GLOBAL TECHNOLOGY AND DESIGN

YOUNG GUNS
Rising entrepreneurs using their skills to succeed

TALKING THE TORQUE
New-generation internal combustion engines

DROP IN THE OCEAN
Helping our Pacific neighbours during the global economic crisis
There is a myth that the “real” university is a place of quiet contemplation, a cloistered oasis of philosophical enquiry where dons engage in abstruse discussion, untainted by tawdry commercial imperatives.

It was never so. Even when universities were few in number and elite in recruitment, they served a practical purpose, producing lawyers, clerics and teachers, and later doctors, administrators and diplomats.

Today any ambiguity has been put to flight: universities are charged unequivocally with equipping each new generation with the capabilities required to participate in a complex, global economy, and to lead and innovate.

From its foundation 126 years ago, RMIT has prided itself on sharing and shaping this world view.

We have specialised from day one in providing an education where analysis and action are fused, where “learning by doing” is privileged, and where the needs of industry and society are incorporated into teaching and research.

We are an industrious university in each sense of the word – in constant and deep dialogue with industry partners, our students engaged in work-integrated learning, and our researchers striving to turn “pure” insights into practical initiatives.

The stories in this magazine help illustrate the case and I hope you find them as enlightening and inspiring as I do.

Professor Margaret Gardner AO
Vice-Chancellor and President
RMIT University
When Karl Benz put the world’s first cars into production with his four-stroke internal combustion engine, he probably didn’t imagine that his technology would still be driving vehicles nearly 130 years on.

“Internal combustion engines are tried and tested,” says Professor Aleksandar Subic. “It’s the kind of excellent, reliable technology that shouldn’t be abandoned because we face different circumstances and challenges – we need to look for new solutions and ways to adapt, modify and build on what we have. Even the electric or hybrid vehicles in the future will require new-generation internal combustion engines to serve as range extenders.”

While some manufacturers have responded to environmental concerns by moving away from internal combustion altogether in favour of battery or fuel cell-powered electric cars, the approach at RMIT’s Green Engines Research Facility is to work with the local and international automotive industry to push the existing technology far beyond its current boundaries.

When Karl Benz put the world’s first cars into production with his four-stroke internal combustion engine, he probably didn’t imagine that his technology would still be driving vehicles nearly 130 years on.

Internal combustion engines are tried and tested,” says Professor Aleksandar Subic. “It’s the kind of excellent, reliable technology that shouldn’t be abandoned because we face different circumstances and challenges – we need to look for new solutions and ways to adapt, modify and build on what we have. Even the electric or hybrid vehicles in the future will require new-generation internal combustion engines to serve as range extenders.”

While some manufacturers have responded to environmental concerns by moving away from internal combustion altogether in favour of battery or fuel cell-powered electric cars, the approach at RMIT’s Green Engines Research Facility is to work with the local and international automotive industry to push the existing technology far beyond its current boundaries.

The first of its kind in the Asia-Pacific, the $10 million lab opened earlier this year after three years of intense development.

Its focus is the investigation of every possible alternative fuel – from liquid to gas and multi-fuel platforms – and enabling technologies that could be used in new-generation internal combustion engines. The aim is to identify strategic improvements and innovations to combustion and fuel delivery systems for engines that are cleaner, more efficient and better adapted to our 21st century carbon-constrained economy.

Officially launching the facility, Victorian MP and passionate motoring fan Craig Ondarchie described it as an investment in the future. “All of our skills, all of our advantages will be needed if we’re going to keep pace with the global car industry that we know is restructuring and undergoing significant fundamental change both in production and design,” Ondarchie said.

“This is a world-class facility and it confirms Victoria’s place as the leading Australian state for automotive and advanced manufacturing research.”

Doctoral researchers Siti Mazlan and Bing Jie Zhang are working to optimise internal combustion engines that run on natural gas. The first research projects funded through the AutoCRC (Cooperative Research Centre for Advanced Automotive Technology) have also begun, focusing on gaseous fuels vehicle technologies, including liquid natural gas (LNG) conversion for heavy vehicles.

Natural gas releases less carbon dioxide per unit of energy than oil, so making the switch offers a relatively quick way to cut emissions with little change to overall transport infrastructure.

A research group built around the facility is led by engine technology expert and former Fiat research leader Associate Professor Albert Parker. Also on board is Dr Luca Marmorini, Head of Engines and Electronics at Scuderia Ferrari and an Adjunct Professor at RMIT, who is bringing the technologically advanced world of Formula One to the lab through strategic advice on potential areas of research.

“It’s strong industry connections like this that are key to ensuring the global impact of this research laboratory – we’re focused on making a difference to what’s possible in the real world of the automotive industry,” Subic says.
When Simon Lockrey was flown to Hobart to explain life cycle assessment to staff at the Australian Antarctic Division, he didn’t expect to strike such an instant chord. “There was a real resonance with the research focus of the Division’s human impacts program and the organisation’s long-standing commitment to environmental protection. They just put the words straight up on the board – ‘LCA: NEEDED’.”

A comprehensive systems-thinking approach, LCA offers hard evidence to support environmental decision-making. Lockrey, a research fellow and LCA specialist at RMIT’s Centre for Design, could see that LCA would provide a valuable framework for achieving the goal shared by all parts of the Division – to demonstrate leadership in environmental management across all its activities in Australia and Antarctica.

“Each of the things they do will interact with the environment in some way. Solar panels might reduce fuel use, but at the same time increase physical footprint or diminish aesthetic values.”

“A triple membrane filtration waste water system would protect the oceans, but would there be greater net environmental benefit from installing new highly-efficient incinerators?”

“For years, the Division has been pursuing different, excellent ideas to manage the environmental aspects of its activities. But there’s currently no straightforward or objective way to compare apples and oranges – to figure out which ideas will actually have the most impact – or to determine what mix of options would give the best overall result.

“LCA brings it all together – you can talk a common language.”

Lockrey and RMIT colleagues, Dr Karli Verghese and Dr Enda Crossin, are collaborating with Associate Professor Mick Abbott from the University of Otago to work with the AAD on a flagship research project.

The team will develop strategies based on LCA to reduce the environmental impacts of operating Casey Base, located in the Windmill Islands just outside the...
Researchers are working to improve our knowledge of the Antarctic climate by using GPS signal data to determine how the atmosphere above the continent has behaved in the last decade.

The Satellite Positioning for Atmosphere, Climate and Environment (SPACE) Research Centre at RMIT is leading the study, which will build on the centre’s world-leading research into atmosphere analysis using satellite data.

– Gosia Kaszubska

Antarctic Circle. The five-year project, funded through an Australian Antarctic Science grant, is the first time life cycle thinking has been applied to the environmental management at any of Australia’s Antarctic bases.

The project was born out of pilot LCA research conducted by RMIT with the University of Otago, focusing on New Zealand’s Scott Base. The insights from that work are informing the Australian research.

“At Scott Base, there were issues such as the food storage being at one end of the base and the kitchen at the other, so the chef had to walk with a backpack to collect supplies every few days. That’s a result of how the base was originally designed, and then extended over time, but identifying these kinds of problems faced by the people on base is also part of our approach,” Lockrey says.

As well as gathering information on the human side of living and working in the extreme Antarctic conditions, the researchers are collecting base data – energy use, water use, food and other supplies, waste – on running Casey Base, home to about 20 people in winter and 150 over summer.

Once the baseline is established, emissions and resource use are translated into a set of environmental impact indicators. From this, the research team aims to develop a simple, web-based tool that will enable the AAD to clearly see the impact both of specific decisions (e.g. flying in supplies versus shipping, solar versus wind) and how a mix of choices could work together to maximum effect.

The Centre for Design has runs on the board in this area, having designed the Packaging Impact Quick Evaluation Tool (PIQET) – widely used for environmental impact assessment by the packaging industry – and the Australian Greenhouse Calculator, an online tool for households.

“The key is to do the modelling then take all that complex information and have it sitting in the background, so anyone can plug into the tool and see the practical results of their environmental decisions, with no special training or instruction,” says Verghese, chief investigator on the project.

“One of the unique aspects of the project is looking at a closed community in a harsh, remote environment, where every possible resource required must be brought in and out.

“But what we learn from here can apply outside Antarctica. There are industrial closed loop systems, such as airlines, but also other closed loop communities in remote areas, such as mining communities and outback stations.

“While the conditions in those places may be different, the fundamental lessons we learn from our work in Antarctica can have environmental impacts far beyond that frozen continent.”
According to the Australian Companion Animal Council, we own 3.4 million dogs – and the more dogs, the more canine illnesses.

“Dogs have lived alongside humans since ancient times,” says Associate Professor Janine Danks, who is Head of Histopathology at RMIT. “They’re also similar to us biologically, so they’re susceptible to similar conditions, including breast cancer.”

Breast cancer is the most common type in human and canine females alike. What's more, canine and human breast cancer have many similar features and risk factors.

“Like women, female dogs face a higher risk as they get older,” says Danks’ research associate and PhD student Kristi Milley. “And, just like humans, dogs carrying excess weight may be more susceptible.”

According to Breast Cancer Network Australia, the five-year survival rate for women with breast cancer was 89 per cent in 2010. This ostensibly good news leaves fewer human tumour samples for further research into diagnosis and treatment.

Since the early 2000s, pathologists have increasingly classified human breast cancer into five sub-types, based on their genetic makeup. This “sub-typing” helps researchers better understand tumour behaviour and develop more effective treatments.

However, sub-typing has not been extended to animal cancers in Australia. Treatment options for dogs with breast cancer remain limited, and the survival rate is low.

To address these issues for the benefit of humans and animals alike, Danks founded the Australian Veterinary Cancer BioBank at RMIT in 2010. The BioBank collects, registers and stores tissue for access by researchers around Australia.

“Dogs that aren’t desexed have a higher risk of developing breast cancer,” says Danks. “Fewer dogs in rural areas are desexed, so rural vets are our best source of tissue samples.”

Milley has developed a kit that keeps tissue DNA intact for up to 10 days. To date, vets have used the kit to send the BioBank more than 250 malignant and non-malignant tumour samples from across regional Victoria and southern NSW.

In addition to country vets, the BioBank has caught the attention of specialists like Melbourne-based veterinary oncologist Dr Charles Kuntz.

“Very few owners have pet insurance,” he says. “Realistically, they have to consider their finances in deciding whether they want you to treat their pet.

“To my knowledge, the BioBank is the only resource in Australia that will enable us to genotype animal cancers. This may help vets predict a particular animal's prognosis, so the owner can make a more rational decision about treatment.”

As a starting point, Milley is sub-typing canine breast cancers according to the five classifications now used for human tumours.

The BioBank aims to boost its canine breast tumour collection to 1,000 over the next few years. If funding allows, Danks and colleagues plan to expand the collection process nationwide.

The BioBank is also collaborating with researchers who have interests in improving the diagnosis and treatment of feline breast cancer and canine osteosarcoma (a type of bone cancer).

Breast cancer in cats is even more aggressive and deadly than breast cancer in dogs, while studying canine osteosarcoma could enhance knowledge of human childhood osteosarcoma.

Find out more: watch the video at www.rmit.edu.au/news/makingconnections
Nano-technology design, it seems, is already disappearing off the scale of human comprehension for many people. But this realm of ultra-tiny products and components, smaller than the human eye can detect, is no less important for that.

Even though the world of nano-technology is still in its infancy, it is already spawning revolutionary thinking about better ways to store and retrieve data, create “thinking machines”, and construct all manner of products that need less space, are more reliable, have greater capacity and offer new capabilities over previous generations of technology.

Helping lead the charge toward this nano-future are teams of dedicated researchers, including at RMIT, where plans are advanced to establish a multi-million dollar Micro Nano Research Facility to build on the record of RMIT's Microelectronic and Materials Research Centre. Due to open in early 2014, the facility will include advanced contamination-free “clean rooms”, specialised laboratories and almost 50 sophisticated tools to assist researchers in their design, fabrication and testing work.

The nano-research under way at RMIT has attracted the interest of many organisations, including the successful Australian developer and exporter of hearing implants, Cochlear Ltd.

According to Milind Raje, Cochlear’s Manager, Manufacturing Technology, nano-technology solutions are likely to offer benefits to miniature medical devices in future. “Basic nano-technology solutions are already implemented in a few medical devices,” he says.

“The implementation challenges are around material characterisation, safety and manufacturing scalability. Cochlear is watching research activities and new developments in this field with great interest, as are many other companies.”

Areas of nano-research already under way at RMIT include:

“Memristors” – nano-scale devices which offer variable resistance to electrical currents, store more information than silicon chips, and have the ability to “remember” even when turned off. They mimic the synapses of the human brain in the way they process information.

Flexible electronics – nano-scale “bendable” electronic components that can be inserted into tiny spaces, and twisted, compressed and stretched without damage – even made “elastic” in some cases.

Micro-scale energy sources – devices able to power themselves, and which are implantable into the human body when needed. These devices use “piezoelectric” materials around 100th of the width of a human hair, capable of generating power from any pressure applied to them.

Micro and nano-sensors – devices which cheaply and continuously sense and monitor biological and chemical processes.

These developments are all still in their infancy. With this in mind, researchers around the world are open to collaboration with colleagues in other institutions.

Dr Sharath Sriram (pictured), group leader of the Functional Materials and Microsystems Research Group at RMIT, recently won a Victoria Fellowship from the Victorian Government, enabling him to visit Ireland, France and Britain to meet research teams.

Sriram hopes his impending trip may help lead to a partnership with a leading instrument manufacturer to develop practical sensing devices, arising from the basic research undertaken already at RMIT.

“The potential for harnessing nano-scale effects and for new nano-materials and devices is enormous, but a great deal of further work is needed in the years ahead to realise that potential. International cooperation can help to move this along,” Sriram says.
Fiona Marsden meets young entrepreneurs using skills gained at RMIT to build vibrant businesses.

SINGULAR SUCCESS
A disappointing festival experience sparked Georgia Beattie’s entrepreneurial career. “After queuing for 30 minutes, I found the bar couldn’t serve wine, because it was too hard to do outdoors.”
Partway through a Bachelor of Business (Entrepreneurship), Beattie obtained the rights to manufacture a single-serve wine glass product in Australia and Asia. “The degree helped me develop a certain way of thinking, to identify and address market gaps.”

Founded in 2012, Single Serve Packaging produces a ready-to-drink, shatterproof and 100 per cent recyclable wine glass.
Beattie’s current focus is contract packaging. Treasury Wine Estates has adopted the concept for its Rosemount label, currently sold in Melbourne at Etihad Stadium and the MCG. Beattie has also expanded into Asia.

MOBILE MAESTRO
It’s your classic start-up tale. “I’m the guy who shops at the markets before dawn, helps with food prep, updates the Facebook page and serves customers into the night,” laughs Simon Williams, who founded White Guy Cooks Thai in 2012.
After a long career in hospitality and marketing, Williams wanted his own business. Bricks-and-mortar rents proved prohibitive, so he went mobile.
His truck does the lunch and dinner trade across inner Melbourne. “We aim for fresh, light flavours and ingredients. Customers shouldn’t feel ‘heavy’ after they eat.”
Williams completed an MBA in 2011. “Numbers used to terrify me,” he says. “Now I can look at a balance sheet and understand where my finances are at. It’s one of the skills I need most.”
When it comes to career direction, many of us try on a few hats before defining what we really want. Linda Vydra worked in a corporate organisation for a year, but found it wasn’t for her. “I’ve always enjoyed being creative,” she says, “and I really prefer doing my own thing.”

While completing a fashion diploma in 2010, Vydra created the Lydra fashion accessories label. She designs each piece and employs seamstresses to use yesteryear’s skills in a contemporary context. “Whether it’s retail or online, fashion is a tough industry,” says Vydra. She also runs Classic Wedding Invitations, which features her partner’s graphic designs. Longer term, she’ll reinvest part of the turnover back into Lydra, to help expand the label.

“I felt like a lost person in a dark tunnel.” That’s how Duong Thuy Linh describes her experience as a start-up entrepreneur and co-owner of Wabi Sabi restaurant in Hanoi. After working in a Japanese restaurant overseas, Linh and her husband saw a market gap for Japanese cuisine in Vietnam. Now, they operate three restaurants, employ 150 staff, and want to expand overseas.

“Fiona Marsden meets young entrepreneurs using skills gained at RMIT to build vibrant businesses.”

“Gut Instincts”

“‘I felt like a lost person in a dark tunnel.’ That’s how Duong Thuy Linh describes her experience as a start-up entrepreneur and co-owner of Wabi Sabi restaurant in Hanoi. After working in a Japanese restaurant overseas, Linh and her husband saw a market gap for Japanese cuisine in Vietnam. Now, they operate three restaurants, employ 150 staff, and want to expand overseas.

“I’ve learned to be patient and take baby steps in unknown territory,” says Linh, “yet go with my gut when the situation calls for it.”

Linh completed a Bachelor of Commerce at RMIT Vietnam in 2007. “I learned IT and presentation skills that aren’t yet common in Vietnam – skills that help me every day as an entrepreneur.”

High above Sydney’s Angel Place laneway, birdcages of all shapes, sizes and colours appear to be dangling from the sky, with the calls of more than 50 birds that differ as day transitions into night.

It seems a strange sight, and even more odd to hear the sounds of all these birds that were forced out of central Sydney by European settlement years ago.

The cages and calls are part of a highly popular public art installation, titled Forgotten Songs, by a group of Sydney artists – just one of many groups using public spaces to express and engage with their communities.

In Sydney, laneway art has become a cultural part of everyday life, a way to allow artists to be involved in their city.

“Laneway art has had a very large impact on the city,” says Claire Morgan, Special Projects Coordinator for the City of Sydney.

“It has opened a door for artists to be involved in the thinking and planning of the city – usually a space used by planners – and these programs allow artists to be in the space and part of its development.”

The programs Morgan mentions are ones that invite artists to contribute their ideas to the city and make laneways, which are otherwise seen as gritty or forgotten, into more hospitable and pleasant spaces.

Dr Tammy Wong Hulbert, a researcher in RMIT’s School of Art, has investigated the relationship between public spaces and visual artistic activity in central Sydney and central Melbourne, looking at how artists contribute to cultural environments.

A recent Public Art Panel member for the City of Melbourne, Hulbert found that Melbourne has been a leader of public art in Australia over the past 20 years, after the City recognised a community of artists hoping to work in the public realm.

“The City encouraged these activities through their public art programs and recognised that an increase in artistic activity would encourage a cultural economy,” says Hulbert.

She also found that many artists choose public spaces to display their work because it increases their ability to have a more direct relationship with the public and gives them an opportunity to comment on the community and society.

“Artists reach different audiences through working in the public realm,” says Hulbert. “Private galleries and museums have struggled in recent years with engaging with wider audiences, as the structure implies an elitist culture, but galleries and museums are making themselves more accessible through the increase of public and educational programs.”

And what would our cities be without public art?

Melbourne for one, Hulbert says, would be without the character that makes it so appealing. “It may possibly feel like a sterile environment with no personality, just another dull commercial precinct with no sense of a community’s existence.”

It’s a strong sentiment that is echoed by Morgan, who says that laneway art is important and essential to the sustainable life of Sydney.

“Creating that real sense of creativity and diversity are important for the city to have a more cultural life.”
The developers of Selandra Rise, at Clyde North in Melbourne’s outer south-east, are aiming to set a new standard for green field housing, with the earlier inclusion of many amenities and services that traditionally would take years to evolve.

Planned in partnership between property group Stockland, the Growth Areas Authority, VicHealth, the Planning Institute of Australia and City of Casey, the development has incorporated health and wellbeing concepts into its masterplan from day one.

These include multiple parks, walking and cycle paths, a community centre, embedded council services, affordable housing, local employment and an overarching focus on improving the health and wellbeing of its residents.

Funded by a VicHealth Fellowship in Residential Planning and Community Development grant, RMIT researcher Dr Cecily Maller is conducting a longitudinal study to assess the lived experience of the residents of Selandra Rise.

Currently moving into phase three of a five-year study, Maller and her colleague Dr Larissa Nicholls are interviewing families about their lives before and after moving to Selandra Rise. The aim is to discover whether incorporating health into urban planning from the outset positively impacts the health and wellbeing of residents over time.

“There are broad questions in the survey about health and wellbeing, about physical activities, stress, about their neighbourhood, childcare, all the things you would expect in the neighbourhood, their friendships with neighbours, participation in community events, volunteering and travel questions,” Maller says.

“What we are hoping to do is follow the changes in the neighbourhood as a whole and in each household, to evaluate a community planned and designed for health and wellbeing.”

Mike Davis, regional manager for Stockland, says the aim is to create a healthy, inclusive community. “We will be taking learnings from this study and putting them into our planning for future residential developments.

“The research has given us a deeper understanding of the growing community.

You find the first residents in typical developments are pioneers, who have no access to meeting places, council facilities and services in the first few years of settling.

“Providing early access to healthy features can help people to be physically active, help to maintain and create social networks and improve mental health.”

VicHealth CEO Jerril Rechter says she hopes Selandra Rise will lead other residential developers to make planning for health a normal part of their business.

“The City of Casey has officers located in Selandra Community Place (the community’s sustainable meeting and function hub) providing on-the-ground services and we are increasing the range of activities and educational touch points for residents all the time.

“The importance of health and wellbeing is something that often gets overlooked, but at Selandra Rise, health and wellbeing are at the forefront of planning. From a business perspective, it’s the right thing to do – we are creating a blueprint for future communities,” Davis says.

“VicHealth is interested in how planning and designing for health can prevent illness and promote good health, while also creating happier, friendlier, more liveable communities.

“Providing early access to healthy features can help people to be physically active, help to maintain and create social networks and improve mental health. It also makes the housing development more appealing for buyers, so it’s a win for everyone involved.”

Find out more: watch the video at www.rmit.edu.au/news/makingconnections
Emily Wright was still a student when she sold her first collection of bags and purses. Now, her accessories label Nancy Bird is sold throughout Australia and New Zealand and bought by celebrities.

Infusing influences from Africa, Japan and Central Europe, Wright creates a raw Australian product, made with Italian leather and hand-printed by Melbourne makers.

Wright was studying the way AFL footballers look when taking a mark – a pose strikingly similar to a ballet dance. At first, the project was named nancyboy, but ended by being a mix of nancyboy and dollybird, harking back to a '60s retro theme.

www.nancybird.com

Above:
Indigo Archie Wallet
Dream wallet for the super organised
Chocolate Lincoln Bag
Slouchy drawstring bag with soft tassels and printed details
Tan Wallis Clutch
A slouchy clutch with locally hand-printed linens on show

H.A.G.: MAXWELL AND WILLIAMS

The intern’s brief was to create a hand-painted collection – the final product is a fresh, contemporary floral dinner set, the Petal Pastiche.

Drawing on inspiration from spring florals, Tanya D’Souza used her textile design background and flair for hand-painted design to impress H.A.G. owner Max Grundmann enough for him to approve mass production.

After completing several internships while studying, including at Megan Park, Ink and Spindle, and with the design and trim team at Holden, D’Souza is now a design consultant with a Sydney studio.

www.maxwellwilliams.com.au
SIDE ONE PROJECT

The novel concept of 3D printing is no infant in the hands of Youssef Tayeb – it is a fully grown medium providing never-ending possibilities.

Combining digital modelling with 3D printing, Tayeb produces geometrically inspired forms, adapted to a wearable medium.

An industrial designer by trade, he draws on his expertise in rapid product prototyping to create limited edition jewellery designs, hand-finished in a tiny studio then gold-plated and infused with bronze and gold.

www.sideprojectone.com

ICON

Since winning the fourth season of Project Runway Australia in 2012, Christina Exie has launched ICON, her signature ready-to-wear label.

From a young age, Exie used her grandmother’s sewing machine to create clothes, before enrolling in a sewing class at age 13.

Using natural elements such as wool, cotton, leather and metal and with a focus on high-quality tailoring, Exie creates modern and sophisticated, exquisite-looking garments that are ready to wear.

www.christinaexie.com

POPPER LIGHT

Andre Hnatojka’s fascination with design has come a long way since building Lego blocks at five – he’s now an award-winning and internationally recognised designer.

Hnatojka’s Popper light was born as a stool and then reworked into an eco-friendly ceiling light.

Made from recycled aluminium and powder-coated in bioglaze to allow for safe re-recycling, it is created from a single convertible mould.

Through his design collaboration HNAK and LAB DE STU, Hnatojka is constantly experimenting to create products that are innovative, efficient and environmentally friendly.

www.hnak.com.au
With life on this planet becoming unsustainable for many of its species, including us, People and the Planet will explore human interaction with the planet across the integrated domains of culture, ecology, economics and politics.

Rather than focusing on technical solutions, the aim will be to work towards an imagined future, drawing on the insights of academia, community, urban government, business and industry.

People and the Planet is part of a larger process of rethinking sustainability across the world. Co-organised by the UN Global Compact Cities Programme and the RMIT Global Cities Research Institute, the conference will build on the recommendations of the 2012 Rio+20 Earth Summit’s corporate sustainability forum. It is also supported by World Vision and the UN-Habitat World Urban Campaign.

“We are responding to the contemporary challenges presented by the changing nature of sustainability under global conditions,” says Nevzat Soguk, Deputy Director of the Global Cities Research Institute. “The conference will take an integrated approach to creating capacities by which we can sustain our world to confront new challenges and opportunities.”

People and the Planet draws on engaged cross-disciplinary research in a wide range of areas. The 12 keynote speakers include Deborah Bird Rose, Joyati Das, Robert Manne and Brendan Gleeson.

— Pauline Charleston

Find out more: global-cities.info

RMIT DESIGN HUB

EXHIBITION » 17 JULY – 5 OCTOBER 2013

WALTER VAN BEIREndonck
Dream the World Awake

RMIT University presents the first major retrospective outside Europe of the work of internationally acclaimed Belgian fashion designer and visionary Walter Van Beirendonck within the iconic new exhibition spaces of RMIT Design Hub.

This daring and innovative fashion exhibition from the Antwerp Fashion Museum travels to Australia courtesy of the philanthropic leadership of Naomi Milgrom AO.

RMIT DESIGN HUB
CORNER VICTORIA AND SWANSTON STREETS, MELBOURNE
WWW.DESIGNHUB.RMIT.EDU.AU
This seems to have been the case when Peter Williams, Chief Edge Officer of Deloitte's Centre for the Edge, crossed paths with Associate Professor David Gilbert, of RMIT's College of Business, back in 2007. Gilbert had just moved to Melbourne following a successful career in engineering and business in Tokyo, and had taken on managing RMIT's undergraduate studies in entrepreneurship. One of his early priorities was to find ways to give students more immersion in the world of business.

“I wanted to get them beyond just preparing business proposal documents,” he explains. “One of the most important things students need is to get involved in understanding the ambiguities and uncertainties of operating in real business environments and finding ways to move things forward.”

Gilbert was introduced to Williams, based at Deloitte in Melbourne, who was also embarking on a path of renewal and re-invention of aspects of Deloitte's own business model in Australia.

The chemistry between them began to work almost immediately. The relationship between their organisations has developed to the point where Williams has become an Adjunct Professor, the consultancy firm is involved in workplace experience activities offered to students (including sponsorship of a $2,000 annual prize), and RMIT entrepreneurship students are often employed by Deloitte upon graduation.

“From our point of view, our students get a real dose of reality about what it takes to be a successful entrepreneur in business.”

Gerhard Vorster, Chief Strategy Officer for Deloitte in Asia Pacific, is now head of the industry advisory committee that advises RMIT.

Gilbert says both organisations retain the freedom to work with other organisations as appropriate, but they see their increasingly close relationship as fruitful.

“Credibility is important, on both sides. You have to understand what the other party needs to get out of the relationship, and seek to deliver that. From our point of view, our students get a real dose of reality about what it takes to be a successful entrepreneur in business.”

For Deloitte’s part, Williams says the relationship came together because he had some ideas ready to be tested and acted upon, and Gilbert had students who were looking for real-world experience.

“I had a raft of digital ideas and nascent business initiatives that needed passionate people to either put them through the wringer or give them some momentum. Initially it was an experiment, but after we saw the output from the students we realised we were onto something.

“We employed some of the students from the first year and the wonderful thing was that they took ownership of the program and were key to delivering it in following years.

“As the relationship evolved we’ve seen increased collaboration between Deloitte and RMIT – sharing thoughts and ideas with the Chancellor and Vice-Chancellor, embedding PhD students into our Innovation program and collaborating with researchers and academics across many disciplines.”

Williams believes the key to success has been that both organisations have focused on doing things and continually experimenting, without getting bogged down too much in process and bureaucracy.

“Looking back it’s hard to believe where we have got to, and personally I feel very honoured as an alumnus of RMIT to have been made an Adjunct Professor.”

**Chemistry of Success**

Story by Graeme Domm

Success in business is often about chemistry – chemistry between people that is. When the right people come together at the right time, with the right knowledge and skills and outlooks, what comes out of it can greatly exceed the sum of the parts.

Find out more: watch the video at www.rmit.edu.au/news/makingconnections
It is well known that our Pacific neighbours, Solomon Islands and Vanuatu, are vulnerable to natural disasters. Less well known is their vulnerability to recent food and fuel price hikes and the impacts of the global economic crisis, which followed the global financial crisis of September 2008.

The impacts of these economic shocks are on-going and negatively impacting on local households. The Australian Agency for International Development (AusAID), through its AusAID Development Research Awards Scheme, is seeking solutions to help these Pacific households.

With more than $394,000 over three years, RMIT has teamed up with Oxfam Australia, the University of the South Pacific and Deakin University to help find those answers.

By identifying the most vulnerable households and understanding the factors that contribute to household resilience, the research will provide policymakers and aid donors with crucial information to help target their interventions.

This knowledge will be particularly important for future economic development and possibly developing social protection programs.

The RMIT project team is headed by Associate Professor Simon Feeny, who is working with senior lecturer Alberto Posso and PhD candidate Lachlan McDonald, who is also an economist working at Oxfam.
Feeny says that to understand how households have been affected by these economic shocks, as well as how they respond to them, the research team conducted more than 1,600 household surveys (using smartphone technology), focus group discussions and key informant interviews in Solomon Islands and Vanuatu.

“The research team has found that recent increases in food and fuel prices have led to households finding it increasingly difficult to pay for other essentials such as school fees and health services,” he says.

“As a result, households have responded by sourcing more food from their gardens and the reef, as well as by increasing their income from the sale of food and other agricultural products in nearby markets.

“In response to higher prices, it is also common for households to purchase cheaper and often lower quality food.”

Feeny says that the findings from the research suggest that during difficult times, reliance on traditional support structures, such as friends, neighbours and extended family remains particularly important.

“The research also highlights the important role of women who provide a crucial safety net in Melanesian communities, being primarily responsible for the wellbeing of people in their own households as well as selling things in local markets when immediate cash is required,” he says.

“On account of these responsibilities, women are bearing a substantial burden of the adjustment to the impact of shocks, sometimes consuming less food, working more and travelling less.

“Information from focus groups also indicated that violence against women can increase during times of stress, exacerbating one of the most pressing social problems in these two countries.”

McDonald says using research to forge stronger links between academics and aid agencies like Oxfam can help make an important difference to vulnerable people and communities.

“Projects that combine the academic rigour of universities and the on-the-ground presence of aid and development agencies can shed new light on important social problems,” he says.

“The results from this research will be used by Oxfam to better target our programs and campaigns to support people in need in Solomon Islands and Vanuatu.”
Rough roads, hungry engines and bored kids made road trips of yesteryear noisy, uncomfortable affairs. Better surfaces, greener engines and iPods have delivered respite for drivers. Ah, the serenity.

However, reductions in traditional noise sources mean that wind sound and atmospheric turbulence stand out. The masking is gone. This is of increasing concern to car companies worldwide, particularly with the emergence of quiet, all-electric cars.

“In a carbon-constrained economy, technology advances can mitigate one problem only to reveal another,” says RMIT’s Simon Watkins (pictured). Professor Watkins and colleague Dr Mark Thompson have been collaborating with the Kia/Hyundai Motors research centre just outside Seoul, Korea, to address the puzzle of in-cabin noise.

A range of cars were equipped with sophisticated instrumentation equipment to measure wind speed including wind gusts, road speed and in-cabin noise. The research involved driving on a high-speed proving ground and similar measurements in a full-size aero-acoustic wind tunnel with subsequent analysis taking place at RMIT and at Kia/Hyundai.

“Computer modelling alone is not enough, physical testing in wind tunnels and rubber on the road is crucial in replicating realistic conditions,” says Watkins.

“The more we understand about the nuances of wind noise, and especially how noise gets affected by turbulence in the wind, the better we can refine the design of a vehicle.” Recommendations for design improvement generally focus on the car’s A-pillar, the vertical support adjacent to the windscreen – the part you wish you could see through but can’t.

“You could say it’s the usual suspect,” says Watkins. “The ergonomist wants the A-pillar to be transparent for good visibility. The structural engineer wants it to be strong, giving rigidity and crash protection.

“The aerodynamicist and acousticians want it to be streamlined to cut drag and wind noise. Whereas in the rain, it needs to perform like a gutter! It’s a conundrum of competing imperatives but the best designs will be a good blend of all aspects.”

— Paul Noonan

RMIT Europe opens its doors

RMIT Europe has opened in Barcelona – a coordinating centre for the University’s extensive and expanding education and research across the continent.

Find out more: www.rmit.eu

---

RMIT University
Making Connections
2013

---

18
Australian researchers and entrepreneurs are helping lead the way in developing civil applications. Australia is, after all, a country with great potential use for unmanned aircraft systems – with vast distances to map and patrol around its borders, and frequent encounters with fires and other events that create dangers for pilots.

RMIT is currently the only Australian university to teach the design of these systems, a situation boosted by the recent donation of a Javelin UAS fixed-wing aircraft by Ryan Vu, a graduate and founder of a local UAS business called ECV Aeronautics Pty Ltd.

The Javelin joins three other UAS vehicles, Bask Aerospace MR4 AeroDrones, allowing RMIT to extend its research into control systems, airborne sensing and performance in a range of civil applications.

It all sounds encouraging, but at the moment there is just one catch: safety regulations to allow routine outdoor flights are still being developed. So flights at present need to remain indoors.

RMIT researchers are helping industry and the Civil Aviation Safety Authority to develop appropriate regulations. This process includes risk modelling, the development of regulatory frameworks and further research to understand social issues associated with UAS use.

RMIT researchers are helping industry and the Civil Aviation Safety Authority to develop appropriate regulations. This process includes risk modelling, the development of regulatory frameworks and further research to understand social issues associated with UAS use.

The new Javelin and the Bask AeroDrones are proving useful platforms to support RMIT's research into safety, multiple sensor systems, aerodynamic analysis, and further development of advanced guidance, navigation and control systems.

Dr Reece Clothier (pictured), Deputy Director of RMIT's Sir Lawrence Wackett Aerospace Centre, says the MR4 drones provide a particularly safe and convenient test platform.

"We can only do flight testing indoors at present. But with the appropriate approvals in place, we hope to extend flying operations outside, and include larger and more capable fixed-wing platforms like the Javelin," he says.

"For now, the focus is on what we call small or micro UAS. These vehicles may have many potential applications in emergency services, farming, mining – even surf lifesaving.

"We're using these platforms to explore the key technical and operational challenges facing the industry. Ultimately, we expect the research will help the civil UAS industry realise its true potential in Australia and around the world."

RMIT researchers are currently designing and developing their own UAS vehicle as well, and this, they hope, will support more advanced research on UAS technologies and applications.

As potential practical uses for UAS vehicles come to be more widely recognised, it appears the time for this technology has arrived at last. Over the next few years – dare we say it – the sky's the limit.
To solve these problems, RMIT researchers have built a prototype for a new advanced gym machine, Smart Gym, a muscle diagnostics and exercise machine that records muscle data without any sensor (sensor-less sensing) and provides different training modes.

And being smart it also measures the current exercise state of a muscle group, indicates the onset of fatigue, adjusts the mechanical resistance automatically and is lightweight and portable.

It’s also a winner in that it prevents joint and muscle overload and injuries, provides real-time performance feedback, can be used on the playing field, is auto-powered, uses smartphones as a platform, and is far cheaper than standard exercise machines.

Smart Gym is the brainchild of Franz Konstantin (Tino) Fuss, Professor of Sports Engineering, and his co-inventor and Masters student, Robert Smith.

“The first sensors were analog, followed by digital sensors,” Fuss says. “What comes after digital sensors? No sensors at all.”

After having developed several smart and instrumented devices such as climbing holds and walls, ten-pin bowling balls, wheelchairs, cricket balls and AFL balls, Fuss is currently developing a biofeedback shoe without any sensors, in cooperation with the Australian company Rizmik.

“The principle can be applied to other medical and sports equipment and even to applications in daily life such as beds, car and aircraft seats, or military use,” he says.

“Everyday life will change significantly in the next decades with embedded and distributed sensors for ubiquitous and pervasive computing, connected to smartphones and iPads. The cheaper and the smaller the sensors are, the better it is. Having no sensors at all for measurement purposes is the best solution of all.”

Fuss, Editor-in-Chief of the Sports Technology journal, won second prize at the sports technology pitching competition at last year’s inaugural Australian Sports Technologies Network conference with the Smart Gym idea.

Fuss and Smith filed a provisional patent on the project last October and are now working with Australian Sports Technology Ventures (ASTV), which commercialises Australian sports technology, on finding investors for the project.
Getting older has its benefits: experience, wisdom, perspective. Paradoxically, just when we begin to “get it together”, our bodies start to slow down.

We are more likely to develop conditions like arthritis, osteoporosis, incontinence and breathing difficulties, all of which can cause broken sleep. Experts from the Sleep Health Foundation say our bodies also make less of the hormone melatonin, making it harder to fall asleep in the first place.

According to the Better Health Channel, sleep deprivation can cause fatigue, impaired concentration, mood changes and poor coordination. In particular, it can reduce deep sleep (also known as Stage 3 and 4 non-REM or “delta” sleep); potentially affecting essential repair and restoration processes.

Bureau of Statistics figures show that the proportion of Australians aged 65 and over rose from 11.1 to 13.6 per cent in the 20 years to June 2010, while the proportion aged 85 and over doubled from 0.9 to 1.8 per cent.

Those who become unwell or less mobile with age may not only be more prone to poor sleep, but forced to spend longer in bed.

“In this context, creating optimum environmental conditions may facilitate peaceful or restorative sleep,” says Associate Professor Rajiv Padhye, Director of RMIT’s Centre for Advanced Materials and Performance Textiles.

“A conventionally constructed and finished mattress can intensify a person’s body heat and push it back into their skin, causing perspiration. The resulting discomfort can disrupt restorative sleep.”

With funds from the Federal Government’s AusIndustry program, Melbourne-based bedding textile manufacturer Bekaert Australia has joined forces with Padhye and colleagues Associate Professor Lijing Wang, Dr Lyndon Arnold and Saniyat Islam to develop textiles and finishes for better moisture management and thermal regulation.

“Moisture management involves drawing any perspiration away from the skin, through the bed sheet and into the mattress fabric,” says Wang. “This maintains the person’s back at a comfortable level, so they don’t wake up perspiring.”

RMIT’s team will design and test a mattress and uppermost layer (known as “ticking”), along with a multi-layered removable mattress cover, for potential use in settings like hospitals and aged care facilities.

Bekaert has also asked the team to help make its existing bedding range more functional for the broader Australian population. This includes incorporating moisture management agents into mattress ticking; treating bed sheets with a durable anti-microbial finish; and embedding mattresses with a polymer-based “phase-change material”, which can absorb or release heat to keep the surface temperature more comfortable and constant.

With an annual $30 million-plus turnover, and more than 110 employees, Bekaert Australia has a large presence in the domestic market. “When it comes to basic products, factors like local wages and the high Australian dollar make it difficult to compete with overseas manufacturers on price alone,” says Managing Director Luc Deleu.

“To maintain our market leadership, we have to compete through innovation. Working with Rajiv, Lijing and their team means we can access specialist research and development expertise, along with state-of-the-art technical testing facilities that we don’t have in-house.”

The project is due for completion in late 2014. Bekaert will then consider developing prototypes for market testing, before commercialisation.

---

Find out more: watch the video at www.rmit.edu.au/news/makingconnections

---

RMIT UNIVERSITY
MAKING CONNECTIONS
2013

---

Story by Fiona Marsden

---

Sleeping soundly: Lijing Wang, Rajiv Padhye, Luc Deleu.
In Melbourne, Boeing Aerostructures Australia designs, tests and manufactures large-scale composite structures for Boeing commercial aircraft, including 737, 747, 777 and 787. It is co-located in Fishermans Bend with Boeing’s research and development unit, Boeing Research & Technology-Australia (BR&T-Australia).

The work being undertaken there to build moveable trailing edge components for the Boeing 787 Dreamliner is the country’s largest single aerospace contract, valued at $4 billion over 20 years.

BR&T-Australia collaborates with research and development organisations including RMIT University, where Professor Adrian Mouritz, his colleagues and 15 PhD students undertake research into advanced composites. Mouritz (pictured) says the work he and the RMIT research team are now doing for Boeing might be used in aircraft manufacture, servicing or repair in 10 to 20 years. “The composite technology in the Boeing 787 Dreamliner had to be proven more than 10 years ago. There are long lead times on both military and commercial aircraft,” he says.

“The chief breakthrough material technology on the 787 is the increased use of composites. The plane is 50 per cent composite by weight, including the fuselage and wings. This reduces not only the drag but also significantly reduces the amount of maintenance required.”

Mouritz says composite materials allow a lighter structure, which increases airplane efficiency, reduces fuel consumption and reduces weight-based maintenance and fees. “Composites do not fatigue or corrode, which reduces scheduled maintenance and increases productive time,” he says.

RMIT researchers are undertaking a number of futuristic research projects in advanced composites that may, in coming years, find applications on civil and military aircraft. Projects include the use of ultra-thin pins to increase the damage resistance of composites when unexpectedly hit by a small object, such as a bird, during take-off or landing.

Researchers are also developing ways of repairing composites quickly and easily in the event of damage, including the use of so-called self-healing. By mimicking the human body when it is hurt, such as a cut or abrasion, RMIT researchers have developed innovative ways of composites repairing themselves without human intervention.

Andrew Glynn, BR&T-Australia manager at Fishermans Bend, says the research by Mouritz and his colleagues into fibre reinforced polymer composites and other lightweight structural materials is part of the company’s continuous efforts to make aircraft bodies lighter, safer and more cost-effective.

“Professor Mouritz has carried out work for Boeing for five years and is one of the world’s leading independent researchers in his field. It’s a relationship that benefits both our organisations – giving Boeing access to innovative thinking and allowing RMIT researchers to work on projects with real, long-term pay-offs.

“As well as his composite research, Professor Mouritz’s efforts to create a pipeline for talented undergraduate and postgraduate students is vital to the future success of our industry here in Australia,” he says.
The young woman in the dock on prostitution charges had already packed much misery into her short life – abandoned by her parents and growing up living on her wits. But perhaps her greatest burden was having no teeth.

Traditional justice might have seen her plead guilty and rely on a lawyer’s eloquent plea for mitigation, with every player in the courtroom drama knowing it was just a matter of time before she would be back on a fresh charge.

But this woman was lucky. She appeared at Melbourne Magistrates’ Court on a Tuesday afternoon on what is known as the Street Sex Worker List, which aggregates cases involving sex workers from the red-light zone of the suburb of St Kilda.

The starting point for this cohort is to address health and welfare issues as quickly as possible, with police giving the women they arrest information on health services and referrals at the time of charging.

Welfare services attend the court on Tuesday afternoons and the young woman was provided with health, hygiene and dental services. The impact was remarkable.

Popovic says the proactive approach, attempting to divert offenders out of a cycle of recidivism, has paid off. “We have reduced the number of women charged with street sex work and can demonstrate quite significant health outcomes.”

It is initiatives like these that have informed the establishment at RMIT of the Centre for Innovative Justice, under the leadership of former Victorian Attorney-General Rob Hulls.

Hulls says: “Innovative justice is about new solutions to old problems, about shaping a legal system that acts as a positive, rather than a negative, intervention in people’s lives.”

The ethos has won friends in high places. Prime Minister Julia Gillard visited RMIT earlier this year to launch the Centre, saying: “This is a great university often at the cutting edge. I think the Centre will sit well here and make a real difference.”

Gillard used the opportunity to announce a $300,000 grant for the Centre, to fund research into how people who fall outside the Legal Aid safety net might be supported.

Popovic says her court is already lining up research projects that will benefit from the Centre’s support. “We’re looking at a mentor scheme between women magistrates and barristers. I hope the Centre will help set up and evaluate the program.”

Other initiatives include looking for cost-effective ways of delivering integrated justice programs and investigating how to build on the successful Koori Court experience.

“The Centre at RMIT will be an absolute boon to justice in this state, in particular to the Magistrates’ Court, where most of the innovation has been hatched over the journey,” Popovic says. “I can see a very long and fruitful collaboration.”

Find out more: watch the video at www.rmit.edu.au/news/makingconnections
Maxwell Smart, Agent 86, loved the Cone of Silence. The chief did not. A novel concept, poorly executed, delivered legendary comedy. Five decades later, a fresh concept – the FabPod – is serious business for practitioners and researchers in architectural design, acoustic design, computer-aided design and digital fabrication. The FabPod project has created a prototype meeting room for the open-plan office. While techniques for evaluating reverberation and absorption of sound are well developed, the diffusion of sound is a more emergent area of research. Researchers are investigating the sound-diffusing properties of hyperbolic surfaces, using a combination of digital modelling and mass customised computer numerical control prototyping. Ah, that old trick.

— Paul Noonan