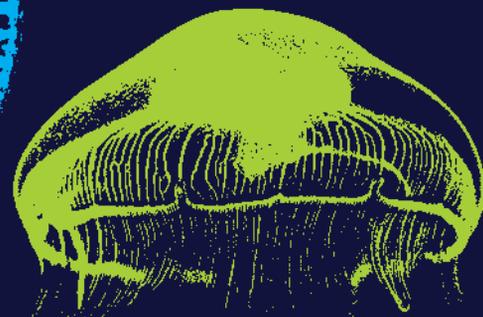
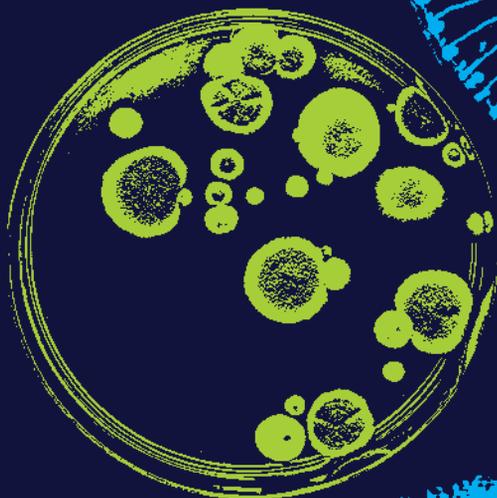
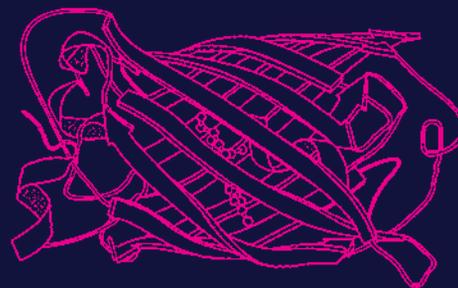
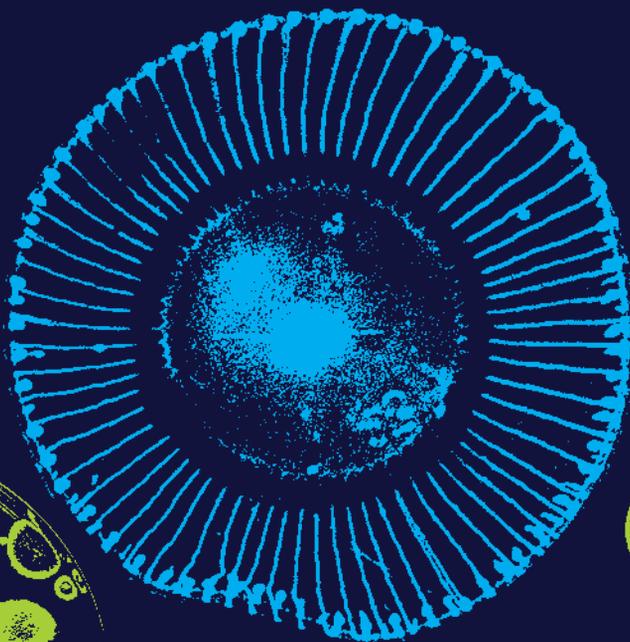
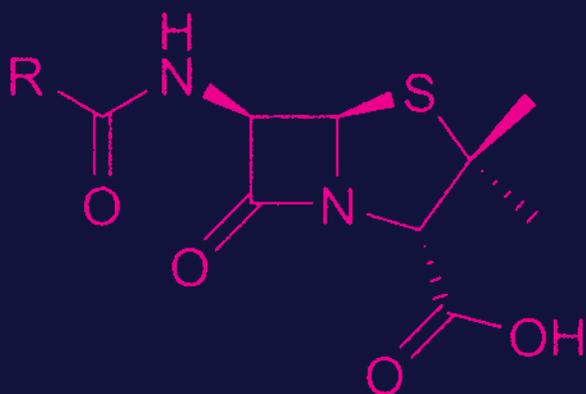




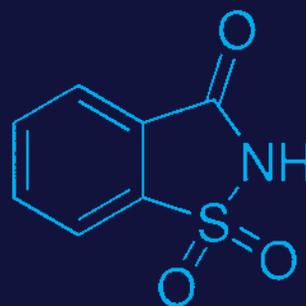
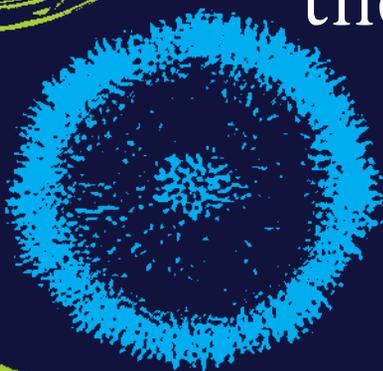
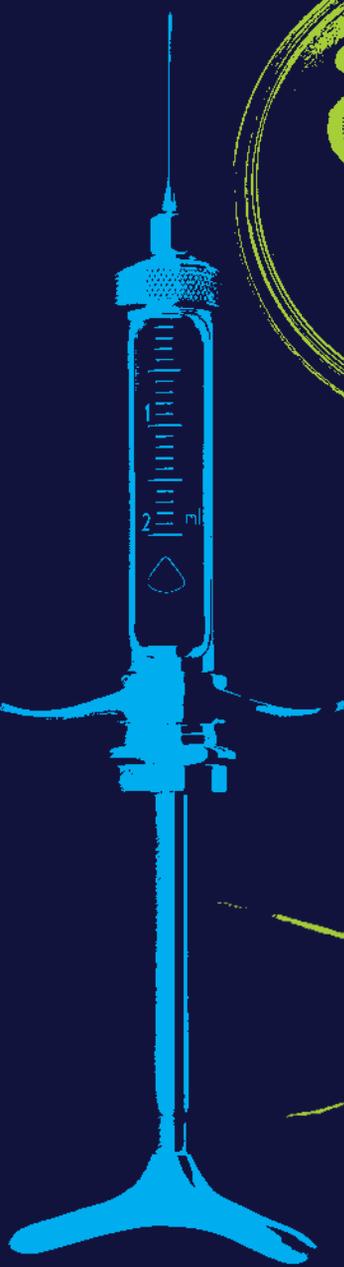
**UNSW**  
THE UNIVERSITY OF NEW SOUTH WALES

SUMMER 2011/12

# uniken



## CURIOUS & CURIUSER... the science of serendipity



# uniken

## SUMMER 2011/12

ISSUE 63

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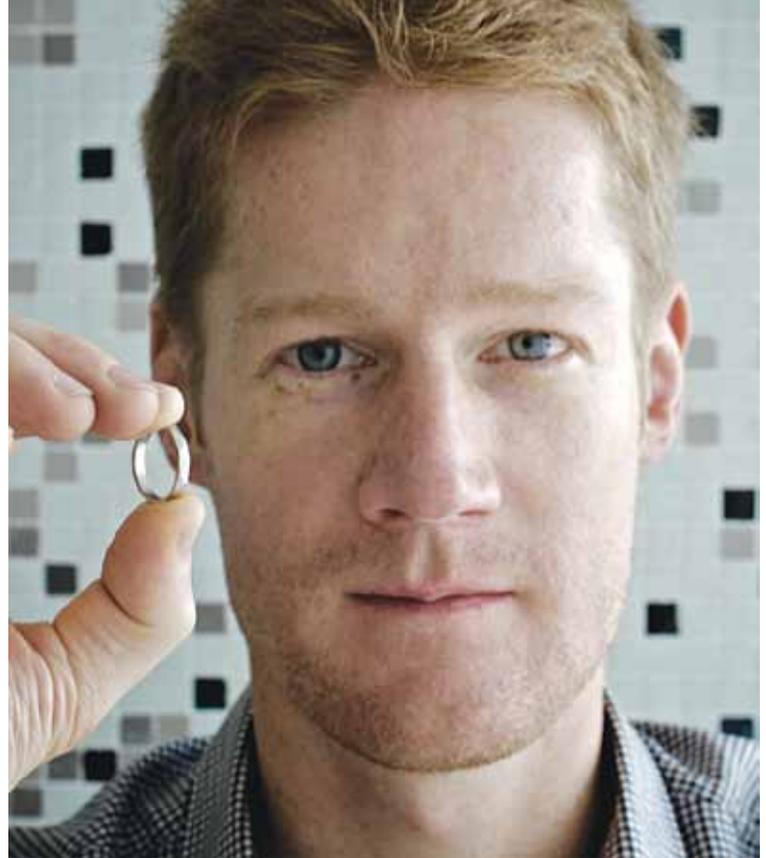
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# OBJECTIVELY SPEAKING... 》》

How this object inspires me.



## Fellowship of the Ring

**Martin Bliemel from the Australian School of Business (ASB) discusses the one ring that binds all Canadian engineers.**

Talking to Martin Bliemel about the collapsed bridges and secretive rituals symbolised by the simple iron ring attached to his key chain is like being transported into a chapter of *Lord of the Rings*.

Worn by engineering graduates across Canada – Bliemel graduated from Queen's University, Ontario in 1998 – the ring is a reminder of the obligations and ethics associated with his profession.

Among the myths associated with the ring is that the original iron versions were made from the Quebec Bridge, which collapsed due to poor engineering during construction in 1907, killing 75 workers. The rings are presented in a ceremony, known as The Ritual of the Calling of an Engineer, which is administered by The Corporation of the Seven Wardens.

The private ceremony involves graduates holding a heavy iron chain and reciting a ritual obligation to the highest professionalism and humility of their profession, which for Bliemel, was already in his blood.

"My father and brother are both engineers by training," says the academic, whose brother presented him with his ring at the ceremony.

"The ritual brings engineers together and gives some seriousness and weight to the profession. If a doctor makes a mistake he loses one patient, if an engineer designs something badly, 10 maybe 100 people could die."

Now the director of ASB's Centre for Innovation and Entrepreneurship (CIE) and the creator of the Diploma in Innovation Management, Bliemel started out as a mechanical engineer and worked on Taipei 101, Taiwan's 101-storey skyscraper built to withstand typhoons and earthquakes.

Although he describes the project as a career highlight it also signified an "engineering plateau" that led him to studying an MBA specialising in technology innovation, followed by his PhD.

"A lot of what I teach, and what CIE supports, is helping students get first-hand entrepreneurial experience. Quite often the attitude is that someone has to validate you as an entrepreneur before you are entitled to change the world. I encourage students to just get out and do it."

Even though Bliemel, 36, no longer wears his ring – as a keen rock climber it interferes with his sport – he keeps it as a totem on his key chain to serve as a "subconscious reminder" of his engineering oath.

"It reminds me that innovation is about more than just making money. It's about being a nerd, improving things and introducing new things to society."

**By Fran Strachan**

To nominate for "Objectively speaking ..." please email uniken@unsw.edu.au.

# Survival Guide

**The impact of cancer doesn't end with an all-clear. Louise Williams reports on a new centre that aims to help sufferers reclaim their lives once the treatment ends.**

**Professor Andrew Lloyd** always imagined his career as an infectious diseases expert would take him back to the tropics, where he lived as a child and had experienced first-hand the debilitating effects of malaria and dengue fever.

Instead, he's heading up Australia's first centre for cancer survivors at UNSW; his groundbreaking work on the "fatigue" syndromes that can follow serious illness having led to his pioneering role in the emerging field of "survivorship".

While medical science has long focused its research efforts and funding dollars on saving lives, its very success has raised new – largely unanswered – questions about what it means, physically, emotionally and practically, to survive major diseases like cancer.

"They've been told the great news, they are cancer free. They are looking good and their specialists are happy to say 'see you later', but for many people

that's not the end of the story," says Lloyd, director of the NSW Cancer Survivors Centre.

Only 50 years ago a cancer diagnosis was virtually a death sentence. Today, advances in oncology mean 70 per cent of childhood cancer sufferers are cured and two-thirds of adult cancer patients live for at least five years, many for longer. Experts believe within 10 to 20 years every childhood cancer will be curable and adult cancer will be "manageable" like other chronic conditions.

At the same time global trends suggest cancer rates will double by 2030. That means a burgeoning population of cancer survivors.

Lloyd says currently many cancer survivors "fall between the cracks".

"They've been used to getting specialist care. Now they turn up back at their GPs saying they feel bad or they can't cope and the GP doesn't know what to do or where to send them," he says.

They might discover they're suffering from relentless fatigue, their general health may have been compromised by aggressive treatment, their bones may have become brittle, they might find

their fertility and sex lives affected, or they may be anxious or depressed and unable to work or function as before.

Fatigue is Lloyd's particular area of expertise, having conducted a well-known study into chronic fatigue following glandular fever, Ross River fever and Q fever at a time when opinion was divided over whether chronic fatigue was psychosomatic.

He found chronic fatigue was real, but that it was likely caused by high numbers of *cytokines* – immune agents that travel through the blood turning on immune cells when the body is fighting infection. The agents had temporarily altered the brain patterns of the 10 per cent or so of patients who, although their bodies were better, still reacted as though they were sick.

How the work led to cancer survivors was the result of Lloyd chatting to oncologists who told him about their patients who, despite being cancer free, were also plagued by fatigue.

"We found the symptoms were pretty indistinguishable so there may well be a common fatigue phenomenon, triggered by different factors."

The Survivors Centre treatment is based around "lifestyle", he says and as a result collaborations are already underway with the UNSW Lifestyle Centre and its director Chris Tzarimas. However, drugs might be needed to control pain, depression or sleep patterns so patients can start to exercise, physically and mentally – by doing cognitive "brain training" – in supervised sessions that push them a little bit further every day.

The end result is patients who were once too tired to get out of bed usually regain their physical strength and mental acuity.

But the Survivors Centre can't take everyone. The fatigue program already has a six-month waiting list.

"We need more research to better tailor programs to individuals and to establish treatment models that can be replicated elsewhere," Lloyd says.

The centre will also facilitate care for cancer survivors by a range of medical and health professionals and will undertake research to determine what challenges cancer survivors face.

*This is an edited version of a story which originally appeared in Campus Review.*



"Cancer survivors fall between the cracks," says Professor Andrew Lloyd (at left). Adrienne Duckworth, 62, pictured with exercise physiologist Kelly McLeod, found she had no energy and was having trouble coping after radical surgery to remove breast cancer and six months of chemotherapy and radiation. Being referred to UNSW's Lifestyle Clinic by a psychologist was a "tremendous turning point", she says. "The exercise program they gave me was customised for my needs. It gave me back my energy, and it helped me take my mind off all the other things I was trying to deal with in my life. And it had tremendous physical benefits."



## BARANGAROO DREAMING

Designs from UNSW interior architecture students could form the heart of the proposed cultural centre under the Barangaroo headland. A national Indigenous museum and a performing arts centre (entrance pictured), are just two ideas from UNSW for the centre. The work of the final year Interior Architecture students was part of the Sydney Architecture Festival and the concepts are also being handed over to the **Barangaroo Delivery Authority** to generate ideas. Image courtesy of Jon Derrin.

### HEALTHY OUTCOMES

UNSW researchers have been awarded \$33 million for 110 projects in the latest round of **Australian Research Council** (ARC) grants, topping the state and ranking third nationally. In Discovery Project grants, UNSW received \$24.6 million for 84 projects. The largest grant of \$750,000 was awarded to a team led by **Professor Robert Kohn** at the Australian School

of Business. The research will support the development of new models for analysing socio-economic and financial data. Meanwhile, UNSW received a total of \$46 million in funding in the latest **NHMRC** round, including funding to establish new Centres of Excellence to drive research into the treatment of traumatic brain injuries, immunising at risk populations, and e-Health. UNSW was

awarded \$7.5 million for the three Centres – the largest number awarded to any university in Australia. They draw on expertise across a range of partner universities, hospitals and research institutes in Australia and internationally. The Centres are led by **Professor Skye McDonald (Brain trauma)**, **Professor Raina MacIntyre (immunisation)**, and **Professor Enrico Coiera (e-health)**.

### STUDENTS SLEEP EASY

More students will have the chance to live on campus, with the addition of 400 new beds in a new residential complex on High Street (Gate 2) and the transformation of the **Kensington Colleges** (Basser, Goldstein and Baxter). Basser and Goldstein are to be demolished and rebuilt, to reopen in January 2014, with the reduced college population housed at Baxter until the two new buildings are completed. The \$90 million dollar renovation will include an environment supportive of Islamic students but which is non-discriminatory and open to all.

## → AROUND THE TRAPS

**Ken Trotman**, a Scientia Professor of Accounting at ASB, has become one of only three living people to be inducted into the Australian Accounting Hall of Fame.

- UNSW's Sunswift team has finished sixth in the 3,000 kilometre **world solar car challenge** from Darwin to Adelaide.
- UNSW has appointed its first chair in forensic mental health **Associate Professor Kimberlie Dean** in partnership with Justice Health (part of NSW Health).
- Four UNSW-affiliated researchers have been awarded **Young Tall Poppy Awards** – Drs **Melissa Green** (mood and psychotic disorders), CCIA's **Eddy Pasquier** (tumour growth), Victor Chang Cardiac Research Institute's **Nicola Smith** (high blood pressure) and ADFA's **Sameer Alam** (advanced air traffic systems).

• The Australian Marketing Institute Award for Marketing Excellence in National Education has gone to the online resource **Knowledge@ASB**. • One of UNSW's most senior and distinguished academics, **Professor David Black**, has been elected as Secretary General of the International Council for Science.

## → WATCH THIS SPACE

Internationally and nationally renowned legal experts, including **Lord Justice Jackson, UK Court of Appeal**, and the NSW Chief Justice TJ Bathurst will be keynote speakers at the conference *Dispute Resolution in the next 40 years: Repertoire or Revolution*, 1-2 December. • **Recycling** will begin on the Kensington campus by semester one 2012, with the installation of 30 new bins, as well as the launch of a new website and education campaign. • UNSW marks the **tenth anniversary of the International Criminal Court** with the conference *Justice For All?* featuring dignitaries including ICC President Justice Sang-Hyun Song – 13-15 February. • *Uniken* is about to launch its **new website [www.uniken.unsw.edu.au](http://www.uniken.unsw.edu.au)** which will allow people to access and share every story online, while giving them better access to photos and other multimedia.

A new look ... how Kensington Colleges will look from High St



# The scientist with the NOBEL TOUCH

**A Swedish scientist and Nobel Committee member is a key player in universities in the Asian region. By Susi Hamilton.**



**Bertil Andersson sits** in what he calls the “Piccadilly Circus of Science” – where he can see everything new in research pass by. A renowned Swedish scientist and Nobel Committee member, he currently sits on two panels that select the physics and chemistry laureates.

“Everything passes by your eyes,” he enthuses. “But there is a huge responsibility. You’re not supposed to make mistakes.”

As one of the who’s who of the worlds of science and

tertiary education, it appears the affable Swede rarely puts a foot wrong.

He helped revolutionise our understanding of plant biology and now manages to head up one of Singapore’s top institutions, Nanyang Technological University (NTU), all while maintaining his research output and forging new partnerships.

For this eminent service, Andersson was recently given an honorary doctorate from UNSW. In his acceptance speech, he told the audience that plants,

unlike humans, have solved the energy crisis.

“Nature does not have an energy problem because 2.5 billion years ago it invented photosynthesis, nature’s own green solar cells. That was the big bang in evolution,” he said.

Like many scientific discoveries, his postdoctoral work at the CSIRO in Canberra was at first both revolutionary and controversial.

“I found, with my postdoc supervisor Jan [Anderson], that the photosynthetic machinery was a dynamic and adaptive arrangement of two photosystems instead of a rigid superstructure as was thought before,” he says.

“When we presented the results at a big international photosynthesis meeting in Greece, the chairman of the conference session said with a loud clear voice that the Canberra model should be thrown in the waste bin as soon as possible.”

But they soon had their day. Two years later the discovery was in every biochemistry and molecular and cellular biology textbook.

Andersson says the experience highlights that it pays to go into science believing in yourself and even “to be a little stubborn”.

Such tenacity has also served Andersson in the halls of academia.

Soon after he moved from Sweden to Singapore in 2007, he began establishing links between NTU and UNSW, which resulted in the Singapore Centre for Life Sciences Engineering. It was made a Research Centre of Excellence and awarded more than A\$200 million from the Singapore Government, outmuscling US Ivy League rivals Duke University.

The Centre, chaired by UNSW’s Professor Staffan Kjelleberg, aims to work out how biofilms (aggregates of micro-organisms in which cells adhere to each other on a surface) can be exploited and controlled to

improve water technology and other environmental processes to benefit sustainable technologies and biomedicines.

This link between the universities is being extended with collaborative research programs and joint PhD programs in energy science, medicine and water research.

The relationship between these “academic soul mates” as Andersson refers to NTU and UNSW, is being further cemented by an alliance known as the Science and Technology Universities Research Network (SATURN). It aims to bring together a select international network of research-intensive universities, including NTU and UNSW, focused on the sciences, engineering, and technological and professional disciplines.

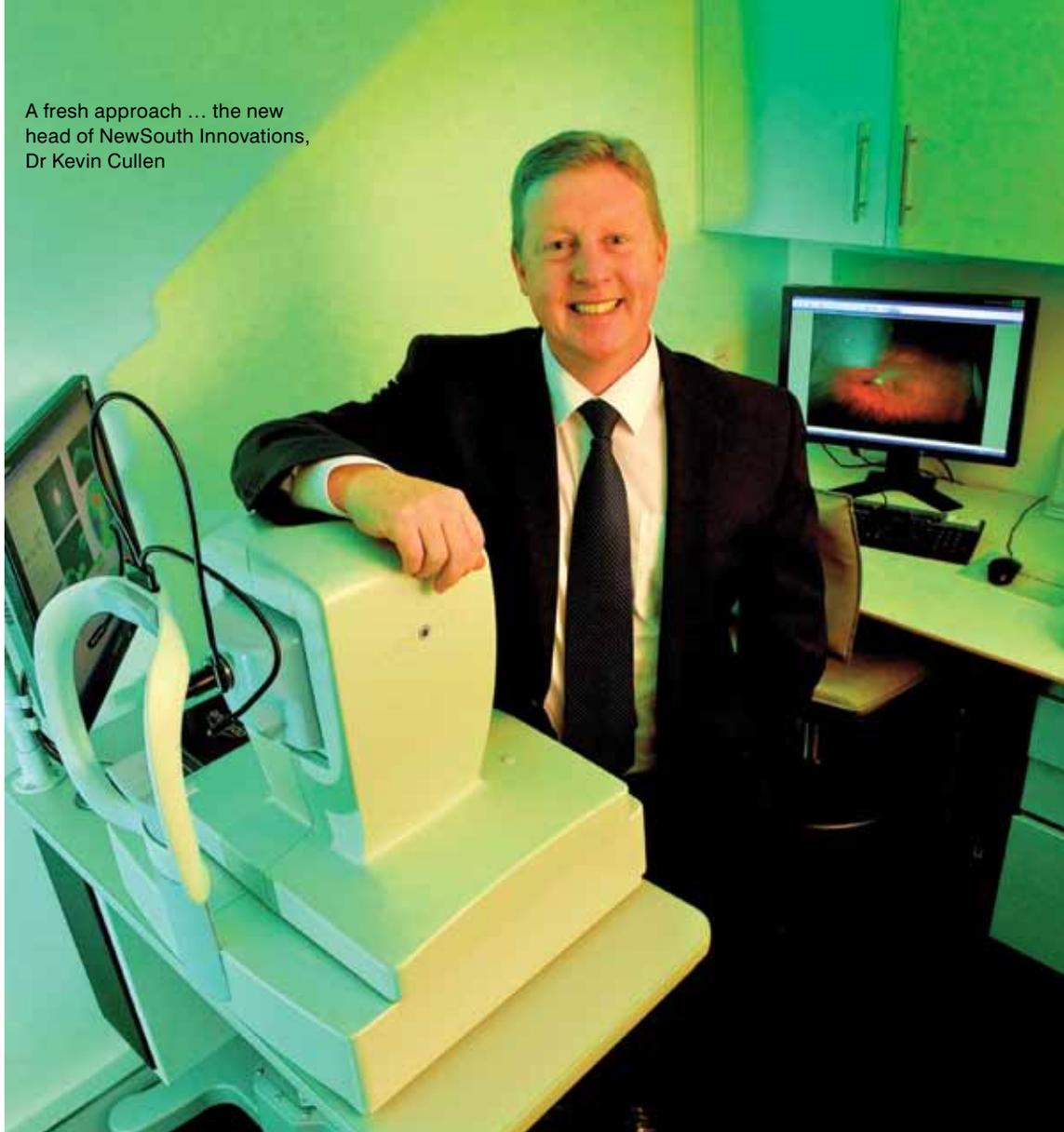
“The idea behind the alliance is that we should have like-minded universities – such as MIT, Imperial College London and Harbin Institute of Technology – and discuss how we can promote science and education. It’s harder to get young people to go into engineering and science. They may be less glamorous jobs. The study is also very hard,” says Andersson.

It’s a partnership welcomed by UNSW’s Pro-Vice Chancellor (International) Jennie Lang: “Professor Andersson has emerged as a star on our horizon into Asia reflecting the best in higher education and scientific approaches from the East and the West.

“We are delighted that NTU together with UNSW will be launching the exciting SATURN network of focused and intensive tier-one scientific and technological universities across Asia,” she says.

As this new network grows, Andersson may find his “Piccadilly Circus of Science” will be competing with an equally cutting-edge and busy Trafalgar Square of university administration.

A fresh approach ... the new head of NewSouth Innovations, Dr Kevin Cullen



# To market, to market

**The majority of UNSW research will be on offer to business, royalty-free, under a radical plan to put more University discoveries to work. By Alexander Symonds.**

**Commercialisation has long proven** a conundrum for universities. Sometimes vital intellectual property is too early to take to market, or it's too risky for companies to take a chance on with their limited research and development budgets.

But now, UNSW will offer nearly all of its intellectual property for free, in a bid to kick-start collaborations between companies and researchers, and have more University research and discoveries put to work for the public benefit.

It's part of a revolutionary approach to innovation, known as "Easy Access Intellectual

Property", which was first adopted by the University of Glasgow in late 2010. The architect of the strategy was Dr Kevin Cullen, who has now taken the reins at UNSW's commercialisation company, NewSouth Innovations (NSi) with the brief to implement a similar approach at UNSW.

In bringing this approach down under, UNSW is forging new ground in Australia around the commercialisation of university research.

"Easy Access IP is all about universities reclaiming their purpose to create knowledge and disseminate knowledge," Cullen says.

Under Easy Access IP, universities make a strategic decision to retain only the IP that can be successfully commercialised in-house. The remaining IP, which Cullen believes could be as much as 80 per cent of the IP held within a university, is made available to business to use, free of charge.

But academics must first "opt-in" to have their research included under the Easy Access approach. For those who agree, NSi and an interested company will negotiate a three-year, exclusive licence for an academic's IP. The academic forgoes their entitlement to royalties. Instead, Cullen says the

focus is on building a relationship between the academic and the licensee. This can be in the form of professional training, staff and student placements, consultancies as well as the creation of future collaborative research activities.

Cullen says the original idea for Easy Access IP came from an academic at the University of Glasgow, and staff embraced, rather than resisted, the new policy.

"The reaction from the academic base was virtually unanimously positive. Initially people said, 'But this is telling researchers their IP has no value.' No, I'm not saying that at all. The IP has value to people and

## “Anyone in industry will tell you that dealing with universities is painful and difficult.”

the academics saw Easy Access IP as a chance for people who were interested to engage with the research they were doing.”

He says Easy Access IP is a crucial tool in overcoming the hesitancy of some companies to engage with universities.

“Anyone in industry will tell you that dealing with universities is painful and difficult; that universities overvalue technology and over-negotiate everything,” Cullen says. “Much of that is war stories rather than truth, but if enough people say it, perception becomes reality. What we are saying to people is: we want to remove those obstacles.”

One of those obstacles can be complex negotiations over licensing and royalties. The Easy Access IP model does away with this, leaving just a one-page agreement between a university and an interested company. To be involved, a company must acknowledge the university’s contribution to their work, as well as returning the IP if they have not exploited it within three years. Also, no limitations will be placed on a university’s use of the IP in question for research conducted on campus.

Cullen heads NSi during a challenging time for Australian innovation. Australia ranks only 22nd globally for innovation, according to the World Economic Forum’s (WEF) Global Competitiveness Index for 2011–12. The WEF also places Australia 14th in the world for the extent to which businesses and universities collaborate, behind the likes of Canada and Belgium.

Further, Australia lags behind the OECD average in corporate spending on R&D. Added to all this, the university sector’s success in commercialisation has at times been mixed at best.

There are hopes UNSW’s new, “Easy Access” approach for IP will increase the incentives for business and researchers to collaborate, potentially lifting R&D activity and delivering a much-needed boost to the nation’s overall

innovation efforts.

UNSW Deputy Vice-Chancellor (Research) Les Field says he and the Board of NSi were very pleased that the University had managed to attract somebody of the calibre of Dr Cullen to the role.

“He brings an enthusiastic new perspective to the NSi business. The role of the NSi CEO is such an important position in a research-intensive university like UNSW where we have a very clear focus on translating good research into practice.

“Easy Access IP recognises the University is not just about locking down its IP with the possibility of perhaps reaping a monetary reward sometime,” he says.

“The biggest impact of University IP comes when the wealth of UNSW technology and know-how actually gets taken up and used by industry and the wider community.

“In the process, we hope to see a much deeper engagement between UNSW and our industry partners and the end result will be better research and a better, smoother uptake of great University ideas.”

An organic chemist by training, Cullen took his PhD from the University of Edinburgh to consumer products giant Procter & Gamble. His work included product and technology development, covering markets in Europe, North Africa and the Middle East. The projects got Cullen thinking about the difficulties and possibilities of technology transfer; of being able to take “blue-sky” developments and turn them into products and innovations that people could use.

This interest took Cullen back into the university sector. His first stop was at Heriot-Watt University in Edinburgh, where he worked at building links between local small to medium sized enterprises and universities, before becoming involved in the university’s commercialisation strategy.

In 1999 he moved to the University of Glasgow, and became

director of the university’s Research and Enterprise Team in 2003. It was here that Cullen developed the Easy Access IP approach.

A number of universities worldwide are taking up the approach, under the banner of the Easy Access IP Partnership. Following the University of Glasgow’s announcement it would adopt the approach in November 2010, King’s College London and the University of Bristol signed up in June 2011, with the University of Copenhagen joining around the same time. UNSW marks the first Australian link to the Easy Access IP chain, with hopes more local and international universities will formalise the approach.

The Director of Innovation at King’s, Dr Alison Campbell, has said the policy gives incentives for companies to collaborate with researchers, even when the outcomes of such work are steeped in uncertainty.

“Some university IP can be too early-stage for a company to risk investment and could present an uncertain market, which can sometimes hinder industry take-up of IP,” she said. “By offering easy access to this IP, companies can evaluate it quickly and explore its potential with reduced risk.”

Cullen admits the move to Easy Access IP can be an imperfect process. He also says UNSW might miss out on some commercialisation chances by giving IP away, royalty-free, and then see it successfully developed by outside parties. But Cullen believes a deliberate policy shift is needed to raise the links between business and academic researchers.

“The default position at the moment is for nothing to happen. And if we’re too concerned that someone might make money and we don’t get a share, the only way to stop that happening is never to do a deal with anyone,” he says. “And I am of the belief that our job is to get knowledge out there and put to use. We need to change the narrative from fearing the one that might get away, to celebrating the ones we helped make happen.”

*Listen to the full interview with Dr Kevin Cullen at [www.tv.unsw.edu.au/video/easy-access-ip](http://www.tv.unsw.edu.au/video/easy-access-ip)*



## THE FIVE KEYS TO EASY ACCESS INTELLECTUAL PROPERTY

### 1. ACADEMIC BUY-IN

Academics have the choice of whether or not to offer up their intellectual property for the Easy Access approach. They must “opt-in” to engage in this new process. UNSW retains the right to continue to do research on the licensed Easy Access IP.

### 2. EASY ACCESS IP SELECTION

NewSouth Innovations staff, together with an expert industry panel, assess new inventions for their market potential and technical merit. The panel then decides which inventions become Easy Access IP, and which will be developed using traditional commercialisation approaches.

### 3. COMPANY CHOICE

Easy Access IP descriptions will be available for companies to view on global open innovation networks and through NewSouth Innovations’ own technology web portal.

### 4. EASY ACCESS IP IS FREE

Companies, individual entrepreneurs and students who can demonstrate how they will use Easy Access IP for the benefit of the community, society or economy will be granted a free licence to the IP.

### 5. SIMPLE LICENSING AGREEMENTS

Companies sign licensing agreements as short as one page to utilise an academic’s IP. The researcher forgoes their claims to royalties, but is able to take advantage of other opportunities to work with the company, such as collaborative research or consulting.

# Evolving success

**Evolutionary biology and quantum physics stole the show for UNSW at the Eureka awards, writes Steve Offner.**

**It was a night Angela Moles** was happy to be left holding the baby.

Faced with the choice of staying home with her newborn daughter or attending the black-tie presentation for the “Oscars of Australian Science”, the 35-year-old mum decided there was no choice.

When her name was called as the winner of the Eureka Prize for Outstanding Young Researcher, Moles climbed the stage in front of 600 of the country’s top scientists, journalists and celebrities with the 11-day-old infant in her arms.

“It just seemed to be the easiest and kindest thing to do,” said Moles, of the decision to bring daughter Sophie along for the evening, snuggled inside a Baby

Bjorn. “Really, my main worry was that I might fall off my heels and hurt Sophie – ecologists don’t dress up like this very often.”

The mother–daughter act was perhaps an obvious solution for the evolutionary biologist who studies species adaptation. Moles’ award-winning research has taken her to every continent other than the Antarctic and in the process has revolutionised our understanding of the way plants evolve.

Her work has uncovered a global pattern to plant height which revealed species at the equator are roughly 30 times taller than those in northern latitudes. She also found seeds in the tropics are on average 300 times bigger than their northern counterparts.

Frank Howarth, Director of the Australian Museum said Moles, from the School of Biological, Earth and

Environmental Sciences, was already acknowledged as a world-class science leader and a rapidly rising superstar in the fields of ecology and evolution. “One would be hard-pressed to find a more impressive research record for someone whose career has just recently begun.”

Another researcher battling competing obligations on the night was UNSW’s Dr Andrea Morello, who won the Eureka Prize for Scientific Research, alongside his colleague Scientia Professor Andrew Dzurak, both from UNSW’s School of Electrical Engineering and Telecommunications.

Honouring a commitment to speak at a conference in Zurich, Morello had to be told of the Eureka win by Dzurak over the phone.

Dzurak said it was an exciting call to make. “We were both in

“One would be hard-pressed to find a more impressive research record for someone whose career has just begun.”

shock. The group of finalists for the Scientific Research award was so impressive,” he said. “There was also a happy synchronicity that [Vice-Chancellor] Fred Hilmer was the one who presented the prize.”

The pair won the “outstanding curiosity-driven research” prize for their role in advancing the science behind quantum computing, the holy grail of information technology. The researchers created a nano-scale device able to register and record the spin, or magnetic orientation, of a single electron – fundamental hardware essential to building the new-generation computers.

In all, 25 Eureka Prizes worth more than \$240,000 were awarded this year during the presentation at Sydney’s Hordern Pavilion. Marking a milestone for the University, researchers at UNSW and affiliated organisations were nominated in a record 11 categories.

Just say Eureka ... Dr Angela Moles, daughter Sophie and Professor Andrew Dzurak



A sky-high problem ... Cathy Sherry outside an older-style apartment block

**As many as two children a month are treated for falls from apartment windows or balconies at one Sydney hospital alone. Alexander Symonds reports on one way to reduce the tragic toll.**

**A mother is momentarily** distracted. In that instant, her two-year-old boy climbs up to a window and falls through the fly screen, landing on a concrete driveway four floors below.

He is rushed to hospital with severe head injuries, but despite the best efforts of staff at the Children’s Hospital at Westmead he dies, leaving his distraught mother to a lifetime of grief.

This is just one of the real-life cases staff at the Children’s Hospital at Westmead have dealt with in the past year.

And the Westmead team are not alone in raising concerns about the rising number of falls from buildings involving children.

“While roughly two children a month are treated at the Children’s Hospital at Westmead



# Safety NET

## more than **CHILD'S PLAY**

**Australia's suburban design** could be contributing to a range of social ills from obesity and aggression to poor cognitive development and crime, according to Faculty of Built Environment (BE) Acting Senior Associate Dean, Sue Holliday.

The importance of creating urban environments that support the wellbeing of young people has been understood for decades. Fifteen years ago the United Nations called for the rights of children and young people to be recognised in governance and urban management, but this is still not happening in Australia.

"Suburban design is anti-family friendly," said Holliday, whose position as the Director General of Planning in NSW from 1997 to 2003 put her at the forefront of the state's urban planning process. "It is very car-orientated."

"Cities are designed by people who can get around without a problem," said Holliday. "But young people can't do that, so we need to design spaces that are suitable for them."

Researchers, urban planners and children's advocates are taking part in a series of lectures on children, young people and the urban environment with a view to catering better for their needs. Launching the series was the Commissioner for Children and Young People, Megan Mitchell.

The work comes out of a partnership between the Commission for Children and Young People and UNSW's BE.

"We have a National Urban Design Protocol, but there is no mention of children specifically, except in relation to play areas," she said. "This is staggering since children make up a quarter of the population."

Professor Holliday said children must be included in the consultation process.

"Children need an advocate," she said. "Social media could provide a real opportunity for them to have their voices heard."

*The series will run throughout 2012.*

**By Susi Hamilton.**

after a fall from a building, that's just one hospital," senior law lecturer Cathy Sherry says.

"The total figure for Sydney could be much higher and that is staggering considering only 10 per cent of kids in Sydney live in apartments."

With the majority of fall incidents taking place during summer, the next few months could see even more children injured after window falls.

Sherry, a member of a working party that recently examined ways to prevent the falls, sees the deeper tragedy in the fact that it could be so easily prevented through cheap and easy-to-install window locks, which can be adjusted to keep them open just a few centimetres – enough to stop a child from falling through.

For Sherry, the issue lies at the intersection of her professional and personal interests. At UNSW, she teaches property law and does research into strata and community title. She also teaches a course that looks at the broader impact of laws on children. Added to this is a personal fascination with how urban planning

decisions impact on kids.

Sherry believes there are a number of ways to prevent children falling from windows, including better public education campaigns to raise awareness among parents and carers about the issue and the need to ensure windows are not accessible to young children.

However she believes strata law reform is the most effective approach.

Sherry wants legislation amended to target landlords and strata owners to install the necessary safety locks, as was recommended by the working party's outcomes report released in February this year. In particular, she has the *Residential Tenancies Act* and the *Strata Schemes Management Act* in her sights.

"Reaching new parents through education campaigns is quite hard, as opposed to reaching landlords. There are established avenues through strata managing agents and body corporates," she says. "It's actually easier to educate them than parents."

More fundamental, however, is the way apartments are planned and designed. The majority of

older-style blocks, which make up large chunks of the landscape in many suburbs, have not been built with young children in mind.

"There's literally no space outside for kids to play, so they have to play inside the apartment," says Sherry, adding that because of a lack of space, furniture is often pushed against walls near windows. This allows young children to climb up to normally out-of-reach windows and puts them at risk of falling out.

For major cities like Sydney, coping with increasing populations, the only way is up. That means more urban density, more apartment blocks and more families with children living in units and flats. And potentially even more falls.

"Australians traditionally don't live in apartments when they have kids, but as population and financial pressures increase, we will be seeing more of that," she says. "So there's the wider planning issue here. There's a very real need for communities to start thinking about building child-friendly cities. A child's wellbeing should matter to everybody."



# The SCIENCE of serendipity

IT TAKES YEARS OF STUDY TO CREATE A CHANCE DISCOVERY, WRITES ASHLEY HAY.

**An ecologist stops beside a puddle** he's driven past scores of times and samples its water. An historian orders up drawings from the French National Archive and is brought the wrong thing. A chemist forgets to wash his hands after a day working with coal tar and tastes an unusual sweetness as he eats dinner.

The discovery of a new species of shrimp; the only extant drawings of France's first theatre; penicillin and saccharin; the fluorescence of jellyfish: these are all moments of serendipity, confluences of knowledge, experiment and happy accident that touch the word as Horace Walpole coined it in 1754. Serendipity, he stated, was "accidental sagacity".

Everyone loves an extraordinary find, an unlooked-for twist and often scientists find themselves on new paths because of serendipitous moments.

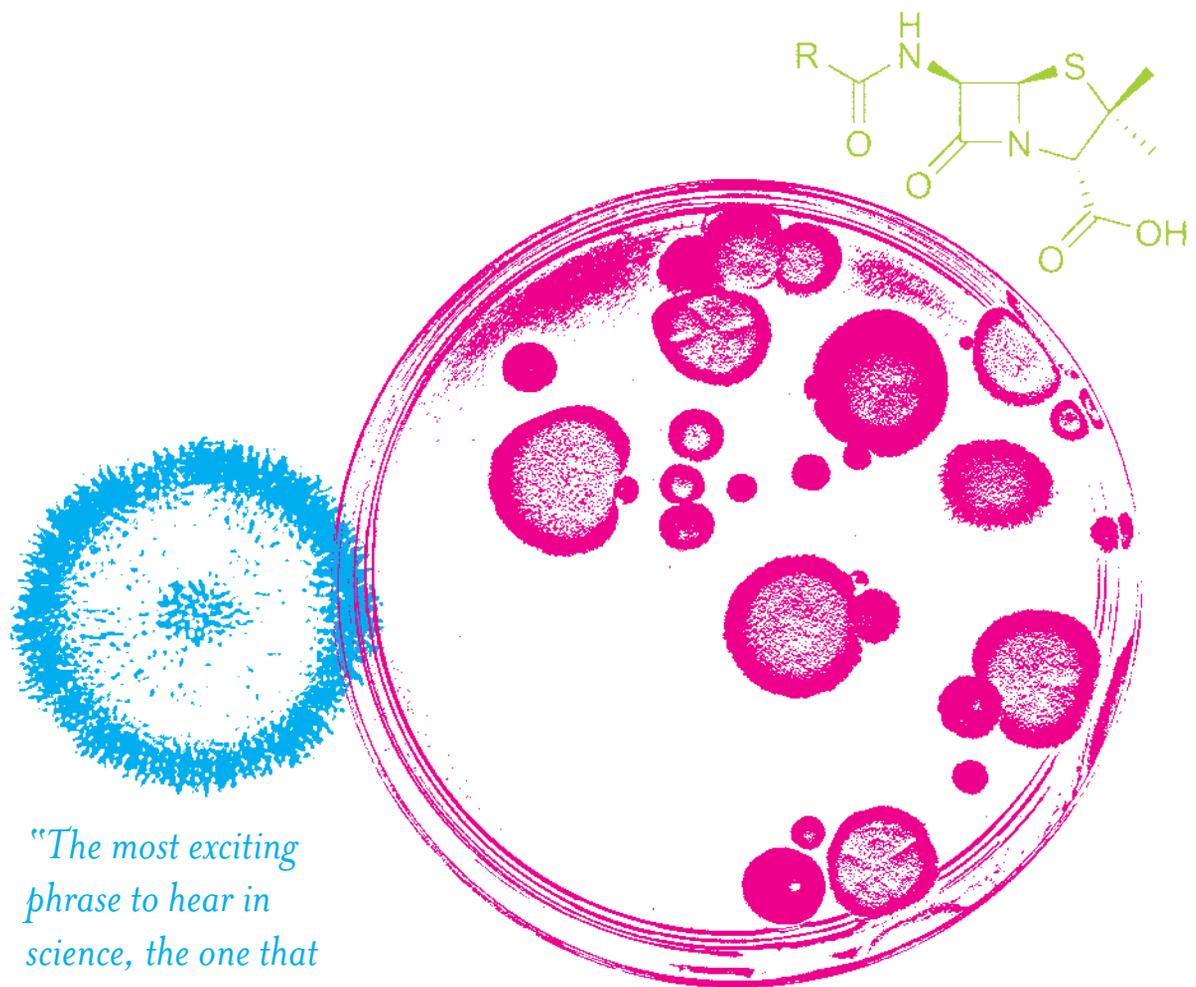
"Researchers are often encouraged to offer a

breakthrough like this," says Dr Richard Corkish, head of UNSW's School of Photovoltaic and Renewable Energy Engineering (SPREE), "both to attract funding, and to encourage high expectations." Some become so well known as to be almost clichéd: the penicillin in Alexander Fleming's petri dish; the sweet saccharin Constantin Fahlberg tasted on his unwashed hands. Yet two of this year's peak Australian scientific awards – the Science Minister's Prize for Life Scientist and the Prime Minister's Prize for Science – were awarded to researchers who found something they weren't looking for: a new kind of chlorophyll, and the means of controlling the movement of molecules in polymers.

"I always say to grad students, when you come across something that doesn't make sense, keep an open mind," says Professor Ary Hoffmann, a geneticist at the University of Melbourne.

"The unexpected pushes things through, and serendipity in science is a wonderful thing. We try to pretend sometimes that many of our major discoveries are not associated with serendipity, but of course they often are."

In Hoffman's case, one such moment came just as he thought he'd found a major flaw in a new control strategy for dengue. The idea was to shorten the life of the mosquitoes that transmit dengue by infecting them with *Wolbachia*, a naturally occurring bacteria. One of the attractions of the approach was that *Wolbachia* would be inherited by any offspring of those infected mosquitoes – meaning the *Wolbachia* infection would perpetuate itself through generations, rather than requiring the ongoing release of infected mosquitoes. Then Hoffmann's team discovered that while the mosquitoes could "spread pretty well in the wet season, in the dry season, they came



to a grinding halt". If releases had to be ongoing, one of the strategy's major advantages was undermined.

Around the same time, fortuitously and incidentally, the project's team discovered *Wolbachia* effectively vaccinated mosquitoes against transmitting dengue – irrespective of how long the mosquito lived – and they found a strain of the bacteria that allowed the mosquitoes to breed on through the dry.

"That was my serendipity moment," says Scott O'Neill, leader of the Eliminate Dengue project and Dean of Science at Monash University. "Of course, we write up a paper, we make it tell a story about science. This was the idea; we went and tested it; and we did it. But usually, you were doing something completely different and this fell out ... nearly all science is like that."

Professor Philip Hogg, Director of the Lowy Cancer Research Centre at UNSW, agrees: "The reality is it won't have unfolded as a story; it will be an odd result that you saw here, which you then tried to understand, and you end up finding something new. That's serendipity. But when you read the paper you think, these guys are pretty smart – they knew it was going to be like this."

Unravelling some of these narratives is part of the impetus

*"The most exciting phrase to hear in science, the one that heralds new discoveries, is not 'Eureka!', but 'That's funny ...'."*

– Isaac Asimov

behind the *Journal of Serendipitous and Unexpected Results* (JSUR), recently initiated by an editorial team including Assistant Professor Ryan Lilien from the Department of Computer Science at the University of Toronto and Assistant Professor Ramgopal Mettu from the Department of Electric and Computer Engineering at the University of Massachusetts.

"It's important to have the perspective of how research takes twists and turns," says Mettu. "You don't often get that in plenary talks by famous people: what you get there is a very nice and beautiful story about what they did. It would be great for grad students to see how people do things, in a principled way, and how they deal with the situation when an experiment doesn't work, or when something they tried doesn't go the way they expected."

"That's also true in articles," adds Lilien. "But we take a quote from [American physicist] Richard Feynman about the pitfalls and blind alleys encountered during a particular line of inquiry – those are all really important."

There are four kinds of communications in JSUR's remit: those dealing with serendipity or "compelling curiosities"; those that contradict prevailing wisdom; follow-up papers on earlier unexpected results; and perspectives or reviews.

"Of course," says Lilien, "we don't want to put the message out that most of science is random happenstance; you play round in the lab and something works. Mostly that's not the case – and you can't fund that model of science."

"But then the standard model of science isn't that fundable either," adds Mettu, laughing. "Mostly what you'd be saying is, this probably isn't going to work, but we're going to try it, and we might learn something that isn't exactly what we're looking for, but I promise we'll learn something.

If grant proposals told the exact truth about how science went, they'd look more like that. We need to say that there's a lot of hard work involved in discovery and exploration, and people try a lot of other things before they come across something successful – not that that successful thing is just lucky."

The journal's website is bannered by a quote from Isaac Asimov: "The most exciting phrase to hear in science, the one that heralds new discoveries, is not 'Eureka!', but 'That's funny ...'."

For John Golder, a visiting senior research fellow in UNSW's School of English, Media and Performing Arts, the language of discovery was not so polite. Realising the material the French Archives had mistakenly delivered was sketches of France's first theatre, the Hotel de Bourgogne – a place thought to have left no extant drawings, and a place he'd been studying for more than three decades – "the hairs on the back of my neck bristled", he says, "just as they do now as I recall the moment".

## A flash of inspiration

In 1961, a young Japanese post-doc called Osamu Shimomura was studying *Aequorea* jellyfish at Friday Harbour, Washington. He was trying – unsuccessfully – to extract the substance that made the jellyfish glow.

At a certain point, Shimomura realised the problem might stem from presuming he knew which substances he was looking for – perhaps it would be better to try to extract *any* bioluminescent material. Failing to convince his superiors of this approach, he proceeded alone, spending fruitless days on one side of the bench while his disapproving colleagues worked on the other. “It was an awkward, uncomfortable situation,” he said, and so he took to rowing out into the harbour to think. One afternoon, he had an idea.

One of the problems of studying bioluminescence is that the act of making something luminous exhausts the supply of whatever generates that glow. To separate the material, you have to temporarily block that function, make the extraction, then reverse the block to activate the fluorescence. Sitting on the boat, it occurred to Shimomura that luminescence probably involved a protein, which meant luminosity might be easily – and temporarily – deactivated at a certain pH value. He rushed back to the lab, identified the pH value at which no light was discernible in his jellyfish samples, and then neutralised that pH. The original glow returned.

Then, the “big surprise”: Tossing the solution into the sink, the basin flared with a bright blue flash – and the only other thing in the sink was seawater from an aquarium overflow. Something in the seawater had activated that brilliant luminescence. Because the composition of seawater is well known, it didn’t take Shimomura long to work out which component – the calcium ions – was responsible. Knowing this, he could complete the extraction.

In 2008, Shimomura shared the Nobel Prize for Chemistry for the work to which this serendipitous discovery led.

Realising subsequently, on the Metro, that one exquisitely coloured piece he’d dismissed was from the same place, “I was shaking with excitement”, he recalls. He thinks he probably swore aloud, given that everyone else in the carriage was staring. “These things just don’t happen to you very often.”

The world of research might be best described by Donald Rumsfeld: it’s a world of “known unknowns” – the questions you believe you can answer by the methods you have to hand – and “unknown unknowns” – the questions you don’t know how to answer, or the questions you haven’t yet thought to ask. If that sounds incomprehensible to those of us who never enter it, it’s only slightly less so to many of its newest arrivals, the students moving from structured undergraduate courses to the open landscape of postgraduate research.

“When you do a coursework program, you know the length of the courses, you undertake an exam on a certain date, and then you go to the pub,” says Professor Laura Poole-Warren, UNSW’s Dean of Graduate Research. “Research isn’t like that.”

“Because it’s the unknown,” says Hogg, “it’s very hard to put timelines around it. Being self-driven really freaks some people out because you just don’t have the comfort of knowing what you have to do when you get into work. And to do something worthwhile can take a long time, and can be a struggle. The notion that you might need to work for three years before you see the results – that’s something some people have difficulty with.” He has seen more than one graduate student baulk at the timelines, and walk away.

The disconnect between funding timelines and the realities of research is well known: in a recent opinion piece for *The Australian Financial Review*, UNSW Vice-Chancellor Professor Fred Hilmer and Deputy-Vice Chancellor (Research) Professor Les Field called for the time frames for the research funding system to be reset. “With success rates for grant applications sitting at around 20 per cent, a 12-month application process and a three-year funding cycle, it’s no exaggeration to say that two out of four research years can be lost to jumping funding hurdles,” they wrote.

How then to keep the unexpected, the new opportunities – or what Hogg calls “the crazy ideas” – moving forward? Most do as Hogg did when he began investigating the way protein function is controlled and the influence on this of disulphide bonds. “When I first started telling people about this, more often than not they did think I was crazy,” he laughs. “I used to quarantine some funds [from other grants] and, with the best people working with me at the time, we’d explore this idea. That’s how we do it. There’s a saying that I think is quite apt: as a researcher you do what you need to do to be able to do what you want to do.” With the ongoing support of two or three senior academics at the time, the idea got off the ground.

Those two or three colleagues exemplify elements most people identify in the making of a good researcher: the importance of mentors, and the importance of input on your ideas from beyond your own world.

“Finding your independence as a researcher, that’s key,” says Poole-Warren, “but it’s also key to have

good, strong mentors. At UNSW we have early career researcher (ECR) programs that pair ECRs with a mentor who's outside their normal sphere of operation. If that works, it works well."

"It's always important to keep your ears open, to be aware of what other people are doing," says Corkish. "In a perfect world, in a university, you'd have the resources and the leisure to be listening to talks in physics at lunchtime, and them coming to us at SPREE, and we would pop down and see material sciences every so often. But that's a more gentle world than the one we have, so those things don't happen enough."

What is important, says Associate Professor Darren Curnoe, head of UNSW's Human Evolutionary Biology Lab, is knowing how to maximise your chances of serendipity. At one international conference, he was invited to China to meet some fellow academics, "to see if it might be possible to do some work together". He made the trip, met the researchers and saw some of their material. To find yourself looking at something you suspect will tell you a great story, he says, "that's an amazing thing". He pauses. "Five years later, we find ourselves submitting papers to high-profile journals – the serendipity of meeting someone at a conference, the serendipity of the particular fossils you're allowed to work on, of ascertaining whether or not they're internationally significant ...". You might not be able to predict or depend on the appearance of such inspirations, such situations, but Curnoe advocates increasing their chances of occurring – by putting yourself in the way of as many people as possible, and being

willing to head down the paths that open up behind them.

Professor Brian Timms from UNSW's Australian Rivers and Wetlands Centre, calculates he's visited Far North Queensland's Paroo River almost 100 times in the past 20 years, sampling aquatic life from the temporary pools that spring up after rain. For most of that time, he'd driven past one pool of water on a flood plain figuring that most pools on flood plains host fish that would have eaten the shrimp he was interested in. "One day, for some reason, I stopped and sampled it," he says, "and lo and behold, there were shrimp in it – it was filled with rainwater, not flood water."

That shrimp turned out to be a new species: "*Branchinella clandestina* I called it," says Timms, "because there it was, living this clandestine existence, right under my very nose, just waiting for me to discover it. That's what I call serendipity."

Often, however, serendipity springs from a collision between older research and newer questions, the connection of dots from disparate places across long periods of time – O'Neill's *Wolbachia* work built on a PhD thesis completed in 1971 that sat, unutilised, for another 20 years. And Osamu Shimomura's serendipitous extraction of luminous material from a jellyfish (see box, opposite) was all the more resonant for its profound impact on other research fields. More than 30 years later, researchers realised its potential as a genetic marker – it could be attached to anything inserted into a gene, and then made to fluoresce to indicate the insertion was successful. Green fluorescent protein is now used in cell and

*"There it was, living this clandestine existence, right under my very nose, just waiting for me to discover it." – UNSW Professor Brian Timms*

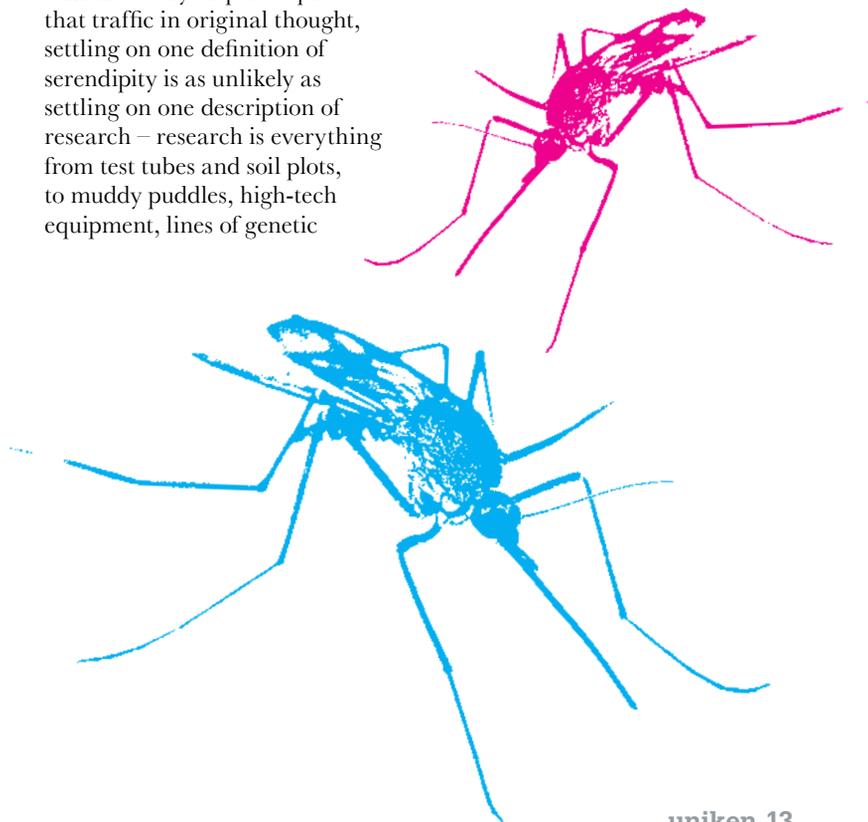
molecular biology, cryobiology, microscopy and transgenics.

In a similar vein, the surprises in photovoltaics spring more commonly from realising discoveries in one area of research are highly useful to others, says Corkish. "Technology from our third-generation group, based on quantum physics, is now applied on thin-film or second-generation solar cells. And an ink-jet printing method developed for use on our thin-film cells is used on our original solar cells. These crossovers are surprising sometimes, but maybe that's not serendipity; maybe it's something that happens if you're looking in the right places."

In the vastly disparate places that traffic in original thought, settling on one definition of serendipity is as unlikely as settling on one description of research – research is everything from test tubes and soil plots, to muddy puddles, high-tech equipment, lines of genetic

code and scribbled notes on scrappy paper. "Think of researchers in the humanities," says Poole-Warren, "they are the virtual bench."

"[Research is] a fantastic job," says Hogg. "I love it, and it's a privilege to do it. Most of us recognise we're lucky to be able to do this job. Yes, most of us survive on three-year, five-year grants – there's no security – but that's the trade-off for working in an area that's a big unknown. You have to be creative and innovative, good enough to discover new things or gain new insights. If you can do that consistently, you can stay in the business."





# THE POWER OF ONE

**Many hands may not necessarily make outstanding science, argues UNSW's Science Dean Merlin Crossley as he calls for better funding of high-achieving individual researchers.**

**Just as some people doubt** promises that involve getting something for nothing, I worry every time I hear, "by collaborating in this multidisciplinary, high-level enterprise we can be more than the sum of our parts".

Increasingly, we are being encouraged to sing the praises of multidisciplinary, interdisciplinary, cross-disciplinary and trans-disciplinary research. My concern is artificial collaborations offer all the synergies of a three-legged race. And, in pursuing collaboration for its own sake, we risk overlooking the need to champion brilliant individuals upon whose shoulders the rest of us stand.

The logic of collaboration is that as the big problems facing society are multifaceted, only interdisciplinary approaches can offer solutions. It is true that when we reach the point of delivering solutions we need elaborate multi disciplinary teams. However, life-changing contributions to problems like infectious diseases, world hunger, energy and communications, have been made by individually driven exploration, discovery and invention.

Nobel Prizes recognise contributions that confer the greatest benefit on mankind and, strikingly, cannot be shared by more than three people. No human endeavour occurs in isolation, but Alfred Nobel identified individual leadership is a critical ingredient that should be recognised and encouraged.

I am surprised when I hear interdisciplinary research is more important than ever as more than

100 years ago Charles Darwin synthesised the work of the economist Thomas Malthus and the geologist Charles Lyell with his own observations in biology and came up with evolution as an explanation for the origin of species.

The same goes for popular claims that the most exciting research these days is occurring at the boundaries between disciplines, at the very time these boundaries are said to be dissolving. This paradoxical idea sounds interesting, but I don't think it means much. Some exciting work does arise when advances in one discipline facilitate progress in another. When the British Navy was grappling with navigation, one single person, John Harrison, played a dominant role in the development of seaworthy clocks that achieved the accuracy in timekeeping required to calculate longitude. It was terrific when Captain Cook used a clock based on one of Harrison's designs and discovered many new regions of the world. But, it is the individual discoveries that are remarkable, not the fact they were operating at these mysterious boundaries.

That said, there is always a case for integrating knowledge and facilitating the uptake of advances emerging in different disciplines. My own view though is that this is best done by identifying leading individual researchers and supporting these individuals properly. This is something practical that works. The Nobel Prize provides funding specifically to high-achieving individuals who must be alive and able to oversee

the use of the prize money. In the US the legacy of Howard Hughes is used to support the highest-achieving researchers in the biomedical sciences and their productivity and achievements have been remarkable. In Australia, the Federation Fellowship scheme and its successor, the Laureate Fellowship scheme of the Australian Research Council, and the Australia Fellowship scheme of the National Health and Medical Research Council have supported high-productivity researchers. These people have operated with such prominence that researchers in other disciplines have been drawn in to collaborate with them. This is how multi-disciplinary research can be engendered and supported.

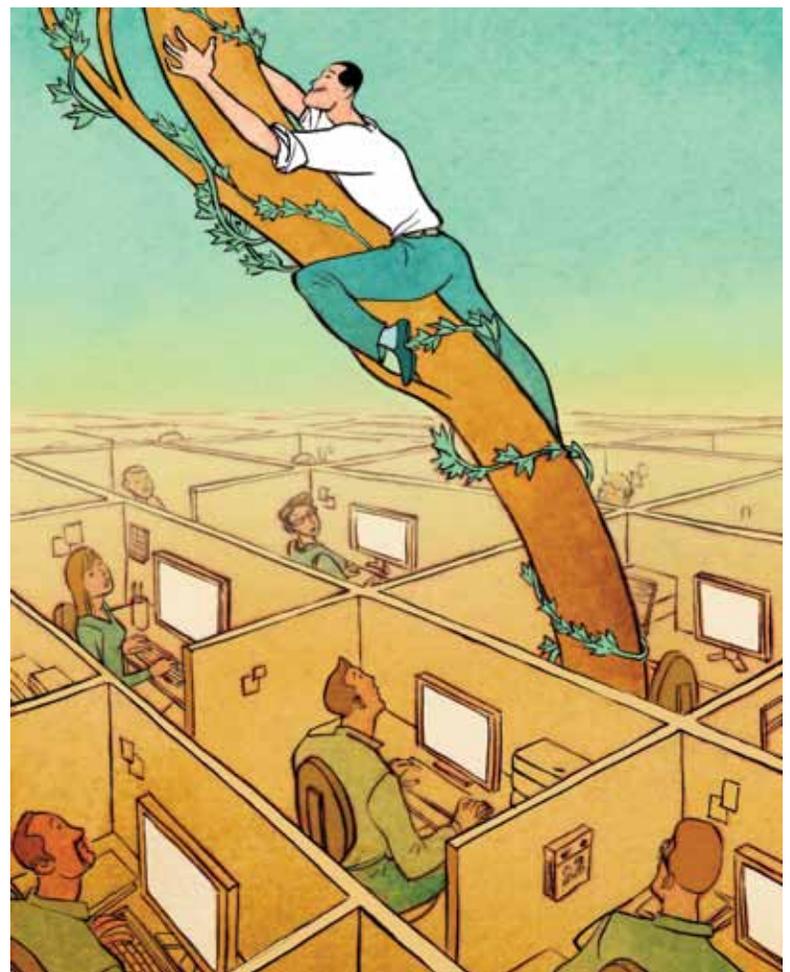
Surprisingly, schemes that support individual excellence are not easy to establish or sustain – the elite nature seems to work against them. Fewer Laureate Fellows are being offered than there were Federation Fellows and the future of the Australia Fellowship scheme is uncertain. Remarkably few voices are raised to support these pinnacles of excellence, in contrast to

the frequent choruses calling for mechanisms to support collaborative networks and broader interdisciplinary initiatives.

Why is collaboration so prized over individual excellence? The answer is almost certainly in the numbers. There will only ever be a handful of elite researchers and it is seen as self-serving if they appeal for more funding for themselves. Yet when the topic of collaboration arises many people realise they might benefit so hands go up in support of the larger community and murmurs of approval reverberate.

Having schemes that support individual excellence is the first step to supporting collaboration and subsequent cross-disciplinary research. Australia has a long record of focusing on excellence in research and in running harmonious cross-disciplinary collaboration. The more we support dynamic research champions to lead collaborations, rather than requiring artificial networks, the more Australian research will prosper.

*A version of this opinion piece first appeared in The Australian's Higher Education Supplement.*





# The desert blooms

**The unique landscape surrounding Fowlers Gap, near Broken Hill, has inspired more than 300 PhD awards, featured in more than 1,000 scientific papers and been the subject of countless artworks. Bob Beale reports.**

**Terry Dawson is down on one knee**, gazing appreciatively at a small miracle. It is emerging from the orange-red desert soil at one of UNSW's most far-flung but valuable assets – the Fowlers Gap Arid Zone Research Station, north of Broken Hill.

The object of Dawson's fascination, poking out of a jumble of fractured stones, doesn't really look miraculous: it is merely a low, compact shrub with little blue-green fleshy leaves shaped like elongated beads.

"It's a pearl bluebush," says Dawson, pushing back the brim of his hat for a closer look. What is remarkable about this pocket-sized bush, he explains, is that despite its apparent fragility, it is probably several centuries old.

And it is not alone: the surrounding arid landscape is peppered with many such ancient survivors – including gnarled old mulga trees that probably sprouted before European settlement of Australia. Indeed, the ancient weathered surface of Fowlers Gap belies the biological richness of its low rolling hills. Apart from plants, many thousands of kangaroos, reptiles, birds and bats live here. All these hardy creatures

carry in their genes a hard-won recipe for enduring anything the harsh and extreme Australian climate can throw at them – fire, drought, flood and even plagues of mice and locusts.

Fowlers Gap has seen it all and that is one key to understanding its special place in the life of UNSW since the University gained responsibility for it 45 years ago. Emeritus Professor Dawson also has a special link to Fowlers Gap, having been involved with the station in one way or another for more than 50 years. First as a University of New England undergraduate in 1958 when the station was a NSW Soil Conservation Service research station and then as a lecturer after it was given to UNSW on a lease in perpetuity. During his initial research he camped there with his wife in 1967. Despite retiring a decade ago, Dawson is still a regular visitor and the irreplaceable "corporate memory" on the station's management committee.

Fieldwork conducted at Fowlers Gap was the major source of the intimate knowledge Dawson acquired over decades about Australia's iconic animal – the

kangaroo. His 1994 UNSW Press textbook *Kangaroos – Biology of the Largest Marsupials* is a classic on the topic, one that will soon see a new edition. He even managed at one point to train some kangaroos to hop on a treadmill while he made measurements.

As if on cue, a big male red kangaroo appears nearby as we talk. "Magnificent animals," says Dawson, as it moves languidly into some shade, "just about all muscle and so miserly in their use of energy."

He uses both arms to make a sweeping gesture around him: "This is why this place is special: it represents 70 per cent of the real Australia."

Despite such a vast share of the continent being semi-arid or desert, very few permanent research facilities exist there. Fowlers Gap is the exception – a tough and beautiful landscape that has attracted countless researchers, teachers and students over the years. Field research carried out there has resulted in an estimated 300 PhD awards across many disciplines and it has featured in perhaps 1,000 scientific papers.

"The station attracts visitors from top universities within



**A broad perspective ...  
the Ochre House Artist's  
Retreat at Fowlers Gap**

it in recent years – a condition of the lease is that UNSW accommodates any reasonable research program. It can also host small conferences. Such visits supplement the station's finances, but its mainstay has long been from some 5,000 sheep that provide about 75 per cent of its income.

The station however remains very much part of the University's future. Just as two successive summers of abundant rainfall have brought the landscape to life after a long drought, major plans are afoot by the station's energetic director, Dr Keith Leggett, to rejuvenate some of its older facilities, with hopes of a new laboratory, workshops and dormitory.

"Every continent has an iconic field station and we are privileged to have Fowlers Gap," says Crossley. "Much of Australia is arid farmland and the great thing about the station is that it's also a working farm. It's where much of the early work on the impact of grazing by sheep and kangaroos was done and it remains a unique facility for investigating how best to practise agriculture in the bush.

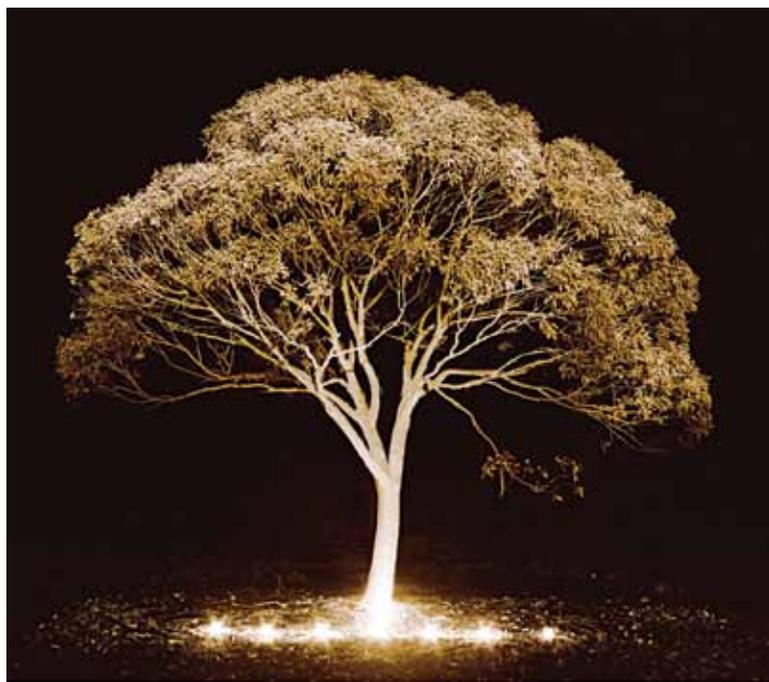
"Current plans include efforts to understand the movement of feral goats and we are very lucky to have Dr Keith Leggett, who is a world leader in arid-zone biology, having spent much of his career tracking elephants throughout Africa.

"Maintaining a remote field station is an investment but we've been fortunate. There has been a succession of good custodians, we have an excellent team at the station, our UNSW Facilities team has been great in maintaining the buildings and we've got clear plans for the future building around Keith's vision. There is a buzz around Fowlers at present and some strong supporters and I look forward to it continuing to deliver in the coming years."

Australia and from other countries to study our fauna, flora and geology," says Professor Merlin Crossley, Dean of the UNSW Faculty of Science, which administers the station. "At present, the greatest concentration is of researchers studying the social behaviour of birds and this work is world renowned."

Many traces of human activity can be seen around the 39,000-hectare property. The oldest by far is a prehistoric Aboriginal quarry. Modern artefacts tell of surveying students who left stone cairns; engineering students who built culverts; and geology students who picked at its stone outcrops. You'll also see the remains of hydrology experiments; fenced areas where trials of native plants were conducted; and the manager's home – known as Solarch House – was a test-bed for pioneering sustainable building techniques, including solar power. Inspired by the visual richness of the place, lasting impressions also have been recorded in countless photographs and works of art (see box, right).

Although Fowlers Gap has been a hive of activity for the UNSW community, other institutions have been making most use of



## FINDING INFINITY

Fowlers Gap offers artists a unique perspective: it's one of the few places in a highly urbanised world where you can see the curvature of the earth, says Louise Fowler-Smith from UNSW's College of Fine Arts (COFA).

"You really get the sense of infinity," says Fowler-Smith, who is also the Director of the Imaging the Land International Research Initiative (ILIRI). "International artists in particular are blown away by the sense of space out there."

They are not the only ones. Fowler-Smith "fell in love" with the remote property in the mid-1990s when she first visited and has been travelling back annually ever since.

Although she and other COFA academics had been taking students to the property on an informal basis, in 2003 they set up ILIRI and established a special course in painting and drawing, that culminates in an exhibition showcasing land-based art in its many forms.

"This sort of landscape is a challenge for many artists," says Fowler-Smith. "We found that the traditional perspective for artists did not work out there. So we needed to look at different ways to 'image' the land."

Fowler-Smith's own work has focused on the tree. She says she wants to change perceptions, by lighting up Eucalypts and mulga bush, for example, and photographing them at night, making them seem somehow ethereal (see image at top).

"I am using the tree as a metaphor," she says. "Pastoralists used to think of it as vermin, but I want people to see the beauty in it."

More recently, she has established another course based at the property on art and the environment. The course is open to students from engineering, science and Faculty of Built Environment, as well as those from COFA.

The Creative Laboratory, a large area of land set aside for cross-disciplinary collaborative projects that focus on the environment, is also open to international guests through artist residencies.

**By Susi Hamilton.**

# Designs on the future

UNSW urban design students will go all the way to the Sydney Town Hall to present their research on how to overhaul the Redfern–Waterloo area. Susi Hamilton reports.

**To say Redfern–Waterloo has an image problem** is something of an understatement.

“Most people who live in Sydney probably don’t know much about this area. Most have never been here,” says Nigel Dickson while strolling around the back streets of Redfern.

Dickson, Professorial Visiting Fellow in the Faculty of the Built Environment, says the area, just three kilometres from the city, has traditionally been isolated – in part by design.

“For a long time it’s been bypassed politically and socially,” he says. “It had a large agglomeration of social housing which was built in the 1950s and 1960s. Big roadways were put in, encouraging people to just drive straight through without stopping.”

And there are still some who question whether it’s safe to go to parts of the area – particularly at night.

Dickson knows Redfern–Waterloo intimately. He is one of two academics who has helped

24 students re-imagine the area up to 50 years from now, as part of the final unit of their Masters of Urban Development and Design (MUDD).

The students have done intensive research, looking at issues including transport, housing, green space and business development. The work incorporates the views of residents, as well as some of Sydney’s most senior bureaucrats and councillors John McInerney and Irene Doutney.

At the heart of the semester-long project was a week of intensive learning with one of the world’s leading urban planners, Professor Jonathan Barnett, from the University of Pennsylvania. Also a former director of urban design in the New York City Planning Department, Barnett says government planners and policy makers often don’t have the opportunity to take such an approach themselves.

“These are ideas which have not come through normal outlets,” he says. “[Government planners]

often don’t have the opportunity to sit back and say: ‘What if we made different assumptions?’

The people who are doing the work don’t necessarily see the design opportunities.”

Michael Neuman, Professor of Sustainable Urbanism and the other lecturer of the MUDD students agrees: “Our brief is of our own choosing. Just as companies have research and development to determine where their investment priorities are for the future – our research and design work is the same. It is geared to guide the investments for infrastructure and public sector improvements, as well as private sector development.”

“We wanted to make the entire site more open and safe and

**“For a long time Redfern-Waterloo has been bypassed politically and socially.”**

vibrant and to provide more meeting spaces and community-oriented spaces, including outdoor spaces, plus more services and appropriate retail for all, including Indigenous community members,” he says.

The changes mooted by the students include the redevelopment of housing commission, high-rise blocks into a range of housing choices for all incomes to alleviate social problems; the development of more low-rise public housing; and a high-rise development and improved amenities around Redfern Station.

MUDD student Max Stember-Young says his group wants to see light rail down Elizabeth Street.

“It is the only street that connects the CBD, Redfern, Waterloo and Green Square. Green Square is significant because it is such a large-scale redevelopment and this will allow it to be better connected to the CBD.”

Other plans include creating a pedestrian boulevard near Central Station; improved pedestrian crossings at Cleveland Street to better link Redfern and Surry Hills; bike lanes; and the introduction of a new train station on the Airport Line at George Street, Waterloo, linked to the possible establishment of convention facilities there.

The designs are so comprehensive the City of Sydney has asked the students to present their findings to major players at the end of the year. The faculty also signed a Memorandum of Understanding with the council earlier in the year.

“It would be a dream if they took up our proposals, but even to have Town Hall consider our ideas is great,” says Stember-Young. “There is a large series of problems that have been created in Redfern (such as roads and social housing) and it needs a whole series of design solutions to bring about positive, community-needs-based change.”



A progressive outlook ... Redfern Park is a successful redevelopment

Energy to burn ... (l-r) Professors Michael Neuman and Travis Waller



# Switched on solution

**Electric cars might already help reduce an individual's carbon footprint, but as Anabel Dean reports, in future they could have a much greater environmental benefit.**

**Imagine a world where every car** is a mobile power generator and hopping behind the wheel can save the planet instead of adding to its woes.

That is the vision two leading academics plan to turn into reality as one of the ambitious projects they will undertake after uprooting from the US to join the fledgling UNSW Research Centre for Integrated Transport Innovation (rCITI).

American professors Michael Neuman and Travis Waller were colleagues working in different disciplines at different universities in Texas until they accepted roles at UNSW within weeks of each other.

"We both moved halfway across the globe, and of all of the hundreds of universities in the world, we ended up at the same one," Waller says. "It was a very nice confirmation of our decision because we independently and unknowingly came to the same conclusion."

Their conclusion was that a substantial opportunity existed at UNSW to show leadership

and make an impact in the domain of sustainable urban development and transport infrastructure planning.

Waller left the University of Texas to accept the role of Evans & Peck Professor of Transport Innovation in the School of Civil and Environmental Engineering at UNSW. He will lead the new centre as director.

Neuman was similarly attracted to "a world-ranked university in Australia with a long history in energy innovation and sustainability". He resigned from Texas A&M University to take up his appointment as Professor of Sustainable Urbanism in the Faculty of the Built Environment at UNSW.

An integrated perspective taken by these practical scholars, in different disciplines, is expected to achieve far-reaching results.

"As soon as Travis and I realised we were both here, we agreed our priority was to establish the cross-school research project integrating energy and transport networks with the built environment by using electric vehicles," Neuman says.

The proposed car-powered grid project is a way to create millions of mobile power generators (cars) that, when harnessed in this new way, decrease the need for expensive energy infrastructure, such as coal-fired power stations, that harm our environment.

Neuman believes such radical rethinking around energy production is required if we are to combat climate change and pollution.

**"There is a substantial chance that electric vehicles will transform our transportation system."**

"As a society, we continue to exploit the environment for more coal to generate electricity to feed 200-year-old technology that belches carbon dioxide and other toxic gases into the atmosphere and into our lungs," Neuman says.

He admits that a car-powered energy grid is however "not going to happen overnight".

"We can test and prove this technology in a few years. The

question is how long will it take for the institutions and industries and our daily ways of living to catch up with the innovations?" he asks.

Waller agrees that electric vehicles may provide solutions to a range of sustainability issues, but warns societies need to be prepared.

"I believe there is a substantial chance and opportunity that electric vehicles will transform our transportation system," says Waller.

"We can choose to let it happen or we can attempt to plan and manage that possibility. If we do the former, history has taught us within the realm of transportation, it will not go well," he says.

*An international symposium is planned on the UNSW Kensington campus for 25 November.*

*The e-car Mitsubishi i-Miev (pictured) is part of UNSW's hire vehicle fleet.*

# Artistic REASONING

There are many discoveries to be made at the point where science and art meet. Susi Hamilton reports.

## American composer

**David Dunn** probably never thought he'd end up with a career in science.

But when the amateur environmentalist started recording the sounds of microscopic beetles six years ago, his journey into science began.

The work centres on the Mountain Pine Beetle, which is just one species of a few dozen highly destructive beetle species (there are 7,500 bark beetle species worldwide) that will have killed 70 per cent of native forests in British Columbia in Canada within 10 years.

Dunn's recordings showed the beetles, which are also devastating native forests in other parts of North America, Europe and Asia, made a "terrible" noise, not unlike scratching old phonograph record grooves with your fingernail.

The work caught the interest of physicist James Crutchfield, from the University of California Davis, who went on to found the Art and Science Laboratory Sante Fe, New Mexico with Dunn.

The pair has since found acoustic interactions between insects and trees could hold the key to arresting rapid deforestation, accelerated by global warming.

Laboratory tests, undertaken in collaboration with forest entomologist Richard Hofstetter at Northern Arizona University, show they can use the sounds the beetles use to communicate against them – in some cases causing them to cannibalise each other.

"The assumption was that the sound was a very important factor in how they carry out their behaviour. We've proven this is the case, but now we need to apply it in real trees," says Dunn.

The pair is at the forefront of what seems to be an emerging field at the intersection of art and science and they recently gave a keynote lecture at COFA's Institute for National Experimental Arts (NIEA) Conference.

"This project was really interesting to us because it was an experimental sound artist working

with a physicist and both of them were unable to do the work within the confines of their own disciplines," says NIEA director, Professor Jill Bennett.

UNSW researchers who presented at the conference included COFA's Associate Professor Paul Thomas whose most recent project "Nanoessence" is an ongoing collaboration with colleagues in Western Australia.

"The audiovisual installation I am working on creates a physical and visual experience of the nanoworld for the viewer," he says.

What appears as a landscape on a large screen is actually the visual representation of skin cells. Likewise, what seems to be a soft techno beat is the sound of atoms vibrating.

The artwork is activated by the viewer breathing on a piece of equipment that houses a 3D model of a skin cell.

"You're playing God by breathing life into this work," says Thomas. "In the context of the project, breath critiques the proposal for nanotechnology to reshape nature 'atom by atom' with a metaphorical link to a biblical inception of life," he says.

Dr Petra Gemeinboeck, also from COFA, works with artificial intelligence researcher Rob Saunders from the University

Captivating ... visual representation of skin cells in *Nanoessence*

of Sydney on creative robotics. Recently they embedded the robots into the walls of gallery spaces.

"At first people saw the walls, then cracks in the walls. They then realised there were things in the architectural fabric of the space," says Gemeinboeck, describing the work which looked at computational creativity.

"The robots get rewarded for learning and bored if nothing different happens. They have to interact with the world to entertain themselves."

The robots have an "eye" and an "ear" – a camera and a microphone – and can record when they are interested in something.

While Gemeinboeck says the collaboration is not aiming for a practical outcome, there are potential benefits for industry.

"We already have the notion of intelligent architecture, whereby buildings are imbued with intelligence, enabling them to respond to changes in the environment and to their inhabitants," says Gemeinboeck. "Our work takes that a few steps further [because] these embodied agents learn over the long term."

It may be only a matter of time until these self-motivated, curious robots play some role in the buildings around us.



A new approach ... (l-r) a forest destroyed by the Mountain Pine Beetle; a close up of the beetle; images of a robot embedded in walls



# Detective work

Inspector Chen creator, Qiu Xiaolong, talks to Fran Strachan about China's complex past, its corrupt present and his new role as Adjunct Professor of Writing.

**Like most authors Qiu Xiaolong** has plenty of stories to tell, but it's his experiences growing up as a child of China's Cultural Revolution that add emotional and historical depth to his novels.

The son of an "accidental capitalist" deemed a class enemy by the Communist Party, Qiu was hounded and humiliated during his childhood in Shanghai.

"My father was considered politically untrustworthy and evil simply because he was a small business owner – that meant that I was tagged a 'black puppy' or less than a human being," the internationally acclaimed crime-writer says.

The fact capitalism is now celebrated in China is "the irony of history" and a theme Qiu weaves through his novels as protagonist Inspector Chen, a poetry and fine-food lover, attempts to counteract the corruption he encounters with a quiet integrity.

"Equality was in the Chinese DNA way before the Revolution, Mao propaganda just reinforced the idea – the new China of inequality is shocking to me," says the author, whose Inspector

Chen series has sold more than a million copies and been translated into more than 20 languages.

Now, UNSW students will benefit from Qiu's expertise in his new position as Adjunct Professor of Writing.

"The position is an honour to me and a much-needed encouragement," he says. "In the past several years, I've been too busy writing to continue my academic pursuance like before, so this appointment is a reminder of that aspect of my life."

The path to academia for Qiu was not easy. Schools were all but closed during the decade spanning the Revolution, from 1966 to 1976, and young people were sent by the tens of millions to the countryside to learn from peasants, a fate that Qiu narrowly avoided after being bed-ridden with bronchitis.

It was during this time Qiu became interested in English after seeing someone studying the language on a park bench in Shanghai: "Nixon had just visited China so English as a language was becoming a little more acceptable," he says.

A love of English literature and poetry quickly developed.

Qiu translated the complete works of TS Eliot into Chinese and edited and translated the *Treasury of Chinese Love Poems: In Chinese and English*, a collection of his favourite classical Chinese verse.

The author moved to the US in 1988 and studied at Washington University in Missouri, on a Ford Foundation grant. After the bloody crackdown in Tiananmen Square in 1989, a newspaper reported on his previous fundraising efforts for Chinese

"Equality was in the Chinese DNA way before the Revolution. The new China of inequality is shocking to me."

students, and he was forced to remain in America to avoid persecution by the Communist Party. He has since made Missouri a permanent home for his wife and daughter and teaches literature at the same university where he was once a student.

"I don't take Shanghai for granted like I would if I still lived there," he says. "It's an advantage to be able to see China from a distance, which gives me clarity and perspective. Economically, China is no longer poor, and

there's incredible material improvement in some people's lives but the gap between the rich and poor is enlarging. Morally and ideologically, the society is dangerously close to bankruptcy."

Qiu recently spent two weeks at UNSW as a guest of the Confucius Institute where he lectured both Chinese language and creative-writing students, something he hopes to do regularly.

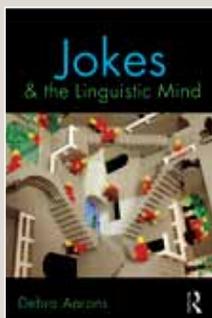
When asked what his life would

have been like if he had remained in China, Qiu is thoughtful.

"I don't think I would have developed a character like Inspector Chen and with the rigorous censorship still there, I might not have been a writer either, but possibly a translator which means less political trouble," he says smiling.

For an interview with Qiu Xiaolong conducted by Professor Stephen Muecke, go to the Art and Design collection of UNSWTV at [www.tv.unsw.edu.au](http://www.tv.unsw.edu.au)





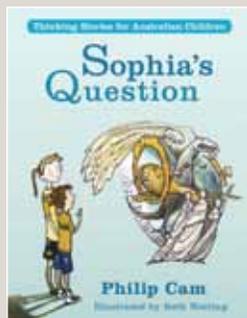
**Jokes & the Linguistic Mind, Debra Aarons, School of Languages and Linguistics**

This book investigates jokes that play on the structure and function of language. Debra Aarons shows that “linguistic jokes” can evoke our tacit knowledge of the language we use. Analysing examples from movies, plays and books, *Jokes & the Linguistic Mind* demonstrates that linguistic knowledge must become conscious for these jokes to be understood. This book is a supplementary text for introductory courses in linguistics, psycholinguistics and cognitive science. It will also be of interest to scholars in translation studies, applied linguistics and philosophy of language.

**Routledge**

**Sophia’s Question: Thinking Stories for Australian Children, Philip Cam, School of History and Philosophy (illustrated by Beth Norling)**

*Sophia’s Question* is a story of self-discovery. Sophia is given an old bracelet and is told to ask her grandmother about its three mysterious charms. So begins a journey in which Sophia attempts to discover what turns out to be a family secret, a secret upon which her very existence depends. Driven by a strong desire for self-determination, Sophia is searching for identity.



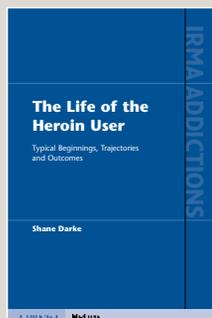
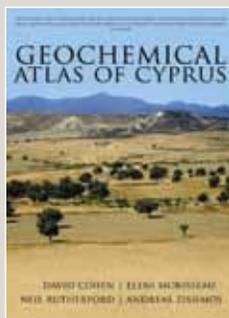
This philosophical novel is a starting point for moral inquiry. Accompanied by a teacher resource book, *Sophia’s Question* is designed to help the teacher or parent develop inquiring young readers and shows them how to use questioning, justification, conceptual exploration and reasoning to explore issues and ideas.

**Hale & Iremonger**

**Geochemical Atlas of Cyprus, David Cohen and Neil Rutherford, School of Biological, Earth and Environmental Sciences (with Eleni Morriseau and Andreas Zissimos)**

*Geochemical Atlas of Cyprus* is the most detailed map of its type ever undertaken at a national scale. The geology of the island is highly variable and for millennia it has been exploited by various powers for its natural resources and prominent location on Mediterranean trade routes. The Atlas contains detailed and systematic mapping of soil geochemistry across Cyprus, based on some 12,000 soil samples. The work took over six years and forms part of a more general geochemical mapping of Europe that was prompted, in part, by the need to assess the impact of the 1986 Chernobyl nuclear disaster on the soils of countries in the region.

**UNSW Press**



**The Life of the Heroin User: Typical Beginnings, Trajectories and Outcomes, Shane Darke, National Drug and Alcohol Research Centre**

*The Life of the Heroin User* applies a biographical approach to the life cycle of the heroin user from birth until death. Chapters address each stage of the user’s life, including childhood, routes to use, the development of dependence, problems arising from addiction, death, and options for treatment and prevention. Drawing on over two decades of experience in the field of heroin research, Darke examines major theoretical approaches to the development of opiate dependence and the efficacy of treatment options. The most detailed review available of what is likely to happen to the dependent heroin user, this is an important book for clinicians, researchers and students in the fields of drug and alcohol studies and public health.

**Cambridge University Press**

**Quantum Anthropologies: Life at Large, Vicki Kirby, School of Social Sciences and International Studies**

In *Quantum Anthropologies*, the renowned feminist theorist Vicki Kirby contends that some of the most provocative aspects of deconstruction have yet to be explored. Revisiting Derrida’s claim



that there is “no outside of text”, Kirby argues that theories of cultural construction developed since the linguistic turn have inadvertently reproduced the very binaries they intended to question, such as those between nature and culture, matter and ideation, and fact and value. Through new readings of Derrida, Husserl, Saussure, Butler, Irigaray, and Merleau-Ponty, Kirby exposes the limitations of theories that regard culture as a second-order system that cannot access –much less be–nature, body, and materiality.

**Duke University Press**

**Perspectives on Brand Management, edited by Professor Mark Uncles, School of Marketing, ASB**

An up-to-date and authoritative text, *Perspectives on Brand Management* is based on international research from a hand-picked team of international experts that explores and analyses the issues, trends and challenges in this dynamic field.

**Tilde University Press**

*Suggestions for new books to include in the next issue of Uniken should be sent to uniken@unsw.edu.au*





## MAGIC OF MILK

Taken by a self-confessed science-phobe, this image won the *Science Through My Eyes* category of the 2011 UNSW Science Photo Competition.

Masters of Architecture student, Chao Xu, used the time-lapse setting of a Canon 450D to reveal the chemical reaction between milk, dishwashing liquid and ink.

The pink ink begins as a circle, eventually blooming into a representation of the photographer's favourite flower, the rose. "I wanted to show what science is through an artist's eyes," says Xu who "hated" science at school but loved photography and design.

"I wanted to enter because I'd tried this experiment at home and thought the results were beautiful."

She wins \$1,000 for her work.

For the winners and runners-up in each of the three categories, go to <http://www.science.unsw.edu.au/photocomp/>

The competition was open to all current UNSW staff and students.



Professor Lisa Jackson-Pulver AM,  
Chair of Indigenous Health



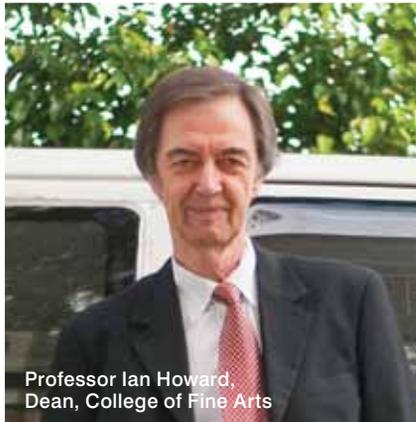
Xanthe Chapman, Senior Development  
Officer, Faculty of Science



Jason Coombs,  
Director of Strategy,  
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Andrew Wells,  
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Professor Ian Howard,  
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