kelly said Mandela showed "mental toughness, courage of character: the ability to deal with adversity and to rise again to fight another day. [He] must have drawn on all this and more in his 27 years of being imprisoned. He learned to be patient, to be disciplined, to play the long game."

Thanking Kelly, UNSW Chancellor David Gonski said the Mandela bust would stand as a permanent tribute, not only to the man but to the contribution made to Australia by all South Africans.

"When I reflect on the legacy of this extraordinary man ... I reflect on his leadership."



► Professor Hilmer, Ms Mqulwana and Mrs Kelly unveil the Mandela bust.
Photo: Andy Baker

BRIEFS

UNSW LEADS CLIMATE REPORT

UNSW scientists have played an important role in the next Intergovernmental Panel on Climate Change (IPCC) report due out on 27 September. The report, published every six years, is considered to be the most important in climate change research. Dr Lisa Alexander and Professor Steve Sherwood from the Climate Change Research Centre are chapter authors. Alexander is also a drafting author of the *Summary for Policymakers* document. Director of the ARC Centre of Excellence for Climate System Science Professor Andy Pitman is a review author following on from his role as a chapter author in earlier reports.

NEW UNDERGRADUATE MD

UNSW will offer Australia's first undergraduate-entry Doctor of Medicine (MD) program, giving medical graduates the dual benefits of a higher-level qualification and a more globally recognised degree. The BMed MD program replaces the traditional Bachelor of Medicine/Bachelor of Surgery (MBBS). Dean of Medicine Professor Peter Smith said: "We believe by introducing the MD we will more appropriately recognise our students' efforts – without any need for curriculum changes."

TRIPLE WIN FOR CANCER RESEARCH

Research into the anti-cancer properties of green tea has been recognised in the NSW Premier's Awards for Outstanding Cancer Research. Dr Orazio Vittorio, from the Children's Cancer Institute based at the Lowy Cancer Research Centre, won the Kids' Cancer Project Award for his work showing the extract can kill half of the cells from neuroblastoma within three days. The Centre also won the Big Data, Big Impact grant for work on recurrent mutations within genomic 'dark matter' in cancer genome data sets. Also recognised was UNSW Professor Neville Hacker for his work to improve the psychological impact of gynaecological cancers.

INNOVATOR WINS TEACHING AWARD

Computing lecturer and avid proponent of open education Associate Professor Richard Buckland has been named the 2013 Australian ICT Educator of the Year by the iAwards – a national program recognising innovation and leadership across the ICT industry. Buckland is the director of first-year studies in the School of Computer Science and Engineering and was one of the first university lecturers in Australia to popularise open education on YouTube.

• RANKINGS JUMP

FIVE-STAR RESULTS

UNSW has scored the maximum five-star rating for 10 performance indicators in the 2014 *Good Universities Guide* – up from eight last year. For graduate outcomes – including getting a job and starting salaries – UNSW rated in the top group, one of only two Go8 universities to achieve this result.

UNSW also achieved five-star results in student demand, research grants, research intensity, staff-student ratio, staff qualifications, cultural diversity and non-government earnings.

UNSW also performed strongly in student retention – a new category for the guide. Vice-Chancellor Professor Fred Hilmer said it was a great outcome, reflecting UNSW's position as a leading research-intensive university. "It's particularly pleasing to again achieve five stars for graduate outcomes – our students are highly sought after by employers."

Strong research performance has also boosted UNSW's position in the latest *Academic Ranking of World Universities (ARWU)*, compiled by China's Shanghai Jiao Tong University.

UNSW jumped 10 places to 132, continuing the positive trend of recent years. Underlining the results was a strong performance in Maths (79) – with UNSW the top-ranked Australian university. Chemistry (90) also performed well and Economics/Business moved up 25 places to 89.

• IN THE SPOTLIGHT

MENTAL HEALTH GETS E-BOOST

UNSW Professor Helen Christensen (pictured) has won a major National Health and Medical Research Council fellowship for mental health, worth \$3.75 million.

The Kirby Institute was also a big winner in the latest funding round with two of its researchers awarded almost \$3.8 million.

Professor Christensen's John Cade Fellowship will help harness e-health technologies to bridge translation gaps in mental health. She was one of only two researchers to be awarded the special fellowship.

Christensen's work, based at the Black Dog Institute where she is Executive Director, will ultimately save lives, alleviate suffering and save millions of dollars a year.

"It's great news because we can get interventions that work from the lab or the clinic into the community faster and better," says Christensen, from the School of Psychiatry.

The Kirby Institute's Professor Tony Butler was awarded almost \$2.5 million for the Australian Centre of Research Excellence in Offender Health, while Professor John Kaldor won the largest Partnership Project in the country, with almost \$1.3 million awarded for a program to improve the quality of sexual health services in remote communities.



JOINT INVESTMENT WITH CHINA

UNSW technology transfer and research commercialisation in China has received a major boost following the signing of a partnership with China's prestigious Shanghai Jiao Tong University (SJTU).

The agreement sets out a future road map for SJTU to adopt the principles of Easy Access IP, where universities offer most of their intellectual property to industry for free, and for the two institutions to collaborate on research commercialisation in China and Australia.

"The research agreement with Shanghai Jiao Tong gives UNSW a front-row seat at the centre of China's development," said Vice-Chancellor Professor Fred Hilmer.

"It provides another mechanism for both institutions to make a shared contribution to the great knowledge partnership between the cities of Sydney and Shanghai in the Asian Century."

UNSW's Director of China Strategy and Development Laurie Pearcey said: "With China on track to overtake the US as the world's largest investor in research and development by 2020 and Chinese universities driving so much of China's innovation, this is a real coup for Australia."



▲ Links for the future: NSW Premier Barry O'Farrell, SJTU Council Chair Madam Ma Dexiu, Vice-Chancellor Professor Fred Hilmer and PRC Consul-General to Sydney Li Huaxin at the partnership signing ceremony at Parliament House.

Leading the 40-member SJTU delegation was Council Chair Professor Ma Dexiu. She was a keynote speaker at a Women in Leadership forum hosted by UNSW Vice-President, Advancement Ms Jennie Lang.

• INNOVATION INCUBATOR

AHEAD ON START-UPS

UNSW leads Australian universities in the number of graduates who have founded technology start-ups in the last 15 years, a new US-based analysis reveals.

CrunchBase, a leading authority on technology start-ups, has published an analysis ranking universities based on the number of graduates who have founded or co-founded tech companies.

Running the analysis for Australian universities shows UNSW leads the field with 16 founders or co-founders – the majority of whom are computing and electrical engineering graduates.

"For most of our students, the world of entrepreneurship is certainly in reach and an option we try to encourage and foster," says Associate Professor Maurice Pagnucco, Head of the School of Computer Science and Engineering.

The school started an incubator program in 2011, which provides rent-free space for six months to student start-ups. The University's commercialisation company, NewSouth Innovations, has also kick-started a student enterprise division designed to help start-ups and student innovators.

BRIEFS

HONOUR FOR WOMEN ENGINEERS

The first Muslim woman to hold office in an Australian parliament has been honoured at the annual Women in Engineering Awards. Dr Mehreen Faruqi, an environmental engineer and newly appointed Greens Member of the NSW Legislative Council, received the Judy Raper Award for Leadership in Engineering. The evening's other winner was Dr Megan Lord from the Graduate School of Biomedical Engineering, who received the Maria Skyllas-Kazacos Young Professional Award for Outstanding Achievement.

NUCLEAR PROGRAM FIRST

UNSW will offer Australia's only graduate program in nuclear engineering, beginning in 2014. The Australian Nuclear Science and Technology Organisation and the Sir William Tyree Foundation each made donations to help establish the program. UNSW ran the first nuclear engineering program from 1954 until it closed in 1986.

NEW RESEARCH FELLOWSHIP

The Kirby Institute has received \$4 million for a new research fellowship to help address increasing rates of sexually transmissible infections and blood borne viruses. The fellowship is part of a broader \$30 million national prevention and research package. The multi-year funding commitment will allow the Kirby Institute to hire an outstanding researcher to work collaboratively across its programs.

WE RATHER LOVE SCIENCE

National Science Week opened with an evening of music, comedy and scientific insights at the world's first IFLS Live! event, co-partnered by UNSW Science. More than 600 people crowded into the Powerhouse Museum to meet online science communicators, including Canada-based Facebook star, Elise Andrew. Andrew's *I F***ing Love Science* Facebook page is so popular that when she links to other websites the high traffic load can crash their servers.



POPTech FELLOW

Associate Professor Kate Crawford, Principal Researcher at Microsoft Research, is the only Australian to have been selected by the Rockefeller Foundation to attend their inaugural Bellagio/PopTech program in Italy. Crawford joins innovators who will focus on how data science and technology can contribute to the creation of more resilient communities.

Read more about Big Data on page 14.

THE BONE BUILDER

Armed with ingenuity and a sewing machine, Melissa Knothe Tate has created a 'sleeve' that mimics the regenerative capabilities of bones. By Myles Gough.

FOR ANYONE WHO HAS SUFFERED a traumatic bone break, the long road to a full recovery is usually fraught with multiple surgeries and a great deal of pain.

High-impact car crashes or explosions, or the removal of cancerous tumours, can leave bones with missing pieces even after the fracture itself is repaired.

'Standard of care' techniques to fill in those missing parts exist, but treatment times are long, patients experience significant discomfort and are subjected to rigorous compliance schedules, and there's no guarantee of success. The methods also require invasive grafting, where segments of bone are taken from elsewhere in the body, or from animals, and ground into a mixture to be packed into the empty space. But a more patient-friendly option involving one procedure and no grafts has several companies eager for clinical trials with the new technology.

Professor Melissa Knothe Tate, recently appointed the Paul M. Trainor Chair in Biomedical Engineering, has designed an implantable device that mimics the regenerative capabilities of periosteum – an elastic membrane covering the surface of our bones.

The sleeve-like device is sutured to healthy tissue like a patch over the bone and provides a network of channels for stem cells and bone-forming material to take hold.

Based at the Graduate School of Biomedical Engineering at UNSW, Knothe Tate is keen to use her position to bring some of the newest and oldest technologies together.

She hopes to establish outreach programs for Indigenous communities and encourage innovation by getting Indigenous youth to observe their environment and explore ways nature has engineered itself to maximise adaptation and survival.

Knothe Tate says translational research and challenging existing dogma are two hallmarks of her work.

These traits are evident in her breakthroughs in bone repair, work that began a decade ago at Case Western Reserve

University and the Cleveland Clinic in Ohio, with a team that included her orthopaedic surgeon husband, Ulf Knothe.

In operations on sheep, a piece of intact periosteum was patched over a missing section of bone. The results were startlingly effective: in less than two weeks, gaps about 2.5cm long had filled with new bone.

"We were quite surprised and delighted," she recalls.

But there was a problem. The procedure depended on the presence of the layer of periosteum, which after a traumatic injury is rarely left intact.

"As an engineer, I immediately started thinking, 'What's the most basic way we can replace the periosteum?' So I got out my old sewing machine.

"We know what periosteum is made of – it's essentially a combination of elastin ... and collagen, which is a very tough protein that helps hold your skin together. And we know there are periosteum-derived stem cells, which are natural bone builders."

Using surgical sutures, Knothe Tate sewed together two elastic sheets, which are used in reconstructive surgery. The outside layer was kept intact, the inside layer was perforated with small holes. The stitching created pockets into which collagen sponges were tucked. And onto their surfaces, she seeded stem cells from the periosteum.

"It seemed so simple, but it worked beautifully," she says.

The results were published in the journal *PLOS ONE* in 2011. Not only did they show the device was able to hasten bone growth in their animal model, but importantly no grafting was required.

"Orthopaedic surgeons thought this was heresy," says Knothe Tate. "But we have to be open to surprises. You don't need the graft – in fact, the graft impaired the ingression of these stem cells into the defect where they do their work."

She has patented the innovation, which she says blurs the line between an implant and a delivery device.

CANCER CRUSADERS

Kids with neuroblastoma could be the first to benefit from a potentially life-saving treatment that's been 33 years in the making, writes Susi Hamilton.

FOR A LITTLE GIRL named Zoe – which means ‘life’ in Greek – the news was devastating.

At age one she was diagnosed with neuroblastoma, the leading single cause of cancer deaths in children under five. Fifteen months of life-saving chemotherapy followed.

Now in remission, Zoe, her siblings and her parents, Erin and Alison Emin, are on a celebratory tour around Australia.

As part of the journey, the family, who raised \$130,000 to help fight neuroblastoma, recently visited UNSW's Oncology Research Unit.

Their mission was to see firsthand the work benefiting from their donation – a new cancer drug that's been shown in the lab to increase the effectiveness of some treatments by around 200 times.

“We wish it had been around when Zoe was diagnosed,” says Erin, a Western Australian farmer. “But we're pleased it can help other kids in the future.”

Developed by a team led by Professor Peter Gunning, the drug targets an ‘Achilles heel’ of cancerous tumours – the structure of the malignant cell itself.

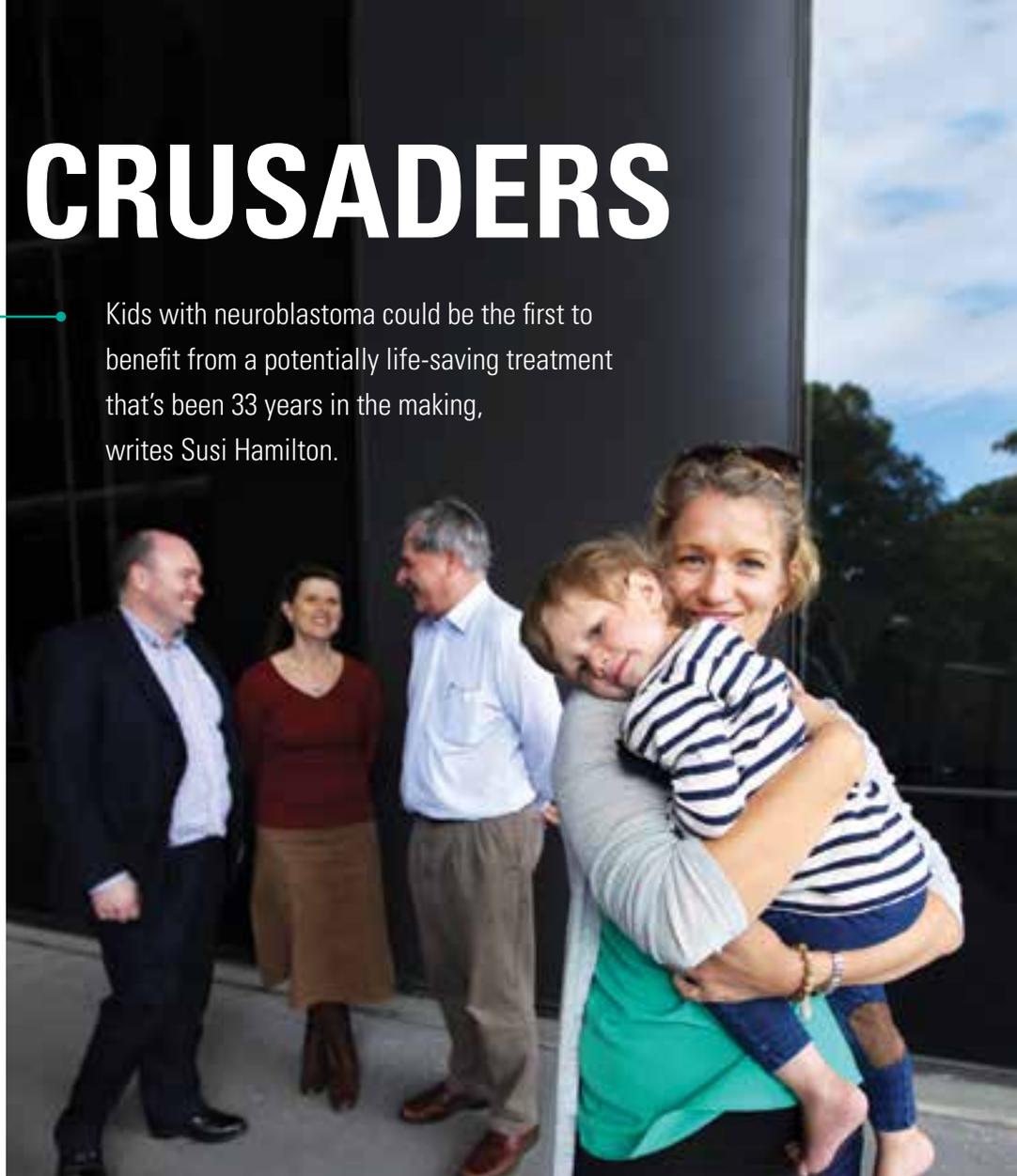
“It is much like what happens when you see a building collapse on the TV news,” Gunning says. “The cancer cell collapses – and it happens quickly.”

Significantly, the drug looks to be effective against every type of solid cancer, both in adults and children, and it is hoped to have fewer long-term side effects than existing chemotherapy.

Research so far has focused on two cancers in the animal model: neuroblastoma and melanoma. The resulting paper is published in the journal *Cancer Research*.

It's hoped the first clinical trials of the drug will take place in kids with the most severe cases of neuroblastoma by 2015.

The breakthrough has been 33 years in the making and is an example of the importance in medical research of dedication and a commitment to the long term.



▲ L–R: Peter Neilson, Dr Justine Stehn and Professor Peter Gunning with Zoe and her mum Alison Emin. Photo: Britta Champion

“Attacking the architecture of the cancer cell has long been an obvious target, but until now all attempts have failed,” says the study's first author, Dr Justine Stehn.

“That's largely because the building blocks of the cancer cell are the same as those found in the heart and muscles, so the collateral toxicity of any drug therapy was unacceptable.”

But in 2004, Gunning says he literally “woke up one morning” and realised how to take down the cancer cell without impacting other organs. It involved targeting a second building block, the protein tropomyosin, which is enriched in the cancer cell structure.

The drug success in the lab is vindication for the research team and also of the strategy of The Kids' Cancer Project, the team's major funder.

“No one was prepared to support

such a risky idea, but they took it on,” Gunning says.

UNSW Faculty of Medicine Dean, Professor Peter Smith, is chair of the charity's research advisory committee. “Cancer in children is not the result of lifestyle issues, so you're relying on medical research to see any improvement in survival rates. In the 1960s, less than 10% of children survived cancer and now it's 80%. That improvement is all down to research and partnerships.”

The Kids' Cancer Project Chief Executive Peter Neilson credits the tenacity of the researchers.

“This research opens up a door on something the pharmaceutical industry and the majority of science gave up on 25 years ago,” he says. “It's such a joy to see Zoe doing so well. We just want more kids with neuroblastoma to have such a great outcome.”



WHEN THE WAR IS OVER

The Australian military is preparing for a battle at home as the mental toll of our commitment in Afghanistan impacts on returning troops, writes Jonathan Pearlman.

JUST SIX WEEKS INTO his first tour of duty in Afghanistan, Private Paul Warren was patrolling only metres away from a fellow soldier who stepped on a pressure-activated improvised explosive device (IED).

That soldier was Warren's friend, 22-year-old Private Benjamin Ranaudo. Ranaudo died; Warren was rescued, but later had his right leg amputated.

Back in Australia, rehabilitation began at a hospital in Brisbane. It was only months later at home with his partner in Townsville, that Warren began to suffer post-traumatic stress disorder (PTSD).

"The physical injury was a constant reminder that one of your mates was killed," says Warren of his return to 'normal life'. "I had five months in hospital learning to walk again. That part was all right because you always had goals to achieve. When I got home and all my mates were overseas, you realise life is a bit different.

"You could be in the middle of a conversation and your mind takes you somewhere else and it is like you are getting blown up again. It is pretty hard to get it out of your head. That goes on for ages. There didn't have to be something to trigger it. It was just constantly there."

More than 27,500 Australian soldiers

have served in Afghanistan since 2001, including 40 who have died. The war has been Australia's most intensive commitment since Vietnam – but, unlike Vietnam, it was conducted in the knowledge that many of the soldiers, even those who escaped physical injuries, would not return home unscathed.

So far 780 troops have presented to medical boards for assessment for PTSD, according to a defence spokeswoman.

"Army members made up about 76% of these, navy 15% and air force 9%," she says.

The figures suggest that as Australia prepares to end its decade-plus commitment in Afghanistan, the military is set to face an ongoing battle at home.

While the number of veterans with PTSD is being tallied, across Australia, hundreds, probably thousands, will also suffer anxiety, depression and substance abuse.

Most of the 1600-odd servicemen and women in Oruzgan, a poor, rural region of central Afghanistan, will be back in Australia by the end of the year.

According to Richard Bryant, a Scientia Professor in UNSW's School of Psychology, the Australian Defence Force (ADF) has been careful to avoid a repeat of Vietnam. One of the world's leading



▲ The ADF has pretty good mental health systems in place ... Professor Richard Bryant.
Photo: Grant Turner/Mediakoo

experts in PTSD, he dismisses claims by a former commander of Australian forces in Afghanistan, Major General John Cantwell, that the military is facing a "tsunami" of trauma-related injuries.

"We will not have a repeat of Vietnam because now the ADF knows what it is dealing with," Bryant says. "Back then you could be in Vietnam and two days later you could be in a supermarket in your local town and still be expecting snipers to be shooting at you. And we wondered why these people were jumpy and edgy."

But researchers are still trying to grapple with the best ways to deal with post-deployment mental health problems.

Figures released by the ADF have shown that while rates of PTSD are high – about 8% or double that of the



experiences and they reunited; they are now married and have a three-year-old daughter and a one-year-old son.

He says while counselling assisted, the ADF's support was inadequate and relied too heavily on medication.

"The worst thing was that they put you in a platoon with injured guys and you sat around all day," he says. "You need to be mentally stimulated. The worst thing you can do is do nothing and your mind will run away from you. It is more manageable now. You think of your mate every day but not to the point where it shuts everything down."

Warren's experience reflects the latest research on PTSD that shows counselling and immersing soldiers in memories of their former experiences is more effective than just medication.

Dr Katherine Mills, a senior lecturer at UNSW's National Drug and Alcohol Research Centre, says the hardest part is getting soldiers to start treatment.

"It is a disorder characterised by avoidance," she says. "The person is doing everything they can to avoid memories and avoid thinking about what happened to them because it is so distressing. You are asking them to go to treatment to do that very thing in order to recover from it."

Bryant says some soldiers fear they will not be promoted or will not be allowed to redeploy if they admit to having PTSD.

"Defence is doing a lot of work to try to change the culture but it changes very slowly," he says. "You will still get the old school saying if you have a mental health problem you are weak. It takes generations to change that."

According to research released earlier this year, another effect of exposure to combat violence is that soldiers will be more likely to commit violent crimes when they return.

Associate Professor Kimberlie Dean, UNSW's Chair in Forensic Mental Health, who co-authored the study while working in Britain, says the "vast majority" of returned soldiers pose no risk of harm. But the study, published in *The Lancet*, "points to failures in the support mechanisms for returning soldiers", she says.

"It is a very poor outcome for those soldiers and it is a very poor outcome for the victims, who can often be family members," she says.

"If you don't do a good job of identifying and supporting and treating returning soldiers then some of them may end up with really poor outcomes that include violent offending. To survive in intense and especially direct combat, you need to be capable of overcoming any barriers to being aggressive or violent. That kind of experience and training has a carry-on effect in civilian life."

Researchers are beginning to focus on improved treatments for PTSD, including trying to augment the reality of the revived memory. There have been attempts to use virtual-reality technology, while UNSW researchers are examining the impact of intense exercise, which might release neurotransmitters that could further enhance the treatment.

Bryant says while the military is aware of the risks facing returned soldiers and "is taking it very seriously", the full effects of the wars in the Middle East will not necessarily be apparent immediately but will play out over the coming years.

"The ADF has pretty good mental health systems in place," Bryant says. "We know from previous conflicts the effects of being in service can arise years later ... but are we going to have an epidemic? Certainly not."

non-military population – the prevalence is not necessarily linked to deployment. This tallies with research showing it's not serving in war that is the problem but soldiers' direct exposure to combat.

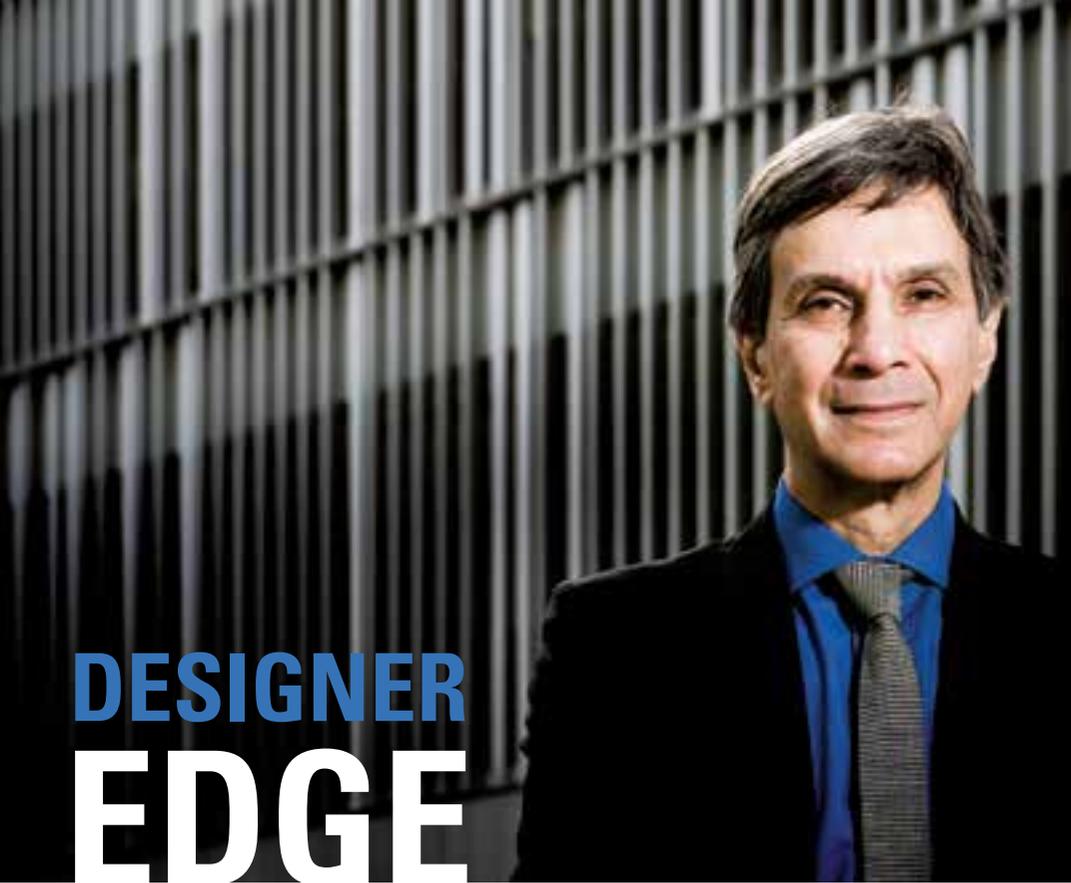
"Lots of people who go on deployment do not get exposed to anything nasty," says Bryant. "What we do know will predict PTSD is the extent to which troops are exposed directly to death or injury. For those dealing with the IEDs, the engineers working on detecting mines, the medics who are dealing with the medical emergencies – the risks among those groups will be higher."

Warren, who left the army in April, says it took him about 6 to 12 months to begin to recover from his PTSD. He and his partner separated but he was eventually able to speak to her about his



▲ Australian SAS soldiers on patrol in Afghanistan.
Photo: Simon O'Dwyer/Fairfax
▶ Private Paul Warren.





DESIGNER EDGE

FBE Dean Alec Tzannes has put his stamp on a new curriculum that gives architecture and design students a perspective that transcends borders. By Susi Hamilton.

SONAL KEMKAR is used to rubbing shoulders with some of the most powerful politicians in the US, including big city mayors and White House staff.

But she counts her teachers from UNSW's Faculty of Built Environment (FBE) as some of her most significant influences.

It was Scientia Professor Deo Prasad's international reputation on sustainable buildings, cities and energy that drew the American engineer, who is now responsible for overseeing green building policy, to Sydney.

"What I enjoyed most about UNSW was the globally relevant staff," says Kemkar, who graduated with a Master of Built Environment (Sustainable Development) in 2008. "These were professors I could use as mentors."

In five short years, she went from working as a sustainability consultant at the United Nations Environment Program in Bangkok to working with the White House Council on Environmental Quality.

And those relationships she fostered

at UNSW have continued to grow: former FBE senior lecturer Peter Graham's career trajectory has crossed hers at a think-tank based in Washington DC.

"Our team was able to meet with my professor from Australia and his work was relevant for leading energy experts at the White House Council," says the 30-year-old, who also helped formulate policy about green buildings and climate change for New York City.

"My Masters helped me transition as an engineer building green buildings to writing policy that affects the energy use of a whole city," she says.

To continue to give graduates like Kemkar the edge, the FBE has established two new schools with a global focus.

The Master of Built Environment (Sustainable Development), which Kemkar studied, is now part of the Australian Graduate School of Urbanism, which has been established to develop leadership skills and interdisciplinary knowledge for early to mid-career professionals. Its courses are further enhanced by research undertaken

at the associated Cooperative Research Centre for Low Carbon Living.

"The problems facing our cities and built environment have changed and become global ones, largely about governance, strategic investment, sustainability, planning and design. We want our undergraduate and postgraduate courses to reflect these challenges," says FBE Dean Professor Alec Tzannes.

A number of new programs at the Graduate School are also being offered, such as the Master of Urban Policy and Strategy and the Master of Philosophy.

The philosophy master has six strands: Writing the City; Housing Policy and Finance; Infrastructure Planning, Procurement and Finance; Design Research in Architecture; Design Research in Interior Architecture; and Design Research in Industrial Design.

Scholar, media columnist and critic Dr Elizabeth Farrelly is teaching Writing the City, which was introduced, says Tzannes, "because we want to raise the public profile of urban-design issues".

"We think that's one way to contribute to improved public discussions and political relevance for built environment issues," he adds.

A second school, the Australian School of Architecture and Design, has also been established, which will offer students a choice between the existing Bachelor of Architecture or a new dual degree jointly taught with Shanghai's Tongji University.

Students who select the second option will be taught in English and will split their study time between the campuses, affording them a different learning and life experience. They will be awarded two testamurs upon graduating – one from each institution.

A postgraduate degree in architecture is also under development to provide graduates with the opportunity to register for practice in both countries.

"Architecture and design transcends national boundaries," says Tzannes. "We have to train people with a bigger perspective."

▲ Training students with a global outlook ... Professor Alec Tzannes. Photo: Brett Boardman

THE BUSINESS BRAIN

Research in the field of neurofinance is showing that how our brains are wired may predetermine our financial success, writes Christopher Niesche.



THE KEY TO SURVIVAL is the ability to adapt and nowhere is this more critical than in the world of finance. But why do some people cope better than others?

Rob Taubman, Executive Director of Equity Sales at investment bank UBS, advises analysts at large international funds on their investment choices.

“There’s always something going on that’s changing why you should be buying or selling something,” he says.

In June, media giant News Corp split into a publishing arm (New News Corp) and an entertainment arm (Twenty-First Century Fox), and the two entities began trading on the Australian stock exchange. The publishing arm hit the market at around \$15, much lower than forecast by analysts and brokers.

At the close of business, New News Corp had traded up “completely outside of all the boundaries, all the realms, all the expectations”, Taubman says. Yet most financial advisers simply took in the unexpected development and adjusted their behaviour accordingly.

For Dr Elise Payzan-LeNestour, a researcher and senior lecturer in finance at the Australian School of Business (ASB), such dynamic adaptability is not surprising.

Her work in the relatively new field of neurofinance has shown people are actually much better at learning from change than previously thought.

Different from behavioural economics – which examines factors other than the rational in economic decision-making – neurofinance seeks to understand the cognitive processes at work and combines research methods from neuroscience, experimental and behavioural economics and cognitive psychology.

To show how adaptable people are, Payzan-LeNestour devised a simple board game in which her subjects – all university students – were asked to allocate money to assets at six locations. Each of the assets produced a different return: a profit, a loss or nothing at all. Importantly, the returns were subject to rapid change.

“The players were pretty sophisticated in their learning abilities, which is at odds with the common belief in behavioural finance,” she says.

Payzan-LeNestour suggests the reason her subjects did so well – while those in other cognitive tests traditionally did not – was financial incentive. Her participants could earn up to \$180 in half an hour – an attractive sum for a student.

“This is particularly relevant for real-world finance,” she says.

Next, the researchers studied the machinery of the brain that allows people to detect regime shifts and adapt behaviour.

The brain findings are reported in the paper, *The Neural Representation*

of Unexpected Uncertainty During Value-Based Decision Making, which Payzan-LeNestour wrote with colleagues Simon Dunne, Peter Bossaerts and John O’Doherty, from the California Institute of Technology.

Through brain imaging, the researchers found that a major neurotransmitter called norepinephrine signals to the brain that the world has changed and that relearning and adjustment is required.

“For survival, it’s very important that the brain signals this to you,” Payzan-LeNestour says. “This is the first real piece of evidence for this particular mechanism.”

The part of the brain targeted is the prefrontal cortex – the region that initiates appropriate behaviour and controls impulses. Bursts of norepinephrine make us more attentive to the environment around us.

The findings are good news for practitioners. “For business decision makers who have to cope with unstable conditions all the time, it’s good to know our brain is geared to adapt,” she says.

ASB colleague Professor Michael Aitken describes the research as “ahead of its time”.

“If you can measure these things, you’ve got another way of beginning to work out what sorts of products [can be offered] to certain sorts of people,” he says.

“It could unlock a lot of secrets.”

▲ Studying the machinery of the brain in the realm of finance ... Dr Elise Payzan-LeNestour. Photo: Grant Turner/Mediakoo

◀ For the full version of this article and other business stories, go to Knowledge@ASB www.knowledge.asb.unsw.edu.au

MATERIAL HAZARD

Preventing toxic lead contamination in e-waste is a research priority for Pro-Vice-Chancellor Mark Hoffman, writes Steve Offner.

IT'S A COMMON SIGHT in developing and developed countries alike: piles of electrical and electronic waste such as TVs, computers, mobile phones and toys.

About 40 million tonnes of e-waste is created each year – the world's fastest growing waste stream, according to a report last year by the International Labour Organization. Of the bulk that's recycled, around 80% ends up in countries such as India, China, Nigeria and Ghana.

What can't be extracted and resold is incinerated or discarded in landfill.

One such component is piezoceramics – the unseen, yet powerful, material that allows devices to convert mechanical energy into electrical power and vice versa. The commercial market for piezoceramics was an estimated \$US20 billion last year, led by applications in the biomedical, military, semiconductor, robotics and consumer electronics industries.

The material of choice for piezoceramics is lead zirconate titanate (PZT). When PZT is incinerated, lead oxide, a highly toxic substance, is released. Exposure in people can cause serious neurological damage. It's no coincidence that much of the manufacture and disposal of piezoceramics happens in countries where safety and environmental regulations are weak.

"From a superficial point of view, e-waste is a recycling success story," says Professor Mark Hoffman, who leads a team of materials scientists and engineers in UNSW's Ferroelectric Materials Research Laboratory. "But that ignores the potential hidden impacts on people and the environment."

Hoffman and his team are hunting for a viable alternative. "The world is making millions of these devices every day and the longer we delay, the greater the threats to health through direct exposure and downstream environmental pollution," he says.

The EU has already moved to regulate against lead-based piezoceramics, once a viable alternative is found. Other countries, including some of the biggest electronic manufacturers such as China and Korea, have followed suit.

One alternative is bismuth alkali-based piezoceramics. Attractively lead-free, the downside is their propensity for fatigue and degradation.

Discovering and rectifying the mechanisms behind this decline will be essential to rolling out a prototype for industry testing. Hoffman believes his team is close to such a breakthrough.

For Hoffman, who recently took up the role as Pro-Vice-Chancellor (Research), it's the type of real-world challenge he loves. Through the ARC-funded Centre of Excellence in Design in Light Metals, he is also studying how to make cars safer by incorporating lightweight but durable metallic foams into their construction.

"Coming up with new materials that offer strength and impact resistance, but are also forgiving when damaged, will be an important breakthrough," he says.

Those materials currently exist, Hoffman says, but there is no way yet to bend them for application on curved surfaces like the bonnets of cars.

Hoffman is also looking at the nano-level structure of human bone to better understand how it changes under the influence of drugs and exercise, and diseases like osteoporosis.

It's an area of personal interest for Hoffman who, as a young, elite athlete, was determined to excel in rowing. When finding and holding down a job got in the way of training, he decided instead to embark on a PhD.

He missed out on the Olympics but his studies took him to the University of California, Berkeley, and then to the University of Tokyo and on to Europe.

Joining UNSW 15 years ago, Hoffman's multidisciplinary expertise has helped make the University Australia's pre-eminent destination for the study of materials science.

And while he still enjoys getting out on Sydney's waterways, Hoffman has loftier ambitions than Olympic gold: "As an engineer, there's no greater result than to create materials that make a real difference to people's lives."

► Hunting for viable lead alternatives
... Professor Mark Hoffman. Photos: Maja Baska and Jerry Mason/Science Photo Library





AUSTRALIA'S LOST WORLD

The discovery of a rich new fossil site could fill the gaps at the heart of the story of the Australian continent. By Deborah Smith.

DUBBED THE WHOLLY DOOLEY SITE by one researcher and Bone City by another, a major deposit of fossils has been discovered by UNSW scientists beyond the boundaries of north-western Queensland's famous Riversleigh World Heritage area.

Initial indications are it represents a different time period and poorly known stage in the evolution of Australia's unique biota. The prehistoric bone-bed contains the remains of a wide range of previously unknown marsupials and bats.

The New Riversleigh area was found about 15km south-west of the western limit of the original Riversleigh site, which is about 250km north-west of Mount Isa, and which Sir David Attenborough has already described as one of the four most important fossil sites in the world.

A team of researchers and volunteers, led by UNSW's Professor Mike Archer and Associate Professor Suzanne Hand, used maps based on satellite-generated images to explore geological deposits in this remote region beyond the World Heritage area.

"There are some animals here I've never seen before," Professor Archer told the *Sydney Morning Herald*. "This place is bone city."

"While the known fossil deposits span and document environmental change over the last 25 million years, there are some 'holes' in the record including the period between about 13 and 5 million years ago," says Archer.

"This was a critical time during which the widespread, lush, ancient rainforests of Australia rapidly gave way to increasingly drier conditions. At least some of these new deposits may help to fill out that critical gap."

The breakthrough enabling the new discoveries came as a result of remote sensing studies by former UNSW PhD student Ned Stephenson.

When challenged to use satellite data alone to "retro-predict" the location of hundreds of fossil sites already known from the 40 square kilometres of fossil-bearing rocks in the World Heritage area, he succeeded with spectacular accuracy.

"The team at UNSW were still getting over their amazement at the accuracy, when he said: 'But wait, there's more!'," Archer says. "When he used the same satellite data to examine the countryside way beyond the World Heritage area, he realised there were even larger areas that appeared to give the same signals as the fossil deposits in the World Heritage area."

The UNSW team managed to reach the edge of the new area last year and immediately found an extraordinarily different fossil deposit than any that had been seen in the original area.

The richness of the discovery led core team member Phil Creaser to call it the Wholly Dooley Site. The silt-filled rocks were treated with acid by research student, Caitlin Anderson, and found to contain the remains of mostly unfamiliar animals.

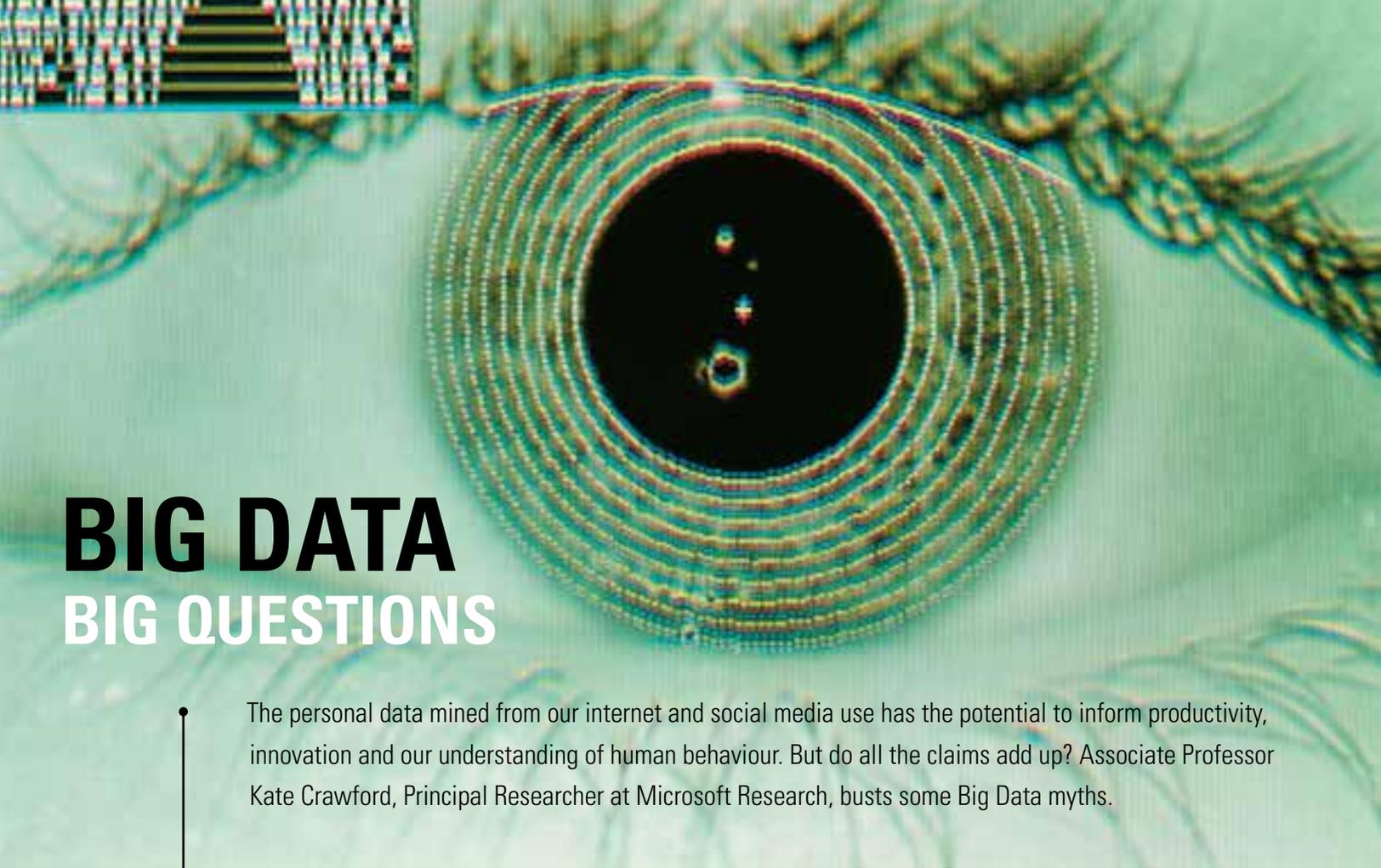
Support for exploration in the hard-to-reach area has been provided by the National Geographic Society, adding to critical support provided by the Australian Research Council and local groups such as Xstrata Community Program North Queensland and the Waanyi Nation.

The team also located more than 30 previously unknown caves.

"This region is an amazing place at the heart of the story of the origins of the Australian continent and its bizarre biota. We anticipate that the new finds will soon be followed by many more, adding significantly to our understanding about how Australia transformed from an Amazon-like world to the dry continent we see today," says Archer.

The hundreds of long-extinct species already known include carnivorous kangaroos, primitive koalas and wombats, giant-toothed platypuses, gigantic carnivorous flightless birds, huge land and tree-climbing crocodiles and marsupial lions.

▲ This place is bone city ... Professor Mike Archer and team at the New Riversleigh site. Photo: Tony Walters/Fairfax



BIG DATA

BIG QUESTIONS

The personal data mined from our internet and social media use has the potential to inform productivity, innovation and our understanding of human behaviour. But do all the claims add up? Associate Professor Kate Crawford, Principal Researcher at Microsoft Research, busts some Big Data myths.

“With enough data, the numbers speak for themselves.”

Not a chance. The promoters of big data would like us to believe that behind the lines of code and vast databases lie objective and universal insights into patterns of human behaviour, be it consumer spending, criminal or terrorist acts, healthy habits, or employee productivity. But many big-data evangelists avoid taking a hard look at the weaknesses.

Numbers can't speak for themselves, and data sets – no matter their scale – are still objects of human design. The tools of big-data science do not immunise us from skews, gaps and faulty assumptions. Those factors are particularly significant when big data tries to reflect the social world we live in. Biases and blind spots exist in big data as much as they do in individual perceptions and experiences. Yet there is a problematic belief that bigger data is always better data and that correlation is as good as causation. For example, social media is a popular source for big-data analysis, and there's certainly a lot of information to be mined there. But there are many reasons to ask questions about what this data really reflects.

For starters, we know from the Pew Research Center only 16% of online adults in the United States use Twitter, and they are not a representative sample – they skew younger and more urban than the general population. Further, we know many Twitter accounts are automated response programs, fake accounts (estimated at more than 20 million) or 'cyborgs' – human-controlled accounts assisted by bots. So even before we get into the methodological minefield of how you assess sentiment on Twitter, let's ask whether those emotions are expressed by people or just automated algorithms.

Then there's the problem of confirmation bias. For example, to determine which players in the 2013 Australian Open were the “most positively referenced” on social media, IBM conducted a large-scale analysis of tweets about the players via its Social Sentiment Index. The results determined that Victoria Azarenka was top of the list. But many of those mentions were critical of Azarenka's controversial use of medical timeouts. So did Twitter love her or hate her? It's difficult to trust that IBM's algorithms got it right.

“Big data will make our cities smarter and more efficient.”

Up to a point. Big data can provide valuable insights to help improve our cities, but it can only take us so far. Because not all data is created or even collected equally, there are “signal problems” in big-data sets – dark zones where some citizens and communities are overlooked or under-represented. So big-data approaches to city planning depend heavily on city officials understanding the data and its limits.

For example, Boston's Street Bump app, which collects smartphone data from drivers going over potholes, is a clever way to gather information at low cost, and more apps like it are emerging. But if cities rely on data that only come from citizens with smartphones, it's a self-selecting sample – with less data from those neighbourhoods with fewer smartphone owners, which typically include older and less affluent populations. One need only look to the 2012 Google Flu Trends miscalculations, that significantly overestimated annual flu rates, to realise the impact relying on faulty big data could have on public services and policy.

“Big data doesn’t discriminate between social groups.”

Hardly. Another promise of big data’s alleged objectivity is there will be less discrimination against minorities because raw data is somehow immune to social bias, allowing analysis to be conducted at a mass level and thus avoiding group-based discrimination. Yet big data is often deployed for exactly this purpose – to segregate individuals into groups – because of its ability to make claims about how groups behave differently. The potential for big data to be used for price discrimination raises serious civil rights concerns.

Under the rubric of “personalisation”, big data can be used to isolate specific social groups and treat them differently, something laws often prohibit explicitly. Companies can choose to show online ads for a credit card offer to people who are most attractive in terms of household income or credit history to banks, leaving others completely unaware a particular offer is available. Now employers are trying to apply big data to human resources, assessing how to make employees more productive by analysing their every click and tap. Employees may have no idea how much data is being gathered about them or how it is being used.

Discrimination can also take on other demographic dimensions. For example, *The New York Times* reported the chain store Target began compiling analytic profiles of its customers years ago; it can predict under certain

circumstances if a woman is pregnant with an 87% confidence rate, simply based on her shopping history. While the Target statistician in the article emphasised how this will help the company improve its marketing to expectant parents, one can also imagine such determinations being used in other ways with serious ramifications for social equality and, of course, privacy.

“Big data is anonymous, so it doesn’t invade our privacy.”

Flat-out wrong. While many big-data providers do their best to de-identify individuals from human-subject data sets, the risk of re-identification is very real. Mobile phone data, en masse, may seem fairly anonymous, but a recent study on a data set of 1.5 million mobile users in Europe showed just four points of reference were enough to individually identify 95% of people. There is a uniqueness to the way people make their way through cities, the researchers observed, and given how much can be inferred by the large number of public data sets, this makes privacy a growing concern.

But big data’s privacy problem goes far beyond standard re-identification risks. Currently, medical data sold to analytics

firms has a risk of being used to track your identity. There is a lot of chatter about personalised medicine. But despite the rapid growth in personal health data collectors such as RunKeeper and Nike+, practical use of big data to improve health-care delivery is still more aspiration than reality.

Other kinds of intimate information are being collected by big-data energy initiatives, such as the Smart Grid. This effort looks to improve the efficiency of energy distribution to our homes and businesses by analysing enormous data sets of consumer energy usage. It can predict not only how much energy we need and when we need it, but also minute-by-minute information on where we are in our homes and what we are doing. This can include knowing when we are in the shower, when our dinner guests leave for the night and when we turn off the lights to go to sleep. Of course, such highly personal big-data sets are prime targets for hackers or leakers.

“Big data is the future of science.”

Partly true, but it has some growing up to do. Big data offers new roads for science, without a doubt. But unless we recognise and

address some of big data’s inherent weaknesses in reflecting on human lives, we may make major public policy and business decisions based on incorrect assumptions.

To address this, data scientists are starting to collaborate with social scientists, who have a long history of

critically engaging with data: assessing sources, the methods of data collection and the ethics of use. Over time, this means finding new ways to combine big-data approaches with small-data studies. New hybrid methods can ask questions about why people do things, beyond just tallying up how often something occurs. That means drawing on sociological analysis and deep ethnographic insight as well as information retrieval and machine learning.

The next stage will be a richer collaboration between computer scientists, statisticians and social scientists of many stripes to ask fundamentally different kinds of questions, with greater rigour.

Given the immense amount of information collected about us every day – including Facebook clicks, GPS data, health-care prescriptions and Netflix queues – we must decide sooner rather than later whom we can trust with that information, and for what purpose.

UNSW Associate Professor Kate Crawford is a Principal Researcher at Microsoft Research, a Visiting Professor at the MIT Center for Civic Media, and a Senior Fellow at the Information Law Institute at NYU.

This is an edited version of an article first published in Foreign Policy.



“Now employers are trying to apply big data to human resources, assessing how to make employees more productive, all by analysing their every click and tap.”

▲ Mythbuster ...
Associate Professor
Kate Crawford.
◀ Main photo: James
King-Holmes/Science
Photo Library



▲ Professor David McKnight is a senior research fellow in the Faculty of Arts and Social Sciences.



Time to kick the coal habit

Myth-making by big miners is fuelling a rise in the use of black gold with deadly outcomes for greenhouse emissions, argues David McKnight.

AL GORE TITLED his famous documentary on climate change 'An Inconvenient Truth'. Today that truth has become very inconvenient to Australia. Our coal exports have tripled in the past 25 years to more than 300 million tonnes annually. Coal corporations now want to double that figure. We are exporting coal like there is no tomorrow. Yet we know to moderate global warming, the world must drastically reduce the burning of coal.

But the world has not stopped burning coal. Far from it. We are bingeing on coal. Global coal production has risen by 4% on average each year since 1999. One result is that between years 2000 and 2008, global greenhouse emissions rose 30%. So while everyone talks about the need to combat climate change, we are going backwards.

What does this mean? It means if you do a litmus test off Sydney Harbour today, it comes out redder than it did in pre-industrial times. Our seawater is 30% more acidic. It means if you look at the extent of the sea ice in summer in the Arctic you find it is 40% of what it was in the 1970s. This reality is outstripping previous cautious scientific predictions.

We know the temperature of the world has risen just under one degree. The sceptics claim the air temperature has now plateaued. They forget to tell us the sea temperature is rising and has not plateaued. This explains the dramatic visual evidence of global warming in the shrinking of the Arctic sea ice. Closer to home Australia this year had its hottest-ever summer and bushfires devastated places like eastern Tasmania.

In the face of all this, very little is actually being done. One of the main reasons is the global coal industry is doing its utmost to make sure very little is done. In Australia, they have funded campaigns against any kind of restraint on the use of coal. This occurred first in 2009 when the first Rudd

government tried to introduce an emission trading scheme. The Australian coal industry fought this modest attempt to restrain greenhouse emissions. Television ads proclaimed that many coalmines would close and thousands of jobs would be lost. The campaign so weakened the emissions trading scheme that it failed to get the support of the Greens and was defeated and then dropped by Rudd.

Two years later, the Gillard government introduced a carbon tax. Once again the coal industry cranked up a scaremongering TV ad campaign about mine closures and job losses. In the end it weakened the carbon tax but did not kill it. Now the coal industry is campaigning to abolish the renewable energy target.

Quite apart from climate change, Australians should be sceptical of the alleged wealth that comes from mining coal. According to the Reserve Bank, the mining industry is around 80% foreign owned

and therefore most profits eventually go offshore.

In addition, the recent coal boom actually damaged other industries in Australia, by forcing a high dollar. The high dollar made it more expensive for tourists to visit and more expensive for overseas students to study. It overpriced Australian exports.

The industry claims coal is a big employer but this is misleading. The coalmining workforce is around 50,000 – a tiny part of the 11 million workforce of Australia. The coal workforce is a quarter of the size of the university and tertiary sector.

By expanding coalmining we are locking ourselves into reliance on coal exports when it is increasingly clear that coal must be rapidly phased out of world energy use. No doubt one day it will be, but it may be too late to stop some of the more disastrous consequences of climate change.

Big Coal: Australia's Dirtiest Habit is published by NewSouth/UNSW Press. Co-authors: Guy Pearse and Bob Burton.

In the hot seat

How committed is Australia, really, to using its Presidency of the UN Security Council to promote women, asks Laura Shepherd.



IN JUNE, the Australian government confirmed that it would highlight as a 'key priority' the leadership role women can play in ensuring long-lasting peace in fragile post-conflict societies, during its two-year term on the UN Security Council.

Australia will hold the presidency of the Council in September, and again in November 2014. The presidency is a unique opportunity to further articulate the Council's commitment to gender equality and women's empowerment: the Women, Peace and Security (WPS) agenda.

But how genuine is Australia about using its place on the Council to make sure this happens?

Despite our public commitment to women's leadership in peacebuilding, Australia has opted not to organise a presidential statement on the theme, or host an open debate or gathering of Security Council members. Instead, the government is coordinating a side event in New York in September, and organising a second event in conjunction with the Chair of the UN Peacebuilding Commission.

These activities are valuable and important, but they won't have the same impact as Australia using the presidency to schedule high-level WPS events at the Security Council.

It has been noted that Australia intends to use its position on the Council to 'mainstream' the WPS agenda across all aspects of Council business. But if all mainstreaming means is that the WPS resolutions are mentioned in Council preambles then this will have limited impact.

Australia needs to make connections with current areas of core Council business: events in Egypt and Syria, or the forthcoming debate about mandate renewal of the International Security Assistance Force (ISAF) and governance transition in Afghanistan.

Deep mainstreaming involves thinking about how Council should respond to these issues with reference to the WPS pillars: the prevention of violence, in particular sexualised and gender-based violence; the participation of women in peace negotiations and peacebuilding; and the protection of women's rights as well as their bodies.

Australia is vocal on the need for enhanced civilian protection, particularly in Syria, with the Australian ambassador Gary Quinlan saying on World Humanitarian

Day that the ability to protect civilians during conflict "is a defining benchmark against which the United Nations itself should – and will – be judged". Mainstreaming the WPS agenda means making the connections between the protection of civilians and the WPS agenda; recognising that civilians gendered differently experience conflict differently, and will need different mechanisms and facilities in place to secure their protection and wellbeing.

The government has also recently coordinated efforts to bring about a high-level briefing for Council members on unfolding events in Egypt. Australia's

emphasis is on the need for national political reconciliation. Harnessing the WPS agenda in this context means that women are able to participate actively in that reconciliation process, that they are involved in decision making regarding the future of the state and its governance.

The UN and other stakeholders – Australia included – have already made long-term commitments to supporting Afghanistan through the transition decade. But there is a regressive tendency for women to be denied a seat at the table during the planning and

implementation of such transitional arrangements.

Invoking the WPS agenda in Afghanistan's post-conflict reconstruction means ensuring that women are included in governance and

juridical reform and protected from gender-based violence to enable their full and active participation.

If it is genuine, Australia's commitment to mainstreaming the Women, Peace and Security agenda has truly revolutionary potential.

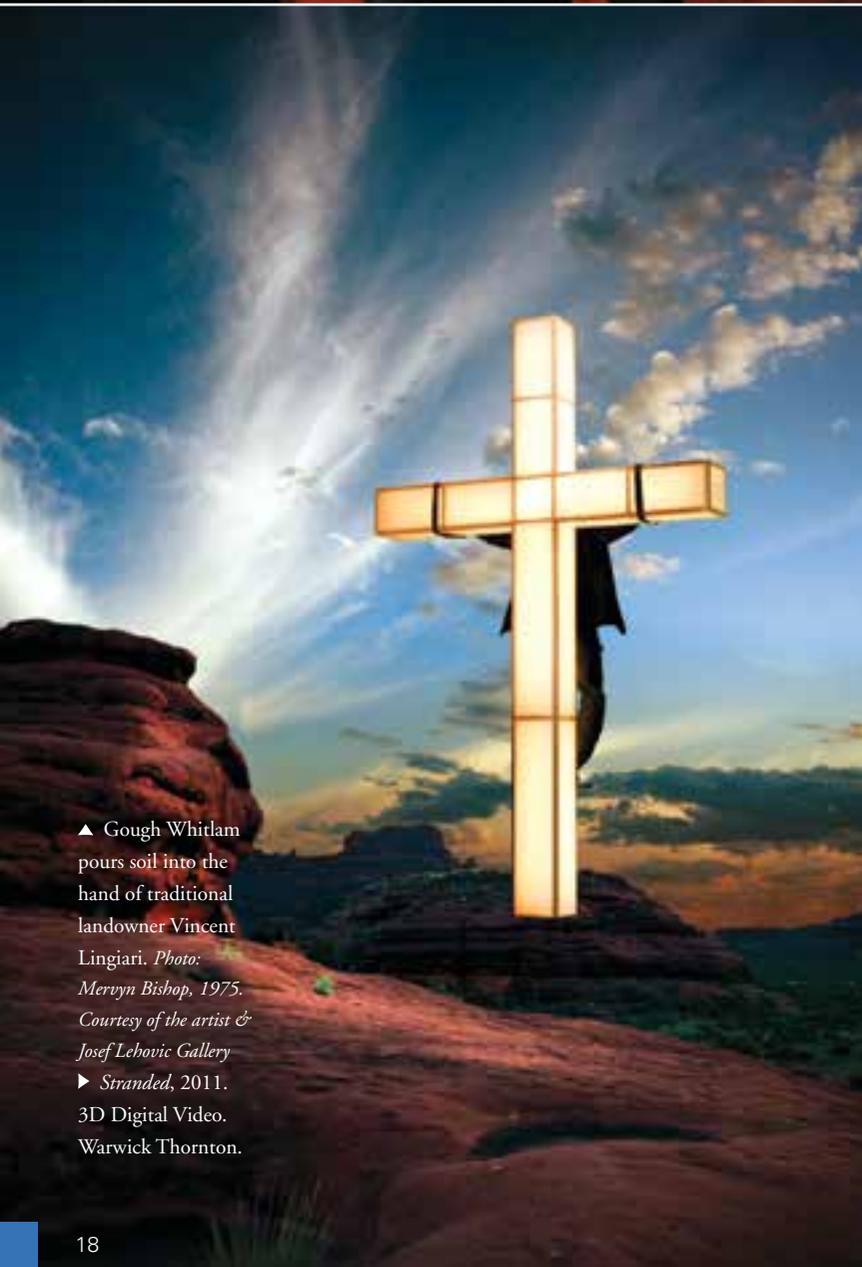
If every Council resolution contained provisions for the presence of Women Protection Advisers in conflict zones, Gender Advisers in stabilisation and post-conflict situations, or proportional representation of women in peace negotiations, there would be true gender mainstreaming, and Australia's campaign promise would be delivered.

▲ Laura Shepherd is an Associate Professor in the School of Social Sciences and a member of the Women, Peace and Security Academic Collective.

"Australia's commitment to mainstreaming the Women, Peace and Security agenda has truly revolutionary potential."



▲ Gough Whitlam pours soil into the hand of traditional landowner Vincent Lingiari. Photo: Mervyn Bishop, 1975. Courtesy of the artist & Josef Lehovic Gallery
 ► *Stranded*, 2011. 3D Digital Video. Warwick Thornton.



MAKING CHANGE

Iconic images of Gough Whitlam's groundbreaking links with Indigenous Australia and his China visits form the basis of a new COFA exhibition.

ON A HOT DAY IN 1975, Prime Minister Gough Whitlam stood against a backdrop of brilliant blue sky and red earth at Wattie Creek and poured sand into the palm of traditional landowner Vincent Lingiari.

The symbolic moment, immortalised by Indigenous press photographer, Mervyn Bishop, has become an iconic image in Australian history and inspired the popular Paul Kelly song, 'From Little Things, Big Things Grow'.

More than 30 years later Bishop performed the Welcome to Country ceremony at the opening of the *Making Change* exhibition at Galleries UNSW. His Wattie Creek image forms the centrepiece of the exhibition, which celebrates Whitlam's groundbreaking links with Indigenous Australia through a mix of historic photos and contemporary Indigenous artworks.

Making Change includes the works of photojournalist and documentary photographer Ricky Maynard, contemporary art photographers Nici Cumpston, Tracey Moffatt and Jason Wing and media-based and installation artists Richard Bell, Warwick Thornton, Bindi Cole, Fiona Foley and Judy Watson.

"The exhibition represents a move away from the historical Anglo-Celtic representation within Australian art, and redefines the cultural identity of the nation to reflect a multiculturally diverse and outward-looking society," says co-curator, Felicity Fenner.

The exhibition also marks the 40th anniversary of diplomatic relations between Australia and China. Whitlam was the first Australian Prime Minister to make an official visit to China, heralding a new era of economic and cultural ties that now spans four decades.

The collection was presented at the National Art Museum of China in 2012 where it attracted 9,000 people. Former Minister for the Arts, Simon Crean paid an official visit to the exhibition to further expand cross-cultural relations within the arts.

The exhibition was also a finalist in the federal government's 2013 Australian Arts in Asia Awards.

Making Change is produced and presented by UNSW's College of Fine Arts (COFA), the Australian Centre for Photography and the National Art Museum of China.

The exhibition runs until 5 October.

By Fran Strachan.

CREATIVE LIFE

A new field of art is using genetic material and living tissue to question our place in the world.



A MALE FACE EMERGES from the petri dish. The tiny portrait, grown in a genetics lab, has been painted with a delicate brush dipped in *E. coli* bacteria and DNA.

As the bacteria bloom in the agar and the genetic material deteriorates, the features of the face take shape.

Dr Andre Brodyk, a COFA graduate and internationally recognised biotech artist, is fascinated by the chain of non-coding (junk) DNA found in the genes that cause Alzheimer's disease.

He creates his portraits then stores them at different temperatures to either slow down or quicken the natural deterioration of the genetic material. It's a process that mimics the frustrating nature of the disease.

"The work is a metaphorical representation of the way late-onset Alzheimer's may lie dormant inside a person for many years without giving a visual indication that it is present," says Brodyk.

"We cannot see it – we only notice its effects gradually as it begins to manifest itself in the decline of someone's identity and personality."

Biological art, or bioart, is an emerging genre where artists use live tissues, bacteria, living organisms and their own bodies to create provocative works.

Using living materials to grow your own art is the theme of *Multispecies Worlds*, an Environmental Humanities subject taught by Dr Eben Kirksey.

He's just come back from UNSW's microbiology laboratory, where one of his students has created a living artwork modelled on the human face.

Viveca McGhie pasted microbes from her own face on to the model made of agar gel. The surface bloomed into a pattern of orange, brown and green microbes.

"It's about realising your face is not just your face – it's a

hothouse of genetic material," explains Kirksey. "Your body is a home for many other organisms. We're not really as separate as we think we are."

Kirksey recently curated the exhibition, *Intra-action: Multispecies Becomings in the Anthropocene*, with Madeleine Jean Boyd from the University of Sydney, which featured time-based, sculptural, installation and photographic interactions with the environment.

His upcoming book, *The Multispecies Salon: Gleanings from a Para-Site*, features Brodyk's art.

Kirksey says the artist's use of genetic fragments speaks to "broader dreams and nightmares" surrounding emergent forms of life.

"Amid speculation about future scientific breakthroughs, Brodyk's works show us that life forms exist at the very edge of the boundary between living and inanimate matter."

Kirksey also applauds the work of US ecological artist Deanna Pindell, who aims to raise awareness about environmental degradation through sculpture and installations.

One of Pindell's recent campaigns involved using donated sweaters to create felt balls which then became homes for moss. The balls in turn helped germinate trees, creating an "ecosystem for mice, voles and other critters", says Kirksey.

"Pindell's work is asking us what might evolve, what might flourish, if we care for abandoned places, such as open-cut mines, felled forests or abandoned car parks."

Kirksey says the aim of bioart is the same as his *Multispecies Worlds* course: "Simply to encourage students to think and talk differently about ethical and environmental issues."

By Ali Gripper and Fran Strachan.



▲ *John Doe* by Andre Brodyk, a biological artwork that mimics the frustration of Alzheimer's disease.

A SAFER SYDNEY



Fran Strachan reports on a virtual model of Sydney helping to clear a path in disaster.

A PLANE flies into Sydney's central business district, demolishing the Queen Victoria Building and trapping commuters in nearby Town Hall Station. Blinded by smoke, they stumble towards the exits, only to find their way blocked.

"There's no doubt about it, commuters wouldn't be able to get out," says COFA's Professor Richard

Goodwin. "The existing exits at Town Hall Station can't cater for that many people in an emergency."

Using a world-first interactive replica of Sydney's CBD created with commercial gaming technology, Goodwin and Faculty of Built Environment senior lecturer Russell Lowe have modelled the flow of Sydney's 40,000 daily commuters and mapped numerous emergency scenarios.

"Patterns of use, mobility and security in cities have changed rapidly since 9/11 and this has been recognised by civic authorities, industries and academics globally," says Goodwin.

"By researching and playing out certain scenarios we can offer planning alternatives that could save lives."

The new computer interface, built in partnership with the NSW government's Emergency Information Coordination Unit (EICU), combines gaming technology from the commercial video game, *Crysis*, with traditional architectural modelling and environmental sensors.

The virtual representation of Sydney, which updates automatically in real time, has the potential to provide urban planners, developers and architects with previously inaccessible security and spatial data critical to emergency response planning.

The interface and architectural model could become a prototype for international urban planning and security and will be exhibited as the centrepiece of Beijing Design Week in September.

Goodwin says the technology will provide an invaluable

central database for the mapping of Sydney. The researchers aim to make the interface open access with privacy settings that can be switched on and off according to the user.

"Our research pulls together what has been a disparate group of databases and software into one cohesive program that developers, planners and architects can access easily and inexpensively – this technology has the potential to act as the 'brain of the city'," he says.

By modelling the city in the virtual world of the computer game, simulations of explosions, floods, emergencies and varying weather patterns can be modelled and analysed.

Sensor-controlled avatars act as residents reacting to emergency scenarios. Their responses are then closely monitored, advancing the capability to map, test and analyse pedestrian movement in Sydney and other cities globally.

"This is the first time gaming technology has been used to map the movement of people in cities," Lowe says. "Our software offers far more comprehensive data than existing tracking devices, including CCTV or GPS."

The project is funded by a \$1.3 million Australia Research Council Linkage grant and builds on Goodwin's 2003 ARC Discovery grant, for the project Porosity, which measured security problems relating to public and private spaces in Sydney's CBD and modelled safe compromises for future building redesign.

Goodwin says improving the efficiency of existing buildings is crucial for growth in the world's cities.

"This technology will significantly improve Sydney's capacity to develop, through the enhancements it can provide to the design of existing buildings and by changing the way we think about usable spaces – particularly safe spaces and security," he says.

Lowe says the future of interrogating all information is in 3D, and in real time.

"It's no longer enough to look at graphs and spreadsheets and count pedestrians. Future approaches to planning and security are about being immersed in different points of view."



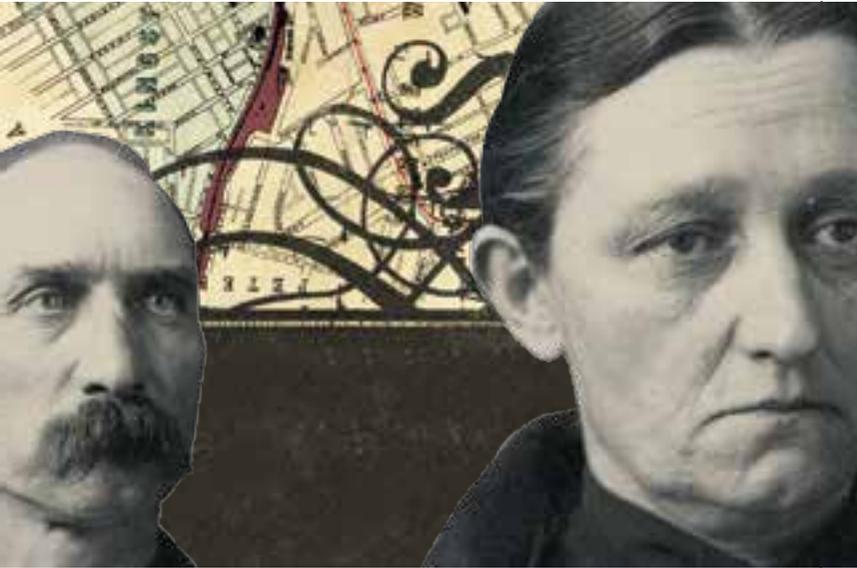
▲ Planning alternatives that save lives ... Professor Richard Goodwin and Russell Lowe.
Photo: Maja Baska
► A scene from the virtual representation of Sydney.



The Baby Farmers

Sarah and John Makin murdered the babies of unmarried mothers as a public service.

But one academic believes their “trial of the century” was flawed justice, writes Anabel Dean.



The outcome of this case informed the law in both England and Australia for more than 100 years because of the controversial evidence that was allowed to go to the jury. After conviction, the Makins appealed to the Privy Council in London, which announced a principle still central to our legal system: that evidence of prior criminal conduct should not ordinarily be admitted at trial.

Cossins – a leading legal expert on evidence law and sexual assault law reform – was pleased to rediscover her love of criminology in the three years it took to research and write the book. She has little sympathy for the Makins despite playing the title role of Sarah in an episode of the television series *Deadly Women* in 2009.

“They don’t come across as very likeable people,” Cossins says. “Sarah was a very angry, violent woman, a loner, and not a great socialiser.”

Regardless of their guilt, Cossins contends the Makins were wrongly convicted: the jury verdict was unsatisfactory and the evidence was circumstantial.

“The final decision did nothing to change the short lives and quick deaths of countless babies in the city of Sydney in the 1890s and afterwards,” she says.

Illegitimate children were bought and sold like a commodity until the *Infant Life Protection Act* was passed in Victoria in 1890, followed in 1892 by the NSW *Children’s Protection Act*.

“Sarah’s and John’s crimes were the crimes of a society that condoned infanticide while, paradoxically, stigmatising unmarried mothers,” Cossins says. “Baby farmers provided an unsavoury but necessary service that filled the vacuum left wide open by government policies and the market economy.”

The Baby Farmers is published by Allen & Unwin.

ADOPTION – Will kind LADY
ADOPT fine healthy BABY (boy).
Address Mrs Bland, PO, William st.

TO THE SYDNEY COUPLE, John and Sarah Makin, the coded message in this newspaper advertisement from the late 1890s was clear. It meant “child for sale”.

The fate of children entrusted to the Makins through “adoption” became horrifyingly evident when the body of a one-month-old boy was discovered in a shallow grave in their backyard in 1892. Twelve more tiny bodies were later found buried around houses where the Makins had lived in Macdonaldtown, Chippendale and Redfern.

One of the most chilling secrets of the 19th century – the trade in the life and death of children – is exposed in all its gritty detail in *The Baby Farmers*, written by criminologist Annie Cossins.

“Hidden in the slums of Sydney, baby farmers effectively operated as kennels for

babies to be ‘put down,’” says Cossins, an Associate Professor at UNSW Law.

The Makins were the most infamous of the ‘baby farmers’. Their case – dubbed the “trial of the century” at the time – provides a sobering insight into the social and economic reality of life in the 1800s. “It’s a slice of Australian history that most people don’t know about,” says Cossins. “We don’t know about the poor and the women.”

Cossins’ book focuses on the colony where the harsh treatment of unmarried, pregnant domestic servants ensured an ongoing trade in babies.

“An unmarried, pregnant woman was trapped by the twin gatekeepers of financial ruin on one side and moral ruination on the other,” Cossins explains. “The Makins took advantage of a moral climate that ... accepted infanticide as a solution to illegitimate children.”

The story does not end with the execution of John Makin at Darlinghurst Gaol (an instantaneous death at the gallows) or the imprisonment of Sarah for the rest of her unfortunate life.



▲ A little-known slice of Australian history ... Associate Professor Annie Cossins. Photo: Courtesy of Allen & Unwin



◀ Michael Chan and Derek Williamson with an example of an atrial myxoma.

I HEART MUSIC

IT'S NOT OFTEN that a musical performance can be called life changing. But when medical student Michael Chan allowed himself to be hooked up to an ultrasound as part of a unique concert at UNSW two years ago, it may have literally saved his life.

The jazz improvisation used the sound and images of Chan's beating heart. To him the music was soothing, but for a pair of health professionals in the audience, alarm bells rang.

The two audience members, a former cardiothoracic surgeon and a sonographer, were able to see and hear what others in the audience could not: an atrial myxoma, a rare and deadly heart tumour.

Within days Chan was in hospital undergoing open-heart surgery.

"I was lucky," says the 24-year-old, who is now an intern at the Prince of Wales Hospital. "I wasn't even planning to be there that night and it was by chance that I was singled out to be hooked up to the equipment."

It was also the first time an image of the beating heart was projected on to a screen as part of the i Heart Music performance.

"If there had only been the sound, as in previous performances, the problem would not have been picked up," says Chan. Most people with the tumour are unaware until they have a heart attack or stroke. And in most cases the condition is fatal.

UNSW's Museum of Human Disease Director Derek Williamson, who helped organise the concert in 2011, recently expanded the series for National Science Week, so audiences around the country could take part via video link.

Performing were three jazz musicians, including a drummer who works with virtuoso Vince Jones. The Sydney performances were staged at the Museum of Human Disease, between perspex boxes holding lungs damaged by emphysema, and gangrenous feet.

Williamson says there are great synergies between health and music. "Both have a rhythm: in music there is often four beats to the bar, for a heart there's 70 beats in a minute. That means three billion beats in a lifetime."

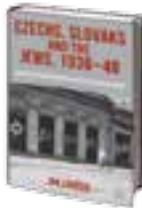
By Susi Hamilton.

BOOKS



CONTINGENCY IN MADAGASCAR
STEPHEN MUECKE, SCHOOL OF THE ARTS
AND MEDIA, AND MAX PAM

As they set off for Madagascar, writer Stephen Muecke and photographer Max Pam adopted as their guiding principle the idea of contingency – central to which is the conscious embrace of risk and chance. In doing so, they established a new aesthetic in which image and text are inextricably linked to the notion of possibility. This stunning collection of photos and essays is the result of their vision, collectively illustrating the beauty and wisdom on offer in one of the world's poorest nations. *Intellect*



**CZECHS, SLOVAKS AND THE JEWS, 1938-48 –
BEYOND IDEALISATION AND CONDEMNATION**
JAN LANICEK, SCHOOL OF HUMANITIES

Covering the period between the Munich Agreement and the Communist Coup, this volume provides the first full account of the Czechoslovak Government-in-Exile in London. In examining attitudes towards the Jews during WWII and its aftermath, the author explores the notion that Czechoslovak treatment of the Jews was shaped by resurgent Czech and Slovak nationalism. He challenges the official history of Czechoslovak policy towards the Jews, which still presents the country as an exceptional case study of an East-Central European state that rejected anti-semitism. *Palgrave Macmillan*



INNER WEATHER: LEARNING FROM DEPRESSION
JENNY STEWART, UNSW CANBERRA

A lucid, honest and deeply searching account of the author's struggle to come to terms with anxiety and depression. Jenny Stewart shows how, with considerable help from others, she was able gradually to take control of her depression, not by focusing on its causes, but by understanding how best to fight it. It covers practical advice as well as personal revelations. This is not just a self-help book, it is a self-seeing book and shows that it is possible to make something positive out of the depressive experience. *Hybrid Publishers*



NANOART – THE IMMATERIALITY OF ART
PAUL THOMAS, COFA

Examining the intersection between art and science and making visible what cannot ordinarily be seen with the naked eye, *Nanoart* provides insight into materiality and life. It includes an extensive overview of the history of nanoart from the work of Umberto Boccioni to the present day. The author looks specifically at art inspired by nanotechnological research made possible by the scanning tunnelling microscope and atomic force microscope in the 1980s, as well as the development of other instruments of experimentation to offer a sustained consideration of this fascinating artistic approach. *Intellect*

“NEOLIBERALISM HAS ENTERED OUR SOCIAL WORLD AND PLANTED ITS FLAG IN OUR MOST INTIMATE TERRAIN.”

Adjunct lecturer Alecia Simmonds on how neoliberalism has spilled beyond its traditional economic sphere into our romantic lives – *SMH, Daily Life*

“THIS ASSUMES THERE IS SPARE WATER WHERE THERE IS NONE.”

Professor Richard Kingsford, criticising a NSW government plan to redirect water from the Macquarie River to Orange in central-west NSW – *UNSW Newsroom*

“IT’S NOT AS IF ITUNES KILLED THE ROLLING STONES OR GOING TO A ROLLING STONES CONCERT, IN FACT MAYBE THOSE ARE EVEN MORE ATTRACTIVE NOW BECAUSE YOU CAN BUY A PLAYLIST ON ITUNES.”

ASB Dean, Professor Geoffrey Garrett, on why the advent of MOOCs does not spell the end of the bricks and mortar university – *International Business Times*

“The question that I have been asking myself is: ‘Should we watch this political process with bated breath or does it even matter?’”

Dr Leila Morsy on the federal election campaign, and the slow uptake by the states of the education reforms recommended under the Gonski Review – *The Conversation*

“IF WE WANT TO CURE CANCER WE NEED TO THINK LIKE VENTURE CAPITALISTS.”

Dean of Medicine, Professor Peter Smith, outlining the strategy of long-term investment in cancer research by UNSW and The Kids’ Cancer Project – *SMH*

“THIS HAS PROVED CONVENIENT FOR POLITICIANS WHO OPPOSE MARRIAGE EQUALITY, BUT ARE NOT PREPARED TO SAY THIS PUBLICLY. SOME HAVE BEEN ABLE TO HIDE PERSONAL PREJUDICE BEHIND A LEGAL SMOKESCREEN.”

Professor George Williams on politicians’ use of constitutional uncertainty to justify their opposition to same-sex marriage – *SMH*

“The depth of the discounts on the pump price offered through these shopper dockets has begun to ring alarm bells at what is, at the very least, a questionable use of market power.”

ASB lecturer Michael Peters on the supermarkets’ use of cut-price petrol to attract customers – *The Australian Financial Review*

“NOW, THESE ARE THE IMAGES OF THE PAST THAT WE FIND MOST ENTICING, MOST EVOCATIVE.”

Associate Professor Joanna Mendelsohn on the significance of the exhibition *Sydney moderns: art for a new world*, and its colourful work created largely by women – *The Conversation*

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