WOLLONGONG - THE DEMENTIA FRIENDLY CITY
UOW researchers aim to build a dementia friendly city in response to the growth of its aging population

CALL FOR BET-FREE SPORTS TELEVISION
Public Health Sociologist speaks out against the barrage of gambling marketing in sport and its affect on our children

A STEP CLOSER TO PRINTING HUMAN ORGANS
Hospital-based biofabrication unit marks milestone for 3D printing at ARC Centre of Excellence for Electromaterials Science
The University of Wollongong ranks in the top 2% of research universities worldwide

Source: QS World University Rankings 2012/2013

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05 NEWS
UOW’s goal to secure a place in the top 1 per cent of universities worldwide is off to a good start

06 NEWS
Business Events Sydney inducts two UOW academics as its newest ambassadors, earmarked as movers and shakers in their relevant industries

14 FEATURE
Can Wollongong become a Dementia friendly city? How the NSW/ACT Dementia Training Study Centre is responding to our growing Dementia population

16 TRAVEL TALE
Social Geographers Dr Christine Eriksen and Associate Professor Michael Adams in California

18 OPINION
Professors Chris Gibson and Geoff Spinks on the future of Australian manufacturing following the end of Australian-made cars by Ford

20 STUDENT PROFILE
Diana King is doing her PhD in Conservation Biology and Environmental Management in the Antarctic

21 NEW STAFF
Marine Scientist David Kirby joins UOW to head up a new AusAID-funded project on ‘Fishing for Security in the Gulf of Guinea’

22 EVENTS
Register to attend the 3Minute Thesis competition.
Coral reef fish research buoyed by Hermon Slade grant

Not all fish are friendly and a $47,000 grant from the Hermon Slade Foundation is backing research that will investigate why. Dr Marian Wong and Professor Mark Dowton from UOW’s School of Biological Sciences have been awarded the grant to investigate the evolution of sociality – using fish. Making comparisons of fish from the coral reefs surrounding Lizard Island in Queensland, the project will investigate the long-standing scientific question of why sociality has arisen.

“While some species are social, others remain stubbornly asocial, and this contrasting variation often seen between closely related species has long puzzled evolutionary biologists,” Dr Wong said.

“In so doing, we will provide a taxonomically broad overview as well as a demonstration of the roles of key ecological, environmental and life history variables,” she said. Coral fishes are of particular interest to evolutionary biologists,” Dr Wong said.

“In order to understand how societies as a whole function, we need to first understand their mating systems”

was published in the June edition of high-impact journal BioScience.

Co-authored with Boston University’s Professor Peter Buston, the paper offers insight into the reasons for female reproductive suppression, group living and bidirectional sex change – a phenomenon which allows many marine fish species to change sex when needed. As a matter of evolutionary biology, the authors suggest that in order to understand how individuals and societies as a whole function, we need to first understand mating systems.

“Despite their ecological quirkiness, our review demonstrates that they have been instrumental in testing the generality and robustness of key concepts that are widely applicable to other taxonomic groups,” Dr Wong said.

“Habitat specialist reef fishes have taught us many things about the evolutionary ecology of mating, social and sexual systems.”

“Mating system research is of critical importance – since natural selection shapes all aspects of an individual’s behaviour to maximise its genetic contribution to the next generation,” she said. The type of mating system plays an important role in the expression of other behaviours, particularly the decision whether to form groups, and in what direction to change sex.”

Field work for the Hermon Slade project is to be conducted at the Lizard Island Research Station, while lab-based work will occur at the University of Wollongong. The Foundation aims to advance the progress of harmony between mankind and the Earth through the study and application of Natural Sciences.

Potential PhD students interested in assisting with the three year research project are encouraged to contact Dr Wong.

Processing the potential of ‘big data’

What to do with the glut of growing data – or ‘big data’ – generated by a rising number of global tech-users is the theme of the June issue of industry magazine Computer. UOW’s Associate Professor Katina Michael from the School of Information Systems and Technology has guest-edited the special edition of the peer-reviewed publication supported by the Institute of Electrical and Electronics Engineers (IEEE).

Since 2008, there has been much published on the promise of big data, and the exponential growth of electronic transactions via cloud computing, social networking, and mobile applications,” A/Prof. Michael said.

“As companies attempt to leverage rich customer data through business intelligence applications, there are unanswered questions that need to be addressed. Where is this data being stored? Who can access it? What can it tell us about customer patterns today and into the future? What is it costing organisations to keep this data? Are their proven economic advantages to the big data proposition?”

According to A/Prof. Michael, the magazine presents a balanced view on the challenges and opportunities of a data-rich future.

“We’ve tried to come to an agreement about some of the frameworks applicable in this new big data environment,” she said.

> The new edition of Computer is now available online.

UOW moves into top 1% for research quality

UOW’s goal to secure a place in the top 1 per cent of universities worldwide is off to a good start with one of the four major world rankings (Leiden Ranking) showing UOW has topped NSW in the field of “Research Quality” – securing the University a top 1 per cent spot, out of about 20,000 universities worldwide.

UOW was ranked 186th in the world overall in the 2013 Leiden Ranking, moving up from 233rd last year. Overall, UOW was rated fifth in Australasia (and number one in NSW) for research quality.

A standout for UOW was the quality of its Engineering disciplines which, according to the Leiden Ranking, has now seen Natural Sciences and Engineering move into 81st spot in the world.

The 2013 Leiden Ranking from Leiden University’s CWTS (Centre for Science and Technology Studies) is a measure of performance of major universities.

“The Leiden rankings showcase the quality of the Australian higher education sector. UOW is one of 12 Australian universities to be rated in both the overall top 500 ranking and in all five of the field of research rankings. The highlight is being rated 81st in the world and third in Australia for Natural Science and Engineering,” the Vice-Chancellor Professor Paul Wellings said.

“The improvement is encouraging and suggests that the research from UOW is being actively used by colleagues around the world.”

> See the Leiden website for further information about these rankings.

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Academics announced Ambassador and Future Leader

The Business Events Sydney Ambassador Program is a strategic initiative that taps into the strong networks and insights of global industry leaders spanning the fields of medical research, technology, arts and culture, engineering, business and science. In May 2012 NSW Deputy Premier The Honourable Andrew Stoner, became the program’s inaugural Patron, and at this year’s annual Ambassador Dinner in May he formally announced 20 new Ambassadors and four new Future Leaders. Among the new inductees were UOW’s Professor Gordon Wallace (Ambassador) and Dr Pia Winberg (Future Leader). The program now includes over 60 Ambassadors based in Australia and throughout the world. The new group of Ambassadors include leaders who represent the NSW Government’s priority sectors, an initiative that forms part of the recently released NSW Economic Development Framework.

Overlooking Darling Harbour, Ambassador and Future Leaders and invited guests were able to network, discuss new ideas and enjoy a panel of discussion entitled ‘Australia…land of opportunity?’ hosted by SBS Insight presenter Jennie Brockie. The panel comprised leading business people David Hutton (Lend Lease), Greg Hywood (Fairfax Media Limited) and Alex Malley (CPA Australia). They shared a few home truths about opportunity in Australia – Do we take it for granted? Is it a blessing or a curse? – and shared some candid thoughts about Australia’s current economic, social and political climate.

iAccelerate’s ‘CriticalArc’ wins pitch competition

CriticalArc, a resident of the University of Wollongong’s iAccelerate StartPad business incubator, has won the prestigious StartUp Trophy at Australia’s largest startup conference SydStart 2013. Selected as one of 12 finalists from a field of 100 applicants, CriticalArc outshone the competition and was declared winner by the judging panel.

Pitching criteria included:
• the team’s likelihood of winning globally,
• the addressable market,
• points of difference,
• traction to date, and
• why the startup would stay ahead of the pack.

Founded by Glenn Farrant, a UOW graduate and former Australian Navy weapons engineer, CriticalArc’s first product is SafeZone, a mobile alert safety solution for tertiary education campuses. The SafeZone mobile app enables students and staff to communicate with campus security teams using location-based incident alerts and helps security teams coordinate a rapid response.

According to Glenn, the SydStart win has already attracted interest from investors. “Winning the SydStart StartUp Trophy has enabled us to set up meetings with a number of potential investors,” Glenn said. “This is terrific for us as we are currently raising capital for our international expansion.”

Commenting on the role of iAccelerate StartPad in the development of CriticalArc, Glenn said “Being part of iAccelerate StartPad has given us the credibility that comes from being selected as one of the incubator’s residents through a competitive process, and mentoring from business people who have advised on the steps we need to take and what pitfalls to avoid as our business grows.”

Focused on technology-enabled start-ups, iAccelerate StartPad’s mission is to help Wollongong entrepreneurs - including UOW’s almost 1000 ICT graduates each year - turn their ideas into viable businesses.

>For further information on iAccelerate StartPad, its residents and alumni, visit startpad.com.au

You need to think like bacteria to defeat bacteria

A new approach to treating antibiotic-resistant infections has been developed by the University of Wollongong and University of New South Wales researchers who have patented the new technology and entered into commercialisation discussions with two French pharmaceutical companies. Antibiotics have saved countless lives and alleviated human suffering for more than seven decades but, as widely reported, their continued use has led to the emergence of antibiotic-resistant bacteria or “superbugs” which pose a major threat to humankind.

In ground-breaking work funded by the Australian National Health and Medical Research Council (NHMRC), researchers focused on the pathogens which are able to resist antibiotic treatments through the formation of biofilms. “Biofilms occur when bacteria grow together as communities, usually on surfaces, encased within a protective polymeric blanket,” explained Illawarra Health and Medical Research Institute researcher, Dr Mike Kelso, from UOW’s School of Chemistry and Centre for Medicinal Chemistry.

“These bacterial ‘fortresses’ are the root cause of most chronic infections, including those occurring on medical in-dwelling devices such as urinary, venous and arterial catheters, orthopaedic prostheses, pacemakers and heart valves, as well as chronic urinary tract and diabetic wound infections and incurable lung infections in cystic fibrosis sufferers.”

“These bacterial fortresses are the root cause of most chronic infections”

“These bacterial fortresses are the root cause of most chronic infections,” he added. “Sadly, there are no effective drugs for treating biofilm-based chronic infections,” he added. In collaboration with researchers from UNSW’s School of Biotechnology and Biomolecular Sciences, Dr Kelso rationally engineered a new technology known as ‘Trojan Horse’ drugs. “These drugs [cephalosporins] are recognised by biofilm bacteria as dangerous and, to defend themselves, they produce an enzyme [beta-lactamase] which would normally degrade the molecules leading to their inactivation.”

“However, when the bacteria degrade the Trojan Horse molecules, a second molecule called nitric oxide, previously hidden within the molecular structure, is released into the biofilm milieu,” he said. “The nitric oxide then acts as a signal that tricks bacteria into dispersing from their easy-going biofilm lifestyle in pursuit of alternative lodging, convinced that their ‘fortresses are the root cause of most chronic infections’.”

“Trojan Horse” drugs.

“Convincing bacteria to disperse from biofilms exposes their Achilles’ heel, since they are much more susceptible to traditional antibiotics and immune defences in the dispersed state.”

“To put it another way, you need to think like bacteria to defeat bacteria,” Dr Kelso concluded.

“Trojan Horse” drugs.
All bets on academic scrutiny of sport ads

Centre of Health Initiatives researcher Associate Professor Samantha Thomas has played an expert role in the policy debate on sports betting advertising, advocating that gambling marketing be removed from televised sport during children’s viewing hours.

Her contribution to the latest Parliamentary Inquiry is but one of a string of expert recommendations made to government on the subject in recent years, having appeared before the Prevention and Treatment of Problem Gambling and Interactive Gambling Inquiries, as well as the Joint Select Committee on Gambling Reform.

“T’m interested in the complex factors that lead to risk behaviours,” A/Prof. Thomas said.

“Often risky behaviour is sold as an issue of personal responsibility, but I am interested in the range of factors – including marketing from industry – that may contribute to people consuming products in potentially harmful ways.”

Featured on ABC’s Four Corners program ‘The Big Gamble’, A/Prof. Thomas has spoken to the issue of embedded marketing in sport and its contribution to the rise and rise of betting culture in Australia.

“A lot of young men spoke about the fact if they didn’t gamble they felt isolated from their peer groups. Those sorts of new cultural norms that are associating gambling with sport are really starting to make us concerned,” she said.

“There are multiple ways gambling is promoted during matches. We found that there were episodes of marketing before the game, during quarter time breaks, that there was advertising on the hoardings on the ground that constantly rotated, logos on team jerseys, and people popping up on the screens.

“While the gambling industry argues that it doesn’t deliberately target children, they are being exposed and, our research shows, are clearly picking up the messages contained in these ads,” A/Prof. Thomas said.

Before her move to Wollongong, A/Prof. Thomas worked at the World Health Organisation’s Geneva-based Mental Health and Human Rights Unit, and later at the Indigenous Peoples Health Unit. She gained her PhD in Community Health from the University of Auckland and has worked as an academic at Monash University and London’s King College.

On Wednesday 8th May a brilliant mix of local community members, business leaders and researchers descended on the University of Wollongong for the inaugural Big Ideas Festival.

The Big Ideas Festival featured presentations by 12 of the University’s recently-appointed professors, talking about the “big ideas” of their work, while some of UOW’s key research centres also had interactive research booths at the Festival hosted at the Innovation Campus.

Presentation topics included the development of better batteries to power electric cars of the future; the implications on sea level rise to national borders; unmasking the mysteries of quantum computing; helping police better manage psychiatric crisis incidents; and the prevention of obesity and physical issues through early intervention programs in pre-schools.

UOW Vice-Chancellor Professor Paul Wellings said the Big Ideas Festival was a “rare opportunity to hear from some of the brightest and best in Australia”.

“The 12 speakers have all taken up their professorial role in the past two years,”

Looking at lipids in disease with high-tech laser and mass spectrometry

The University of Wollongong has received state-of-the-art instrumentation that will allow researchers to take a closer look at how different types of molecules are distributed throughout a sample. Professor Stephen Blanksby says one key research area the technology could assist is lipid characterization.

“The distribution of lipids (fat molecules) within the human ocular lens is being mapped using this technology, which is providing new clues as to how the chemistry of the lens changes as we age, as well as providing new understanding of processes leading to presbyopia and cataract,” Prof. Blanksby said.

The commissioning of an AB Sciex QTRAP5000 mass spectrometer within the Mass Spectrometry User Resource and Research Facility (at UOW), was officially launched in April.

This instrument has been provided by AB Sciex as a part of a research partnership with UOW through an ARC Linkage grant entitled ‘Development of Ozone-Induced Dissociation for Lipidomics Workflows’. The collaboration between Prof. Stephen Blanksby and Dr Todd Mitchell involves working with scientists from AB Sciex’s research laboratories in Toronto, Canada.

Lipidomics is an emerging field of research working with scientists from AB Sciex’s research laboratories in Toronto, Canada.

Dr Tony Brewster (Senior Manager, Australia & New Zealand) on the new mass spectrometer. The project has also been supported by AB Sciex Australia with Prof. Chris Gibson.

Pictured left: Prof. Stephen Blanksby. Pictured below: The Big Ideas audience hear from Professor Chris Gibson.

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Human organ printing one step closer for researchers

The idea that researchers from the UOW-based Australian Research Council Centre of Excellence for Electromaterials Science (ACES) could print human organs had humble beginnings. Researchers bought a collection of inkjet printers from OfficeWorks and began experimenting with printing new ink formulations. This included inks containing organic conductors that were subsequently used to support and stimulate nerve cell growth.

Over subsequent years UOW researchers worked in-house and with collaborators to build customised equipment that could print living cells. Over a 10-year period the researchers also built collaborative links with like-minded clinicians that was to prove crucial to targeting near, medium and long-term applications and developing a translational pipeline that would accelerate progress.

Fast forward to 2013 and researchers are working on a new wave of technology leveraging 3D or additive fabrication, using machines to build 3D objects layer-by-layer from digital data. “While 3D printing is already being used in some medical applications, by bringing together the materials and scientists at ACES and the clinicians and researchers at SVHM, we have been able to accelerate our progress so that we are now on the verge of a new wave of technology leveraging 3D printing/additive fabrication techniques to deliver solutions to a number of medical challenges.”

“Within a few years, we believe it will be possible to manufacture structures that facilitate the regeneration of nerve, muscle, skin, cartilage, and eventually produce structures that replicate the functions of human organs by spatial distribution of bioprintable components (biopolymers, proteins, and cells) in 3D. “Using a patient’s own cells to create this tissue avoids issues of immune rejection,” Prof. Wallace explains that 3D printing, or additive fabrication, uses machines to build 3D objects layer-by-layer from digital data.

“Tissue engineering has been hailed as a potential solution to the problem of organ availability for transplantation. At the National Institutes of Health in the United States alone, the Department of Surgery reports they performed over 22,000 organ transplants in 2009.”

The establishment of a customised facility in Australia to be located in a hospital. “This is an exciting development involving the establishment of a customised facility at St Vincent’s, Melbourne, that will put our scientists and engineers in direct contact with clinicians on a daily basis,” ACES Director Professor Gordon Wallace said.

“It is expected to fast-track the realisation of practical medical devices and the reproduction of organs,” he said. The initial projects targeted by the facility involve wet spinning of long lengths of micron dimensional fibres containing living cells to aid muscle regeneration. In addition, researchers will be electro spinning nanostructured mats containing drugs to implants into the brain for epilepsy treatment as well as fabricating scaffolds for bone and cartilage regeneration.

“It is already possible to print 3D biocompatible plastics and metals to manufacture patient-specific implants,” Prof. Wallace said.

Transforming the lives of people with disabilities through IT

UOW Information Technology expert Dr William Tibben has won the prestigious 2013 Christopher Newell Prize for his research into how governments around the world can utilise technology to increase equity for people with disabilities.

Dr Tibben won the prize in conjunction with Gneila Austrink from GSA InfoComm for their paper in the Telecommunications Journal of Australia: The role of public procurement in improving accessibility to ICT.

“Forty-five per cent of Australians with disabilities live on or near the poverty line compared with the OECD average of 22 per cent due, in part, to high unemployment rates,” Dr Tibben said.

In order to enable higher participation rates in the workplace for people with disabilities, Dr Tibben believes the Australian government should lead the way by purchasing accessible office equipment such as phones and computer systems for government employees with disabilities.

“The government should ramp up initiatives to purchase, measure, and report on digital accessibility,” he said. The Federal Government’s National Disability Insurance Scheme (NDIS) provides an ideal opportunity for creating real and lasting change.

“Accessible [technologies are] a positive step in removing barriers that prevent people with disabilities from participating equitably in society and thus increasing digital inclusion,” he said.

Dr Tibben said Australia has a history of early adoption for all things digital, but when it comes to adopting accessible technologies, we are lagging behind.

“While information and communications technologies continue to improve, advances in technologies that are usable and accessible by people with disabilities struggle to keep up,” he said. The research was funded by a competitive grant from the Australian Communications Consumers Action Network (ACCAN).
How pesticides impact arid ecosystems

Across two million square kilometres of Australian arid and semi-arid grasslands, pesticides are used on an annual basis for the control of locust pests. Professor Kris French from UOW’s Institute of Conservation Biology and Environmental Management is heading up a team of researchers working to manage locust populations by assessing the ecological impacts of two very different pesticides used by the Australian Plague Locust Commission (APLC). While ongoing control is essential to minimise the devastating effects of locust plagues on agricultural production, questions have been raised over the environmental costs associated with the use of insecticides and whether biocontrol is a preferred alternative as a reduced use of insecticides and whether biocontrol would be successful.

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Can Wollongong become a dementia friendly city?

UOW’s Professor Richard Fleming, Director of the NSW/ACT Dementia Training Study Centre, is working towards a significant change in design and practice in dementia care facilities.

His aim is to help create dementia-friendly cities and improve the lives of people with dementia by eliminating some of the confusion, anxiety and suffering by addressing key areas such as:
1) Retrofitting existing dementia care facilities to improve design.
2) Building new and more compact dementia care facilities that facilitate less confusion for patients.
3) Removing unnecessary stimulation, while encouraging positive engagement.
4) Training of staff to recognise that most behavioural problems are an expression of unmet needs and will be reduced when the needs are recognised and met.
5) Introducing volunteer dementia programs to create a friendlier environment.

RETOFITTING AND BUILDING NEW CARE FACILITIES

Complicated building designs which cause confusion, by preventing patients from finding their way, can cause disorientation and agitation. Retrofitting existing facilities can be difficult but there are some simple changes which can be applied.

Providing well-defined pathways supports movement and engagement and helps prevent stumbles and falls. Good visual access provides opportunities for engagement and gives a patient confidence to explore.

As you age, colour contrast becomes more difficult, so the use of strongly contrasting colours on doors and door frames can help patients locate rooms.

“It’s a simple idea really – and you can even extend that to the dinner plates by making sure they contrast with the table cloth. Ideally the food should contrast with the plate – it’s hard to see mashed potato on a white plate” says Prof. Fleming.

The size of the care facility can also make a big impact on the level of confusion and affect the behaviour of a person with dementia. If the facility is large there will inevitably be long corridors of resident rooms, with some located quite a distance away from the central lounge and dining area. Being able to see these shared spaces is important for residents.

The number of Australian people living with dementia is estimated to triple by 2050; that is an increase from 320,000 Australians to 900,000.

President of Alzheimer’s Australia (AIA), Its Buttrrose recently opened the 15th national conference in Hobart (last May 2013), and warned that Australia was already lagging behind other countries like the UK for example, which has thrown $46M into research to help manage the dementia crisis.

"Dementia is already the third largest cost for example, which has thrown $46M into research to help manage the dementia crisis.

The Australian Dementia Awareness Week, Dementia Choir, Side by Side Program (SA), Memory Lane Cafes (Vic), Memory Books Project (NSW), and the Dementia Training Study Centre (NSW/ACT) at the University of Wollongong.

Professor Richard Fleming, who is the Director of the NSW/ACT Dementia Training Study Centre, has already been hosting workshops with planners, architects, managers, architectural schools and care staff around the country, to share his insights into creating ‘friendlier’ spaces for people with dementia.

In front of a television in a busy room can overstimulate them and make them agitated. According to Professor Fleming the environment should be designed to minimise unhelpful stimuli and be balanced by highlighting stimuli that are important to the residents.

He suggests positioning the lounge chair towards a window which could look out into a garden or an outside visiting area, or bird aviary. If these outlooks are not possible, a display of personal memorabilia and photos could be beneficial. The familiarity of the personal objects to the resident is comforting.

IS HIGH SECURITY NECESSARY?

Many dementia facilities are high security which essentially means residents are locked in. Carers will choose this type of facility because they are concerned their loved ones will escape or wander off. In the early stages of the disease patients often try to leave the facility to return to their home. This can cause anxiety and sometimes violent behaviour as they need to escape is quite strong.

Prof. Fleming has visited many dementia facilities overseas where there are no tall fences, and no locked doors. In Norway it is illegal to lock people up because of dementia. The person’s security is protected by providing sufficient staff numbers.

“If a resident wants to leave, the door is open and they can choose to walk out. The difference is the response by staff. Staff can recognise that the patient would like to leave the care facility, so they accompany them for a walk. Usually it only takes a few minutes for them to feel satisfied that they have gone some where and they are happy to go back. So it’s a staffing issue and training of staff to deal with these types of behaviours” says Prof. Fleming.

NEIGHBOURHOOD VOLUNTEERS

Neighbourhoods have a capacity to support people with dementia in ways we are only starting to understand here in Australia.

A volunteer program for the immediate neighbourhood of a facility (and in general) can play a significant role in creating a dementia friendly city.

These volunteer programs are common in Finland and Japan.” Says Prof. Fleming. “People are taught to identify a dementia patient who may have wandered from their home or facility. They can engage with them, show support and friendship. The patient may be confused, lost or simply lonely. A million volunteers in Japan have been trained to recognise a person with Dementia and to provide assistance”.

ACUTE CARE FUNDING FOR DEMENTIA-FRIENDLY HOSPITALS

The NSW/ACT Dementia Training Study Centre has recently received a $200,000 boost to its budget from the Federal Department of Health and Ageing (DoHA) for improvements in acute hospital services for people with dementia.

Professor Fleming said the funding will support two-day workshops on designing dementia-friendly hospitals in every state and territory, and run workshops at universities and hospitals across Australia, by the end of this year.

Professor Fleming’s original funding application to DoHA was to provide education and consultancy on the design of dementia-friendly environments for architects, hospital planners and managers working on the plans for new or refurbished hospital facilities in NSW. However, DoHA advised Professor Fleming to resubmit his application as an Australia-wide project, which has now been approved.

“It is very encouraging to see the importance of the built environment being recognised.” Professor Fleming said.

“There has been good quality research carried out on designing residential care environments for people with dementia, but the hospital environment has been largely neglected. This project will enable us to apply the knowledge that we have, and hopefully, set the stage for future research into designing for the special needs of people with dementia undergoing the stresses of hospital admission.” VW

Interested in making a difference and helping Professor Fleming and his team achieve a dementia friendly city? There are a few things you can do:
1) Donate to Dementia Research at UOW http://www.youruowcommunity.edu.au/donate-to-dementia-research
2) Attend a workshop or event run by the Dementia Training Study Centre http://dementia.uow.edu.au/index.html
3) Read more - Subscribe to the ‘Australian Journal of Dementia Care’ http://journalofdementiacare.com/
4) Volunteer at a local Care Facility.
Geographers map uncertain landscapes in land of the free

From the University of California, Berkeley to Joshua Tree National Park, UOW Social Geographers Dr Christine Eriksen and Associate Professor Michael Adams encountered uncertainties that wove through many aspects of their month-long field trip in the USA.

Entering Palm Springs from the surrounding desert is a surreal experience – bright green irrigated lawns, expensive cars, up-market resort and spa accommodation, and thousands of palm trees in a flat landscape surrounded by arid mountains. This is the traditional country of the Cahuilla Indians. Like Native American tribes across the USA, the Agua Caliente Band of the Cahuilla Indians has faced wide-ranging environmental, social and economic uncertainty.

At Palm Springs, however, a long history of resistance and skilled negotiation by Cahuilla leaders meant that most of the checkerboard of Native American-allocated lands was retained. As Palm Springs eventually developed into an expensive resort destination, the Agua Caliente Band became the single largest landholder with billion-dollar real estate enterprises based on leasing what became downtown lots.

We were in the USA with several aims: to negotiate new international student exchanges as part of a UOW International Links Grant co-funded by the Faculty of Science; to participate with a group of AUSCER researchers at the Association of American Geographers conference; to explore contemporary conservation initiatives and challenges, including Indigenous involvement and NGO conservation initiatives; and to continue research on wildfire and hunting.

While pursuing all these interests, we were repeatedly struck by dimensions of uncertainty in American life, some of which might be particularly acute in California.

We drove 2,000 miles, sometimes funnelled along at 75mph on Los Angeles’ fearsome and crowded 12 lane freeways, and sometimes on remote back roads, across the San Andreas fault – one of the many fault lines that crisscross earthquake-prone California. Tsunami warning signs greeted us on Los Angeles’ Venice Beach. Many times along Highways 395 and 10 we encountered the thousands of miles of aqueducts that flow through dust-blowing deserts, once the rich agricultural hubs of places like the Owens Valley and Mono Lake. Wildfire scars were evident across thousands of hectares of forest. These were all constant reminders that these really are landscapes of uncertainty.

Michael spent a day on the Tejon Ranch, which at 250,000 acres is the largest continuous landholding in California. After a century of ranching, mining and development operations, Tejon has established a complex new environmental dimension in the form of the Tejon Conservancy.

The Conservancy was negotiated between Tejon’s owners and five major US and California environmental groups. In return for certainty for some development activities (particularly a billion dollar real estate project) the newly created Conservancy will manage conservation values across a landscape which links four major ecological regions.

Christine guest lectured at California State University, Chico in one of the few pyro-geography courses taught at university undergraduate level worldwide. Like many parts of Australia, wildfire is an annual occurrence in California. In both countries, the ability of people to coexist with fire at the wildland-urban interface causes much debate and consternation. Christine presented on the challenges of preparing, responding and recovering from wildfire amongst contemporary landholders in California and New South Wales – a key theme in her forthcoming book.

In California water and fire are closely interlinked ecological and social systems. When one is out of balance, the other often is too. On April 20th the front and back pages of the Los Angeles Times reported on the “girding of fire fighters for battle” as Southern California headed for its fourth-driest year since 1877.

On the one hand the general manager of the Metropolitan Water District of Southern California expressed a lack of concern for water supply due to stored water from stronger rain years. On the other, a worried farmer spoke about the increasingly parched regions that supplied most of the water to the Los Angeles metropolis display tough everyday realities: “When you’re a farmer in Central California, you absolutely watch the water as much as you watch your kids,” he said.

Three weeks after our arrival, the United States Senate failed to reform the country’s gun laws and two bombs exploded at the Boston Marathon. With 270 Americans shot in the USA every day, for many people uncertainty is part of the daily social fabric.

> This blogpost was originally published at http://uowblogs.com/ausscer/

AUSCER is a Strategic Research Initiative of the University of Wollongong
Niche markets can breathe new life into manufacturing

According to Professors Chris Gibson and Geoff Spinks, Ford’s latest announcement does not herald the death of Australian manufacturing.

The public debate overlooks the diversity of Australian manufacturing. What happens to the automotive industry is not necessarily indicative of other sectors. The assumption that manufacturing is drying overlooks innovation, diversity, specialisation, and human skills. It ignores the fact that Australian manufacturing output has quadrupled since the 1950s. The truth is that the face of Australian manufacturing is changing. Overall employment numbers are in steady decline, but the proportion of high-skill workers is actually increasing and many sectors are expanding. Manufacturing competitiveness is not just a high dollar problem. We need to look inside industries and regions to identify opportunities. New research that cuts across technology, economics and the social sciences will be crucial.

Indeed, there are opportunities to grow Australian manufacturing in new and diverse ways. But we will need to move beyond glib headlines about the death of manufacturing and appreciate that manufacturing is no longer simply about production lines, low-cost labour and cheap, throwaway products. The question is not whether Australia should have a car industry or a manufacturing sector, but what kinds of high quality, lasting things Australia should make, and where are the opportunities. After all, a deep part of regional and even national pride comes from the things we make.

OPPORTUNITIES ABOUND BUT THE RACE IS ON

There are huge opportunities at the high-tech end of the spectrum. Australian manufacturers are mostly small companies working within specific niches. And yet they are world leaders in a wide range of products, from compost bins to the cochlear implant, musical instruments to polymer bank notes and from 4-wheel drive accessories to wi-fi. Manufacturing is also about specialist services, product design, prototyping and testing – not just assembly lines.

The research sector is vital to future innovation. There is no shortage of great ideas emerging from university and government research labs across Australia. The University of Wollongong’s own research efforts span high strength alloys, better battery materials, bionic implants and nanomaterials. Researchers are also developing innovative machinery like high productivity welding systems, 3D-printers, metal forming systems and autonomous robots. These are just a snapshot of the strength of Australia’s manufacturing-related research. Those countries that are able to best harness their research capacity and convert ideas into industries will gain the advantage. It’s another reason the federal government should continue to grow the higher education sector, rather than cut its funding.

INNOVATION BY DESIGN

Manufacturing innovation is not just about technical advances. Other kinds of manufacturing will rely on making the most of human skills. The key will be to harness existing abilities to craft things by hand, integrating high quality and design, and to better promote and value the human input into how things are made.

The surfboard industry is a great example. The traditional method relies on hand-shaping boards, customised to individual surfers and local waves. It happens in small workshops who maintain strong connections with local surfing communities. That strong local connection and customisation means that designs can evolve constantly as surfers and boardmakers experiment with more radical designs to get a thrilling wave ride. Upon this basis, Australia has become the world leader in new surfboard design.

The debate must also appreciate the regional basis of manufacturing. The downstream effects of Ford’s closure will be region-specific and intense. Attempts to alleviate regional impacts of manufacturing contraction – such as in the Illawarra after 2011 cutbacks at BlueScope Steel – have had very limited success. Governments have thrown money at the problem too quickly, without a good evidence base for what might work. Retraining and job placement schemes have operated without broader strategic regional development, infrastructure and industry support. No amount of retraining or job subsidy will work if the jobs, infrastructure and planning aren’t there.

This is why we need qualitative social science research – as well as high-tech science – on the aspirations and capacities of manufacturing workers within regions. Social scientists can help us explain what those workers ultimately aspire to be. Surely, in light of Ford’s recent announcement, that is among the highest priorities of all.

>By Professors Chris Gibson and Geoff Spinks. Originally published on The Conversation.
What are you studying?
PhD in Conservation Biology and Environmental Management in Antarctica.

What does your research focus on?
My research involves analysing change in vegetation communities on the Antarctic continent over the past 10 years and determining what climatic factors are responsible for these changes.

What do you hope to achieve in your research/field in the future?
I am developing a technique to automatically classify Antarctic vegetation in photographs, and have already been approached by New Zealand Antarctic researchers to collaborate with them to develop similar techniques. I plan to publish a number of papers from my research, and also hope to travel overseas to collaborate further with international colleagues.

What's been the highlight of your career so far?
I think the best thing so far has been the opportunity to travel to conferences. I have been to a number of conferences so far, including local ones in Hobart and Melbourne and also bigger, international conferences in America. It’s great to be able to meet some of the top researchers in your field, and to listen to talks on a huge range of topics. It is exciting to see what research is currently being investigated around the world.

What do you plan on doing after the completion of your study?
I hope to be able to do more research. Once I’ve finished my PhD, but perhaps working on something a bit different. As Antarctic vegetation is quite a niche area to work in, I should be able to apply my computer-based analyses to a variety of different fields, but I would like to remain in ecological research as ecology is my main area of interest. I don’t like to have too many set ideas for the future, as I have learned that if you are more open to opportunities, you have more chance of finding the path that is right for you.

To do this, our research team take photos freezing cold in Antarctica.

To bring them back to Wollongong where we do further work on them. These communities are like mini rainforests, and we can get up to 500 moss shoots in 1cm² of moss turf. We are noticing a dramatic increase in one of our moss species, and think that this could be linked to changing water availability on the continent. I have presented these findings at two international conferences in America, and will also be presenting at the upcoming Antarctic conference in Hobart in June.

What are your plans after the completion of your PhD?
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Research in three minutes

THREE MINUTE THESIS
Tuesday 2 July | 1 pm
McKinnon Building (677), UOW
INFO & RSVP: uow.edu.au/research/rsc
FREE AND OPEN TO THE PUBLIC

Join us for the UOW final of the Trans-Tasman Three Minute Thesis competition, where research students have three minutes to explain their thesis.
UOW’s Dean of Research Tim Marchant believes that the Three Minute Thesis Competition supports the development of research students’ capacity to communicate ideas effectively to a range of non-specialist audiences and the wider community.

Three minute thesis focuses on the mathematical knowledge for teaching of primary preschool teachers.
“Anyone who knows me knows I would find it difficult to talk for less than three minutes!” Elise quipped. “And it’s also ridiculously hard to summarise three years’ worth of work into such a short presentation.”

Working under the supervision of Dr Tricia Forrester and Associate Professor Gary Hoban, the PhD student relishes the opportunity to fully explore an in-depth topic that may one day contribute to her disciplinary field.
“I love the idea that I could be supporting the mathematical knowledge of the next generation of teachers that will in turn influence the mathematical knowledge of our next generation of primary students,” Elise said.

In a mere 180 second presentation Elise suggests representations can be used as a way to develop the mathematical knowledge of educators.
“I also present a challenge in my PowerPoint slide to see if the audience is able to discern which diagrams appropriately represent a maths problem,” Elise said.

But you’ll have to come along to the presentation night to test yourself.
For an insight into the next crop of brilliant young researchers, don’t miss the 2013 UOW final of the Three Minute Thesis.
>
REGISTER TO ATTEND.

Bill Wheeler Symposium:
Fundraising for the future of bionics

Thursday 15 August | 12.30pm–1.30pm
Leon Kane-Maguire Theatre, AiiM Facility, Innovation Campus
FREE AND OPEN TO THE PUBLIC

Future leaders of bionics research are to be recognised at the upcoming annual Bill Wheeler Symposium, hosted at the University of Wollongong’s Intelligent Polymer Research Institute (IPRI) in Wollongong (9 December 2013 – 21 February 2014).

The ARC Centre of Excellence for Electromaterials Science (ACES) and its industry partners are this year offering $6,000 summer scholarships to 10 students.

Interested candidates must be third or fourth year students enrolled in an Australian university in 2014.

To apply for the 2013-14 Summer Scholarship:
Go to www.electromaterials.edu.au and click ‘Apply Now’.

Applications close Friday, 30 August, 2013.

Successful applicants for the 2013-14 Summer program will be announced on 14 September.

Professor Wallace will be available to meet with prospective students on the following dates:

- Adelaide 3.4 July
- Hobart 10-12 June
- Melbourne / Geelong 13.14 June
- Brisbane 7.8 July

To book an appointment email Phil Smugreski.