CONNECTIONS

BIO INSPIRED
Aviation learns from the birds ... and the bees

SPACE INVADERS
Navigating the junkyard in the sky

BAND-AID SOLUTION
Nano-engineered fabric beats bacteria

RMIT UNIVERSITY
Over the past year, discussion about higher education has been dominated by funding models, budget settings and competing theories of regulatory frameworks.

Getting the right result for the sector matters, but regardless of the eventual outcome the core question remains – what is the purpose of universities?

To my mind, universities are designed to ask the tough questions of our communities locally and globally, to make sure that people think deeply around the opportunities and issues that we face.

To a large degree also, they are major engines of innovation, economic development and growth.

That’s why engagement with industry has always been central to the RMIT mission. It’s part of our DNA – in the design of our programs and courses, in the work placements and projects that our students experience, and in the lectures delivered by industry professionals.

And, of course, collaborating with industry partners informs so much of the research we undertake, research that asks those tough questions and delivers that economic development. Research with impact.

This magazine brings you a slice of that activity across RMIT – in science, engineering, health, business and design, in Australia and Vietnam.

I hope that you will be inspired by these stories of research and innovation and discover, as I do, glimpses of how we can collectively share fortunes and our shared future.

Martin Bean CBE
Vice-Chancellor and President
RMIT University
Introducing Martin Bean – see Page 23.

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Cover image: Using their own anti-turbulence devices – feathers – birds smoothly handle turbulent weather. Turn to Page 12 to read about how RMIT researchers are developing new aviation technology, inspired by nature’s solution to the problem.

Secondary infections are a potentially deadly complication for hospital patients. So imagine the importance of a new antibacterial fabric that could kill a range of infectious bacteria, such as E coli, within 10 minutes.

Antibacterial fabrics do not allow nasty disease-causing bacteria, like Staphylococcus, to stick to and grow on their surface – creating an infection-free environment.

The discovery could significantly reduce the risk of deadly hospital-acquired infections and revolutionise the way the medical industry deals with infection control.

The idea is now much closer to reality, thanks to RMIT nano-biotechnology researchers.

Associate Professor Vipul Bansal (pictured), who leads RMIT's NanoBiotechnology Research Laboratory team, says fabrics with the built-in ability to fight bacteria could relegate hospital-acquired infections to the sidelines.

“There is potential for special bedding, linens and surgical aprons on which bugs and bacteria do not grow, so we can maintain an infection-free environment in our healthcare settings,” he says.

“We may also have dressings and Band-Aids that can kill bacteria in the wound, resulting in faster healing. These will all have a major impact on the cost of the healthcare system.”

Bansal says the new antibacterial fabric will have important environmental and clinical applications. The next generation of smart textiles will be free from bacteria and odour and will have a range of potential applications, from putting an end to smelly socks to sporting gear and uniforms.

For the past year, Bansal and his team have been working with CSIRO scientists on the project. They found that organic materials with semi-conductor properties can have superior antibacterial effects over metal salts of silver.

“It has been known for 100 years that silver is anti-bacterial,” Bansal says. “Silver metal, when it comes into contact with body fluids, releases silver ions and these ions are actually toxic and have antimicrobial and antibacterial properties.”

Instead of using silver metal nanoparticles, Bansal and his team have developed a new material called silver-TCNQ, which releases silver ions very slowly for a long-term antibacterial effect.

In another project, the NanoBiotechnology Research Laboratory team is working with nano-particles of different sizes, shapes, compositions and surface coatings to test their ability to destroy bacteria. A nano-particle is between one and 100 nanometres (1 nm is 1,000,000 times smaller than a millimetre).

“The holy grail is to engineer the nano-particles so they become highly active against infectious bacteria, but they do not kill human cells,” Bansal says.

“Traditionally, silver nano-particles are more toxic than gold nano-particles, but our research has shown that silver can be made very safe for biomedical applications by controlling the surface chemistry of nano-particles.”

Bansal says the surface of the nano-particle is critically important because it is what first comes into contact with bacteria or human cells.

Meanwhile, RMIT has joined the world’s first interdisciplinary national wound research centre, the Wound Management Innovation Cooperative Research Centre.

Chronic wounds – which can take years to heal or never heal at all – cost the health system $3 billion each year and cause great emotional, physical and financial stress to more than 430,000 Australians.

RMIT’s initial research project with the centre, led by Professor Franz Fuss and Associate Professor Olga Troynikov, will design, develop and test prototype pressure-mapping insoles with bio-acoustic feedback for the management of diabetic foot ulcers and venous leg ulcers.
Most homeowners know only too well the sacrifice and savings poured into building their own great Aussie dream. But few would know about an environmental cost hidden behind every new home.
Construction and demolition waste accounts for about 1.7 million tonnes of landfill in Victoria alone every year. Given the State’s rapidly increasing number of housing developments, the problem is set to worsen.

RMIT researchers at the School of Aerospace, Mechanical and Manufacturing Engineering and the Centre for Design and Society turned their minds to solving this environmental issue by teaming up with industry leaders to develop a “zero waste house”.

Together with Burbank Homes and the Housing Industry Association, a research team led by Dr Enda Crossin helped develop a house that diverted more than 99 per cent of its construction waste away from landfill.

Crossin and his team investigated the underpinning reasons why different waste types were generated. They audited and measured types of discarded materials to determine how waste could be avoided.

Simple strategies such as reusing onsite surplus materials and minimising off-cuts were also employed to cut back on waste.

Crossin says the project, funded through Sustainability Victoria’s Beyond Waste Fund, started with examining the types of waste produced and how it could be reduced.

“The research aimed to firstly understand the amount, types and reasons for construction waste in a typical brick veneer house built in Victoria,” he says.

“Secondly, the research team wanted to investigate how much waste could be eliminated from a similar house, using participatory design techniques.

“Finally, we were interested in quantifying the environmental benefits of avoiding waste, including benefits from avoiding landfill and from reducing the need for raw materials.”

While decreasing building waste was the project’s top priority, it was also important for researchers to reduce associated environmental impacts. This included emissions created by the production and transport of unwanted resources and ultimately, waste disposal.

RMIT researchers worked with Burbank Homes to identify, implement and assess design and waste strategies targeted at reducing those environmental impacts.

Developing lean construction methods leading to low-waste production also had the benefit of streamlining operations in the construction industry, Crossin says.

“In addition to the environmental problems, onsite waste management is becoming an increasingly difficult logistical problem for the housing industry.

“The footprint of an average house relative to the block size is increasing, meaning that the space available for moving new material into, and waste out of, construction sites is becoming very limited.”

Developing alternative design and waste management techniques was the key to addressing construction waste problems. More specifically, the use of concrete bricks and half bricks contributed to a significant reduction in excess waste.

Of course, eco-design concerns had to be balanced with maintaining commercial viability of house design and construction.

Researchers shared their findings with Burbank Homes and hosted a series of design workshops to develop housing designs targeted at reducing waste generation.

“Following these workshops, Burbank built the new zero waste demonstration home, during the construction of which we ran some more audits to characterise and measure the waste types,” Crossin says.

The zero waste house was unveiled last year, marking an industry standard for sustainable house design.

Crossin says the research was so successful, it saw the reduction of waste in the average brick veneer house from about 9 tonnes to less than 50kg.

“The research highlights that simple design alterations and smart material management techniques can substantially reduce the amount of waste being generated from the construction of a new building,” he says.

“In addition, the research found that there were other beneficial outcomes from reducing waste onsite, such as improved site access and a safer site.”
Many of us log in to business websites every day without giving it a second thought. We provide our name, email and contact information so we can browse for bargains and have them delivered to our homes.

But do we really know or understand what those companies will do with that information once they’ve got it in their database? How many of us actually read all the fine print of the company privacy policy before clicking “I agree”? The risks are also real for the companies receiving the data. For the more than 96 per cent of Australian businesses that are small businesses, engaging in online activity can be complex and confusing.

Privacy is one of the areas that has the most potential to damage a business’s reputation if information is not used in the way the customer expects.

Emeritus Professor Margaret Jackson (pictured) and RMIT colleague Jonathan O’Donnell have worked with business, industry and government for the past three years, in a project mainly funded through the Smart Services Cooperative Research Centre.

Their research has led to the development of Simple Privacy, an online privacy policy generator that Australian small businesses can use free of charge via www.simpleprivacy.net.au.

David Watts, Victorian Commissioner for Privacy and Data Protection, has welcomed the initiative, saying it promotes openness and transparency about the collection and use of personal information by business organisations.

“This is an essential privacy requirement which, when done well, results in greater trust between the parties and in turn fosters healthy relationships between organisations and their customers, resulting in a more efficient economy.”

“I support any efforts that assist organisations to better inform themselves and users about good privacy practice.”

Jackson says privacy policy is an area that most small businesses know very little about.

“Any company that does business online needs a privacy policy, to let customers know how their information will be used,” she says.

“When we went to businesses and asked them where they got the privacy policy on their website from, some said they had gone to Amazon and just copied theirs. That just isn’t appropriate and can lead to problems.

“For a start, privacy policy needs to be tailored more specifically for the Australian jurisdiction. And if you’re not in the same line of business as Amazon, that type of policy won’t be relevant.

“Large companies have the money for specialised legal advice and this informs their policy.

“But small businesses don’t have those resources, and privacy policy is one of those areas where they think it’s a quick cut and paste to the website, problem solved, but that can leave them open to all kinds of trouble.”

O’Donnell says their research has found that people just don’t read privacy policies, and even when they do, they don’t understand it, and neither do most retailers.

“With Simple Privacy, companies just answer seven questions and an appropriate policy is generated. It’s free and is updated as legislation changes because it is centrally hosted.

“We found that customers don’t read privacy policies all the way through, and if they do, they don’t really understand them.

“They are usually incredibly long and complex documents that may not be legally compliant.

“But if a business is online, then its bank or credit provider will require them to have a privacy policy for their transactions and will have rules about how companies need a privacy policy that is compliant with federal regulations.”

Once Simple Privacy has generated the appropriate policy, an icon, link and short summary are provided to be added to the company’s website.
Lung disease, including chronic obstructive pulmonary disease (COPD) and asthma, is a leading cause of death in Australia. More than 13,000 people die from lung disease every year, 2014 data from Australian Bureau of Statistics reveals.

COPD also costs Australians more than $8.8 billion per year, mainly due to the high number of hospitalisations.

But researchers from RMIT’s School of Health Sciences aim to reduce the human and financial toll by developing new therapies to extend and improve the lives of people with lung disease.

Associate Professor Ross Vlahos (pictured left) specialises in COPD, which includes chronic bronchitis and emphysema.

His work is inspired by a family connection to lung disease and a lifelong interest in lungs. “My grandmother died of lung cancer when she was in her sixties and she never smoked.

“I want to try to find a therapy that can help people with chronic lung diseases, in particular COPD.”

Most COPD patients smoked at some point in their lives, so Vlahos’ research focuses on cigarette smoke-induced lung inflammation and damage. These patients are also susceptible to related illnesses, known as co-morbidities, and exacerbations triggered by respiratory infections.

“Current therapies are largely ineffective in COPD, hence there’s a need to identify novel therapies that can treat people with COPD, their exacerbations and co-morbidities,” he says.

Vlahos and fellow RMIT researcher Associate Professor Steven Bozinovski (pictured right) have joined forces with researchers at the Lung Health Research Centre (University of Melbourne) as part of a three-year, $720,000 study funded by the National Health and Medical Research Council to develop new therapies for COPD patients.

Finding a drug to treat lung inflammation suffered by COPD patients is key to boosting lung disease survival rates. This research is focusing on uncovering the reasons why inflammation in COPD-effected lungs fails to be effectively controlled.

“The only effective way of preventing COPD is by quitting smoking. However, inflammation can persist and continue to damage the lungs even once individuals have stopped smoking,” Bozinovski says.

“People with COPD are repeatedly getting hospitalised as a consequence of respiratory infections, and when they get a respiratory infection they are much worse off in terms of health outcomes. They are also more vulnerable to pneumonia.

“We want to improve the patients’ immune system so they can better protect themselves against respiratory infections.”

Bozinovski’s research also explores the link between COPD and lung cancer.

“We’re really interested in understanding how COPD leads to increased risk of developing lung cancer,” he says.

This work is complemented by the ongoing research of Professor Charlie Xue, who has analysed COPD and hayfever for almost 20 years. His focus is Chinese herbal medicines and acupuncture.

Xue’s studies with ginseng have showed promising benefits in the treatment of chronic lung disease.

“Ginseng has been a key herb in treating lung disease because it has anti-inflammatory effects and improves symptoms associated with chronic lung diseases,” he says.

“Natural products including Chinese herbal medicine continue to be an important source for new therapeutic development. In addition, ginseng has an excellent safety profile in clinical use for the treatment of chronic lung diseases.”
This year more than 128,000 Australians will be diagnosed with cancer, and the Cancer Council predicts that figure will rise to 150,000 by 2020.

But the good news is that medical advances are improving every year. Thanks to new therapies and early detection methods, the survival rate for many common cancers has increased by 30 per cent in the past two decades.

Physicist Stephanie Keehan is among Australia’s scientists researching new techniques to reduce the risk of secondary cancers. She is investigating radiotherapy techniques to ensure cancer patients receive the best treatment available.

“My research looks at high-energy treatments that might have some contaminant particles which would produce more radiation than expected,” she says.

Thousands of cancer patients rely on the latest in radiotherapy technology to help them fight the disease and to relieve pain and discomfort. However, some radiotherapy devices need fine-tuning to ensure optimal levels of radiation are being administered to patients.

“Contaminant particles in high-energy treatments means patients would be exposed to radiation in their healthy tissues, which may result in complications in recovery later on,” she says.

Keehan has partnered with the prestigious Melbourne cancer hospital, the Peter MacCallum Cancer Centre, to study radiation machines and radiation delivery.

She works side-by-side with the centre’s physicists and much of her study must be done after-hours when patients are not using the machines.

“Patients get first priority, so I spend a lot of time after-hours setting up and testing the machines,” she says.

Findings from Keehan’s research will be used by Peter MacCallum staff to evaluate whether the benefits of certain advanced high-energy radiation treatments outweigh the risks.

Style was at the heart of sixties and seventies architecture. Now Anthony Ziem’s challenge is to add sustainability to that heart.

He works with the City of Kingston in Melbourne’s south-east to retrofit old council buildings – from libraries to public toilet blocks – to improve sustainability and energy efficiency.

“I manage just over 200 buildings with an average age of 50 years, which were built in an era when sustainability wasn’t important,” Ziem says.

Ziem has undertaken his research while continuing in his role as Team Leader Facilities Maintenance at the City of Kingston.

His work has found that older buildings are costing councils vast amounts in energy bills. Combined with maintenance expenses, these ageing facilities can become money pits.

To modernise these buildings, councils hire consultants to design environmentally friendly additions, but the consultants will specify only technologies they are comfortable with. In extreme cases, some buildings are simply demolished to make way for contemporary constructions.

Through his research, Ziem aims to help the City of Kingston and other councils to reduce their carbon footprint by identifying the best technology for green retrofitting.

“The ultimate objective is to help councils that are in the same situation as we are at the City of Kingston,” he says.

The challenge for Ziem is to find the right technology to bring older buildings up to speed with current sustainable standards. To make the biggest eco-friendly impact, this technology must be retrofitted strategically, he says.

“It’s about finding the correct technology and how to implement that in the right sequence,” he says. “It’s also about finding a balance between being green and saving money.”
Each year, hundreds of Australian landowners donate part of their properties to revegetation projects. These land parcels protect Australia’s biodiversity, provide habitat for native wildlife and offset carbon emissions. So are these environmental benefits the sole reasons why landowners donate their land?

RMIT environmental researcher Nooshin Torabi is investigating the social and cultural motivations that prompt landowners to participate in revegetation schemes.

“I’m looking at why landholders put part of their lands with no financial incentives into 100-year agreements,” she says.

“The result can inform policymakers and will look at ways to increase landholder participation rates in biodiverse carbon planting schemes.”

Through a partnership with not-for-profit organisation Greenfleet, Torabi has interviewed 17 landholders and 14 shareholders. So far, her research has found that landowners are driven by increased land productivity and biodiversity value.

Greenfleet has overseen 400 revegetation projects across rural and urban areas of Australia since it started in 1997. Land parcels of more than 20 hectares are planted with a variety of native trees at no cost to the landowner. Land is donated voluntarily and in some cases the Federal Government pays landholders for carbon offsets.

Torabi says her research explores various elements that are involved in landholders’ decisions to participate in such practices including their socio-cultural drivers, the characteristics of a program and financial incentives offered.

“I developed a model including different options for permanence, so not just 100-year agreements, and various incentivising alternatives to give landholders more flexibility and adaptability for their businesses,” she says.

Natural history museums provide information about the world, but for Sarah Edwards they are so much more.

In a partnership with Museum Victoria, she is researching how understandings of natural history can inform contemporary art practice.

Her project aims to produce artworks dealing with transformation and wonder in the construction of knowledge about the natural world.

“In keeping with my aims, my research asks, ‘In what ways can I appropriate museum processes involved in specimen preparation to generate artworks that transform nature, evoke wonder and reconnect us with the natural world?’,” she says.

“It seems so simple, but believe me there is a lot to unpack in this pithy question.”

Entitled The Museum Hummingbird: Transforming Nature, Creating Wonder, Edwards’ project involves first-hand experience with the museum’s vast animal collections.

Working directly with museum collections has brought invaluable authenticity to her art, she says. “The project has been challenging, complex and fascinating in unexpected ways,” Edwards says.

“Bridging the contemporary world of empirical science and natural history museum practices, with that of a conceptual art practice and pre-enlightenment ideas relating to the natural world, has challenged and pushed my project in directions I didn’t expect.

“These new directions include engaging notions of wonder and transformation through the use of light and sound that have opened up new ways to think about and create artwork.”

FIND OUT MORE

Watch the videos at www.rmit.edu.au/makingconnections
Historically, salt has been removed from water by boiling it to leave salt deposits, then condensing the resulting steam (vapour) back to water (liquid). However, this method is very energy-intensive.

Over the past 70 years, salt has been removed from water by filtration, which is a lot simpler and more energy-efficient. The salt water is filtered through membranes to remove the salt ions via a reverse osmosis process.

Now, an alternative water desalination and irrigation system is under development.

“We are researching a sustainable and economical freshwater management system based on clean thermal energy,” says Dr Abhijit Date (pictured) from the School of Aerospace, Mechanical and Manufacturing Engineering at RMIT.

The system uses a special thermal water pump – developed at RMIT and the University of Pune, India – which is driven by low-temperature thermal energy rather than grid electricity.

The freshwater management system could be used to greatly benefit coastal areas of India and salt-affected farming land in Australia.

“There are many poor coastal communities in India where access to fresh water is an issue, but they cannot afford to use standard power-hungry desalination and irrigation systems,” Date says.

“The desalination and irrigation system we are developing is both cheap to run and sustainable, producing no greenhouse emissions.

“Not only could this system help many coastal communities, it could also enable saline groundwater to be turned into fresh water and used for agricultural irrigation – helping farmers in Australia and globally.”

The system runs on clean power sources – such as solar thermal, geothermal or waste heat – and generates both fresh water and water pumping power, using thermal energy at temperatures below 100C.

It works by boiling a refrigerant at constant temperature and using the pressurised refrigerant vapour to power a piston and pump water out. To suck water in, the vapour is cooled down, reducing the volume, pushing the piston in the opposite direction.

Date and his team have already built a lab-scale prototype of the thermal water pump system, with early tests showing the system can produce 1000 litres of fresh water from 2000 litres of saline feed water with a salt concentration between 5000 and 15,000 grams per cubic metre.

“We have a good working prototype, so the next phase is to optimise the technology for use in the field,” he says.

Fresh water, there’s nothing quite like it – clean and pure to drink and grow food with. But if you live in an area that is salt-affected, you need to remove the salt before the water can be used.

STORY BY
DEBORAH SIPPITTS

GLOBAL UNIVERSITY OF TECHNOLOGY AND DESIGN
Somewhat confused by rapidly evolving “cloud computing services”, what they offer, and what they mean for data security and privacy? A recent RMIT survey shows you’re not alone.

The survey, an initial phase of a broader project commissioned by the Australian Communications Consumer Action Network (ACCAN), interviewed IT and non-IT savvy consumers, along with service providers and consumer advocacy groups, to find out about knowledge, use and expectations of public personal cloud services (those accessed through the internet, rather than closed private infrastructure).

“We found that the main benefit from the consumer’s point of view is mobility,” says Associate Professor Alemayehu Molla, who is leading the project along with co-investigators Associate Professor Vanessa Cooper, Dr Ahmad Abareeshi and Dr Siddhi Pittayachawan. “You can access your content on any device with an internet connection.”

The consumers surveyed also identified real and perceived issues including data security, privacy and ownership, and the need for robust consumer protection.

At the same time, says Molla, consumers’ actual behaviour may not always mirror these concerns. Many don’t read, or fully understand, the terms and conditions of cloud products. Consequently, they don’t know all the potential risks – or the precautions they should take.

Pricing models may contribute to this lack of understanding. Most personal cloud services offer a “freemium” model. Dropbox and iCloud, for example, offer a free service up to a certain storage capacity, with the option to buy more storage.

“Why would providers offer storage for free?” asks Molla. “They are not in the charity business. They exist to maximise shareholder value. Freemium pricing may attract customers, but perhaps there is also value in the metadata that customers are leaving behind.”

According to Molla, consumers may not fully realise that storing or sharing information via the cloud can help service providers build a picture of their preferences and needs, and potentially use this to target paid advertisers.

“In India, we are looking to work with an industry partner to help remote farmers use the system with solar panels, for a reliable source of power and freshwater for irrigation,” he says.

The project is supported by a $132,000 grant from the Australia-India Strategic Research Fund, an initiative of the Department of Industry and Science.

“The success of this project will provide a much-needed alternative system that can be manufactured in Australia and provide opportunity for industry development, employment creation and export,” Date says. ■
Birds of prey hover effortlessly while buffeted by wind. How they do it can teach us how to build better aircraft, as Kate Jones explains.
Nerve-rattling turbulence could be a thing of the past, thanks to new research. Based on the ingenuity of feathers and the way birds use them to detect disturbances in airflow, RMIT researchers hope to make flights smoother.

Flight systems that mimic how feathers help birds adjust to differences in airflow have been studied by RMIT’s Unmanned Aircraft Systems research team, in an effort to minimise flight turbulence. The team has based its studies on the concept of phase-advanced sensing, in which airflow disturbance is sensed before it results in aircraft movement. This is achieved by early detection of the pressures from gust effects on leading parts of plane wings or by measuring the gusts ahead of the wing.

Researchers, led by Professor Simon Watkins, have lodged a provisional patent on this innovative turbulence mitigation system. Encouragingly, tests on a micro plane showed the system significantly reduced the effects of turbulence. These successful tests have led researchers to be optimistic that similar strategies could be used for larger planes.

“We are pretty sure it will work on larger planes since turbulence is most challenging for the smaller ones – and we have demonstrated that we can make it work for lightweight micro planes,” Watkins says.

“The patented methods of minimising turbulence on aircraft can be used for small and large planes, minimising the motions associated when flying at low altitude – especially take-off and landing for passenger craft.”

Watkins says reducing turbulence has the potential to change the future of the aviation industry significantly.

“It could lead to smoother flying experiences and perhaps even reduced ticket prices since the concept may result in less stress on wings.

“Material fatigue is dependent on dynamic loading and if you can safely extend life, planes can fly for longer before they get retired, potentially reducing airline costs.”

Solving the problem of turbulence and how it is managed by moving objects has long intrigued Watkins.

“I have been thinking about the problem and possible solutions for several decades, as I have been flying small radio-controlled models since my teenage days.

“Even then I used to wonder how I could stop them getting perturbed by wind gusts.

“My very small gliders used to roll around a lot when I was flying them from windy slopes and I found my somewhat delayed reactions, when added to the time delays in the control system, meant that corrections were happening too late.

“Too large and too late – a classic over-control issue.”

The same advanced strategies used to stabilise turbulence in aircraft could also be used in cars. Watkins says minimising wind noise in cars would improve passenger comfort.

“A hot topic for passenger cars is wind noise and how it becomes more annoying to humans when it fluctuates.

“Some of my research conducted in this area was done in Germany at Stuttgart University where we instrumented Mercedes Benz cars by fitting our probes through a hole which we drilled in the car roof.

“We showed the link between the turbulence and sound fluctuations inside the car. Interestingly, a modulation frequency of four hertz (cycles a second) is typical when driving through atmospheric turbulence, and humans find this distracting since it is about the frequency of syllables in speech unless you talk really slowly.”

PhD student Abdulghani Mohamed, supervised by Watkins and Dr Reece Clothier in RMIT’s School of Aerospace, Mechanical and Manufacturing Engineering, has contributed to the success of this pioneering research.

Findings from their research have been published in the prestigious aerospace journal, Progress in Aerospace Sciences.
When awestruck onlookers introduced America’s most popular comic book hero with the words: “Look! Up in the sky! It’s a bird. It’s a plane. It’s Superman!”, no one had heard of drones.

But drones, or unmanned aerial vehicles, are now being used in military operations by an estimated 50 countries worldwide, as well as globally for civilian surveillance and information-gathering.

Since drones have become widely used, 21st century innovators have been working hard to refine them, make them more versatile and more adaptable to weather conditions, and to find ways to power them more efficiently (without the use of kryptonite, of course!).

One such innovator is RMIT’s Dr Sridhar Ravi, who is building on research undertaken at Harvard University to establish an Animal Flight Lab.

But drones are only one possible application of the work on which Ravi is embarking. His interest in biomechanical engineering (the intersection of biology and mechanical engineering) blossomed after completing his doctorate in engineering at RMIT.

At Harvard, he worked in the Department of Organismic and Evolutionary Biology, applying his engineering skills to examine how natural systems and organisms evolve and operate, and how some of their features can be applied to man-made systems.

Experiments at Harvard focused on the flight of the bumble bee, as well as on birds such as hummingbirds.

“With bumble bees, we were startled at how well they were able to fly because we were posing quite difficult challenges to them (such as placing them in a wind tunnel with some turbulent and some smooth wind patterns),” Ravi explains.

“But they seemed to have no trouble maintaining their flight path in a windy environment and to have devised a number of strategies, such as a rolling motion, to control their flight.”

Ravi’s team in the RMIT lab will explore sensory motor control as well as flight. “We are asking: How is an insect brain, which has only a few thousand neurons, able to process this complex world around them?” Ravi says.

“If we get insight into how such a small neuro infrastructure is able to solve these complex problems, we can at some point potentially apply these principles to tiny computing devices and high-powered micro computing systems.”

The team has already welcomed a couple of beehives to RMIT’s Bundoora campus and Ravi is looking forward to future experiments, based within the School of Aerospace, Mechanical and Manufacturing Engineering.

“The environment that bees usually forage in is incredibly complex: there are obstacles everywhere,” he says.

“But current drones are incapable of navigating cluttered environments. They can fly a few hundred feet above the ground with no obstacles in their way and they can fly straight, but that’s it.

“So a simple experiment is trying to build artificial obstacle courses or mazes to see what parameters the bees depend on, such as visual patterning.”

Ravi says that in one recent experiment, it was discovered that when a bird lands, it is looking at a black and white palette and working on the contrast. Colour is not a factor.

“So, if you’re making a drone to mimic that, you don’t have to build in information on colour and you are reducing the infrastructure the drone needs,” he says.
With his desk covered in an array of 3D-printed objects, Professor Milan Brandt (pictured) knows the power of visuals in explaining the potential of additive manufacturing. But it’s the most nondescript item in his arsenal – a small grey lattice-like structure – that is actually the most intriguing.

Made from a titanium alloy, the piece is designed to replace cancerous bone removed in surgery. Brandt is collaborating with Australian surgeon Professor Peter Choong, using patients’ own CAT or MRI scans to generate exact 3D-printed replicas of the bone removed.

The lattice structure mimics the density and weight of human bone, enabling the implant to carry blood and encouraging healthy bone to grow into it.

“What we’re working towards is patient-specific implants that can be manufactured in real time, as an osteosarcoma patient is on the surgical table, with a hospital’s own 3D printers,” Brandt says.

“For a surgeon to simply slot in the precise shape that has been removed would be a revolutionary advance on current solutions using clunky metal frames and bolts.”

The research team, including PhD candidate Darpan Prakash Shidid and senior lecturer Dr Martin Leary, have lodged a patent for the bone implant technology, with animal trials set to start this year and human trials to follow.

Shidid’s role in the research on patient-specific orthopaedic titanium implants has already been recognised, winning him the best presentation award at the 30th Titanium Conference and Exhibition in Chicago.

He was given the opportunity to present at the conference after winning the graduate prize in the 2014 CSIRO Titanium Challenge, sponsored by CSIRO, Boeing, the International Titanium Association and Coogee Chemicals.

The biomedical innovation, which uses selective laser melting – where three-dimensional metal objects are printed layer by layer from a computer-aided design file – is one of a range of 3D printing-related projects at RMIT’s Centre for Additive Manufacturing.

The focus is on design and novel materials, with the centre’s 18 researchers bringing diverse approaches to the challenge – from industrial design to bioengineering and materials science.

And in the $25 million Advanced Manufacturing Precinct at RMIT, they have access to leading-edge metal and polymer 3D printing technologies that can bring their ideas to reality.

“For us, it’s about developing new IP,” says Brandt, who is Technical Director of both the Centre and the Precinct. “If you’re simply using all that technology to print things, no matter how intriguing, you’re not adding value. “We’re not just printing components for companies – our focus is research. What we do is bring research and equipment capability into this space that industry doesn’t have.

“Additive manufacturing and 3D printing are still emerging as technologies but they’re clearly not going away. We hope the new products and processes that we are developing can broaden their horizons and help industry become more globally competitive.”

STORY BY GOSIA KASZUBSKA
When Beijing’s National Aquatic Centre, also known as the Water Cube, was being built for the 2008 Olympics, there were thousands of construction workers employed to realise its striking and unusual design.

Inspired by soap bubbles, it was made out of asymmetrical pieces of a material called ethyl tetro-fluoroethylene, or ETFE, which is 1 per cent the weight of glass. Uniquely-shaped joining nodes were needed to put together 3065 bubble-like pneumatic cushions of all sizes. And the thousands of connection nodes were welded onsite with machinery in a costly and cumbersome operation.

But imagine if those nodes could have been created on a 3D printer and run off at the push of a button?

That is the aim of a project run by RMIT’s Spatial Information Architecture Laboratory (SIAL), working with construction industry partner Arup.

The team has been working on a project called SmartNodes, which has created a model of a pavilion structure that incorporates a series of connection nodes, each with their own customised geometry. The nodes were created on a 3D printer, using stainless steel. The network of 180 nodes was used to join 207 standard construction beams and fixings to create a complex pavilion.

Associate Professor Jane Burry, an architect, described the project as “future gazing” into a world where more adventurous designs and construction projects could become reality. “It means we can look at advanced architectural geometry and ‘crazy forms’. The goal would be that you would have more geometric freedom in all sorts of buildings.”

SIAL worked with RMIT mechanical and structural engineers and collaborated with Kristof Crolla, from the Laboratory for Explorative Architecture and Design.

“We are using technology to find simple ways to build complex architecture,” Burry says. “Historically, architects and engineers worked rather differently and had different equipment and techniques, but there is a lot of technology now that is bringing us closer together.”

RMIT has been a leader in the field of advanced manufacturing technologies, creating a $25 million Advanced Manufacturing Precinct.

And the field of 3D printing is evolving rapidly. Metal printing has so far been used for small parts such as medical components and implants. “You can see the usefulness of it there in terms of bodies – everyone has a different knee. When you want to make custom implants there is a lot of opportunity there,” Burry says.

SmartNodes is about using metal 3D printing for much bigger projects such as construction.

“Every node is unique – it will have a slightly different loading requirement, different angles and different loads and types of structures. At least 15 per cent of weight of structure is usually in the node rather than the beam. It is significantly lighter with these 3D printed nodes. And if you save on weight you are also saving on other things like the foundations,” Burry says.

The team would like to expand to look at testing other types of metals and different processes. “The potential in architecture and construction is great. This technology could be used in sports stadiums, cultural buildings, big assembly spaces, outdoor music pavilions or anywhere where you are interested in using irregular non-repetitive structures,” Burry says.
Manufacturing has helped society leap forward at an astounding pace. But advanced manufacturing offers changes unheralded in scope and scale.

RMIT’s Professor Ma Qian (pictured), Professor of Advanced Manufacturing and Materials and Professor of Design, Multifunctional Structures, is engaged in creating that future.

He says the hallmarks of advanced manufacturing are increased freedom of design, much-reduced lead time, comparable, improved or novel properties, reduced energy consumption and improved cost-effectiveness.

“Most conventional manufacturing technologies we are familiar with today used to be advanced manufacturing technologies,” he says.

Perfecting advanced manufacturing techniques so they are better than any other comes with its challenges. But overcoming problems to produce efficient and vastly improved innovations is a hurdle that advanced manufacturing experts relish.

“The challenges I have enjoyed are using or creating the required fundamental knowledge to manufacture defect-free materials or components with desired properties, or to turn the unavoidable defects into a useful feature of the finished products,” Qian says.

“This has been and will continue to be a multidisciplinary activity. It often takes decades of effort by many teams in the world to perfect a technology.”

With so many exciting possibilities that span such a wide variety of industries, 3D printing is a priority focus for researchers at RMIT’s Centre for Additive Manufacturing, of which Qian is Deputy Director.

The centre innovates and researches fundamental and applied aspects of additive manufacturing technologies, material science and processes in partnership with Australian companies to make them more competitive in global supply chains.

RMIT has a long tradition in developing and transferring advanced manufacturing technologies to industries. The University has invested $25 million into this field in the past five years, with its Advanced Manufacturing Precinct housing a wide range of state-of-the-art advanced manufacturing facilities.

RMIT researchers have developed impressive advances in composite materials, titanium materials and medical implants. Medical manufacturing in particular is an emerging strength with the design, development and manufacturing of new biocompatible and biomimetic materials for implants.

Qian and his team are working on four projects funded by the Australian Research Council, which all focus on the design and advanced manufacturing of metallic materials and structures for various applications.

The first involves the design and fabrication of biocompatible titanium-tantalum based alloy for bone implants. The second is centred on the fundamentals of grain nucleation and formation during metal solidification, including solidification under electron beam or laser melting conditions.

Developing a cost-effective advanced manufacturing process to produce intricate titanium components using inexpensive titanium powder is the focus of the third project.

Finally, the fourth project investigates how the coating procedure of long steel strips can be done at an increased level of quality, productivity and cost affordability. These projects involve close collaboration with three Australian companies.
In the most remote parts of Australia, there are no high schools or long-term, face-to-face training and employment opportunities. In Xenia Girdler's words, with beauty and remoteness comes harsh reality, where locals struggle to access what many in large cities take for granted.

Girdler coordinates Vocational Alcohol, Other Drugs (AOD) and Mental Health studies at RMIT. Four years ago, she began working with leading Aboriginal health provider Sunrise Health Service, which operates 10 community health centres in remote communities east of Katherine in the Northern Territory.

In an effort to make vocational education and training accessible to people living in such remote areas, Girdler contextualised nationally accredited training programs to deliver a Diploma of Community Services (AOD and Mental Health) and a Certificate IV in Alcohol and Other Drugs for Sunrise and other health agency staff.

Sunrise Health's Business and Operations Manager, Dale Campbell, has worked with Girdler and RMIT since the beginning. Campbell stresses the importance of delivering tertiary level qualifications in Australia's most isolated centres.

"A meaningful qualification provides an opportunity for individuals to get high-paid jobs and become self-sustainable," he says. "A number of people who work at Sunrise may never have had this opportunity. The sky is the limit for them now."

RMIT’s strong reputation in the Northern Territory reflects a new way of engaging with industry partners to deliver vocational training in remote communities. Campbell says the partnership has not only been beneficial for individual students, but shows a wider community plagued by economic uncertainty what can be achieved with further education.

"Sunrise knew we were working with a high-quality organisation, prepared to listen and work with us to accommodate a number of difficulties and challenges,” he says. “We expected nothing less.”

More than 3000 kilometres from RMIT’s campuses in Melbourne, Jocelyn Dhu began her Diploma in Community Services in Katherine – almost 19 years after leaving high school. Jocelyn says none of her previous studies compared to the RMIT program.

“The lecturers were amazing. I gained more knowledge from them than I ever would from a textbook,” she says. Today, having obtained an RMIT qualification, Dhu is considering an undergraduate degree and is on the path to becoming a casual employee at RMIT, something she never thought she would be able to do.

At its core, the curriculum Girdler developed is practice-themed, taking into account the diverse experience each individual brings into the program. Like Dhu, her students are mostly mature age and working in the community services sector.

Despite the flexibility on offer, the program brings unique challenges with its success. Girdler and her team of teaching staff have spent most of the last four years travelling between the most isolated corners of the Northern Territory. She estimates that the group has covered more than 100,000 kilometres to deliver the qualifications. But Girdler does not dwell on the challenges. Opportunities now exist to expand education and research beyond Katherine to other remote communities.

“Sunrise knew we were working with a high-quality organisation, prepared to listen and work with us to accommodate a number of difficulties and challenges,” he says. “We expected nothing less.”
There’s a quiet green revolution taking place at RMIT in Melbourne, where a $98 million urban sustainability project – the biggest of its kind in the southern hemisphere – is underway.

The Sustainable Urban Precincts Program (SUPP) will drastically cut greenhouse gas emissions, water and energy use.

Electricity use over the next eight years will be cut by an estimated 239 million kilowatts, leading to a 30,000-tonne reduction in greenhouse gas emissions.

Water use is also expected to drop by an estimated 68 million litres.

The project is spearheading the University’s push to take a leading role in urban sustainability.

RMIT Chief Operating Officer Steve Somogyi says the University is committed to demonstrating leadership excellence in sustainable design and innovation.

Transforming RMIT’s environment to create sustainable and resilient cities is integral to this strong commitment, he says.

“It is our vision that our campuses will be integrated with the cities in which we operate, contributing to urban sustainability and culture,” he says.

Infrastructure upgrades will be introduced to create world-leading, innovative, collaborative projects which will embed sustainable outcomes across the core business of the University, delivering strategic outcomes for schools and research areas.”

As part of the program, $4.8 million will support teaching and research in sustainability at RMIT, including 10 PhD scholarships for related research projects.

This “Green Team” of the best and brightest (many pictured above) will be at the forefront of RMIT's sustainability vision, working across 10 key areas from Buildings Engineered for Urban Sustainability to Powering Future Cities.

It may be a small team but its reach will be powerful as they work on world-leading and collaborative multidisciplinary research projects, supported by strong industry linkages.

Integrating SUPP into education and research has been a smart move – it gives RMIT students and staff the opportunity to contribute and learn from this “once in a generation” program.

A range of other sustainable initiatives have been embedded across the University, from an emissions reduction target to a “community of practice” of dedicated sustainability staff in the Learning and Teaching Unit.

Somogyi says RMIT is working with industry leaders Siemens and Honeywell to identify opportunities for energy and water savings in 90 buildings on the City, Bundoora and Brunswick campuses.

Honeywell’s smart energy solutions include upgrades to RMIT’s mechanical equipment, more energy-efficient lighting and water-harvesting technology.

Lighting alone accounts for the second largest use of electricity on campus.

Providing 26,000 smarter, more efficient and low-maintenance fittings across the University will be an early run on the green board.

Honeywell Regional General Manager, Karl Mahoney, says: “The project will not only boost sustainability, it will help the University modernise its buildings and campuses, creating a better environment now and in the future for students and staff.”

Similarly, Siemens Australia Chief Executive Jeff Connolly has praised RMIT's vision and leadership when it comes to sustainability.

“This is a great example of energy efficiency,” Connolly says.

“Our team looked at all areas of the City campus to see where our technology could maximise savings across water, lighting and the building management system, to create a highly efficient campus, both environmentally and economically.”

Feasibility studies are underway to install co-generation and tri-generation technologies which will allow the University to generate part of its electricity demand onsite.

FIND OUT MORE
Watch the video at
www.rmit.edu.au/makingconnections
Taking money out of an ATM in another part of the world is something you take for granted. It’s the same for GPS in your car and daily weather forecasts.

Yet the more we rely on satellite technology for these services, the more we are likely to be affected when they fail. The main issue for satellite technology is space junk.

“Humans have only been sending rockets and objects into space for 57 years, but before we know it our planet will be surrounded by an impenetrable layer of junk and rubbish, and each piece of rubbish – no matter how small – poses a threat to satellites,” says Professor Kefei Zhang (pictured), Director of RMIT’s SPACE Research Centre.

Space junk or space debris is the collection of defunct objects in orbit around the Earth. It includes spent rocket stages, old satellites, things let go by astronauts on their space walks, fuel cells, and fragments from disintegration, erosion and collisions.

Since 2009, about 19,000 pieces of debris larger than 5 centimetres were tracked, with 300,000 pieces larger than 1cm estimated to exist below 2,000 kilometres.

For comparison, the International Space Station orbits in the 300 to 400km range and the 2007 antisat test occurred from 800 to 900km.

“Each collision results in what is known as Kessler syndrome – where more junk and debris is created and it has a cascading effect,” says Zhang.

“Satellites cost around $700 million each, and we rely on them for everything from GPS to weather prediction, from TV to effective use of emergency services, but even a 1cm piece of debris can cause major damage and disruption to services.”

Zhang and his team of researchers are working with key partners Electro Optic Systems and the ANU on this project. Other parties involved include Optus, Lockheed Martin Australia and the National Institute of Information and Communications Technology, Japan.

Zhang continues: “This is a huge issue – space is now polluted with more than a million pieces of debris.

“Billions of dollars have been spent on the International Space Station and in 2012-13 alone there were four emergency evacuations because of unpredicted debris that required the ISS crew to retreat temporarily to their Soyuz spacecraft.”

A collision between US and Russian satellites in 2009 accelerated the need for solutions to be found to the problem, when it resulted in 3000 new pieces of space debris.

RMIT’s role in the $20 million, five-year international research project is to develop new tools to improve the accuracy and reliability of predictions about the behaviour of space debris in relation to the orbit of satellites.

This includes a new model for predicting how the debris will be affected by space weather, atmospheric drag and the Earth’s gravitational field.

RMIT’s SPACE – Satellite Positioning for Atmosphere, Climate and Environment – Research Centre is also investigating ways to improve severe weather prediction and potentially reduce the impact of natural disasters.

The centre has expertise in space tracking, satellite positioning and navigation, GPS meteorology, atmospheric studies, geodesy and ubiquitous positioning and tracking.

“We are a unique group working on groundbreaking research into platform technologies for space, atmosphere and climate applications.

“These are big, expensive and very challenging problems, but it’s great that Australia has taken the lead on these critical issues,” Zhang says.

Watch this space.
A controversial “envelope culture” and lack of a professional practice framework are some of the challenges facing Vietnam’s burgeoning public relations industry.

It’s a country where “modern” public relations has been officially practised for less than two decades, after the doors to the world economy were opened in 1986.

But the early-stage positioning of Vietnam’s public relations industry is critical for its long-term development, according to RMIT Vietnam researchers Jade Bilowol and Mai Anh Doan.

The pair has explored how the introduction of public relations to Vietnam, through the arrival of Western multinational corporations, has been adapted in a local context.

Misperceptions on its role and a widely entrenched practice of gift-giving to journalists are in focus.

“There seems to be a lack of consensus among public relations practitioners in Vietnam on what constitutes ethics in public relations,” Bilowol says.

“Payment to journalists is considered by some as appropriate, given the low salaries, shrinking advertising revenue and slowing economy. Maintaining professional ethics is thought to be more about supplying accurate and factual content.”

Bilowol says the practice of negative public relations or “Black PR”, where agencies are hired to mislead an organisation’s competitors, also presents damaging implications for the growing industry.

But some public relations practitioners in Vietnam reject this approach due to cultural influences.

“Buddhist philosophies and beliefs have been shown to have a role in shaping perceptions of practice,” Bilowol says.

Both researchers argue that for optimum long-term development of the industry, there needs to be a better understanding of what public relations is and the value it can bring to organisations and society at large.

Bilowol says this can be achieved through stronger relations between agency public relations practitioners and their clients, as well as through the establishment of a professional body.

“There are also opportunities for further development of public relations education and training.”

The pair’s research involved interviews with senior Vietnamese public relations executives employed at international and local public relations agencies in Ho Chi Minh City and Hanoi.

“Vietnam’s public relations industry was established less than 20 years ago, through the arrival of Western multinational corporations,” Bilowol says.

“It has grown among a backdrop of propaganda used by authorities to build national unity in a previously war-torn country.

“And the demand for public relations in Vietnam is still mostly driven by multinationals promoting products through media relations.”

Bilowol says many Vietnamese companies are unsure about making an investment in public relations due to a limited understanding of what it is and misperceptions in its practice.

“It highlights the critical need for the establishment of a professional industry body and framework, as well as more public relations training courses or education.”

Bilowol and Doan presented their findings at the 2014 World Public Relations Forum in Madrid, Spain.

The pair’s work is now being used to inform a framework for professional practice, which is being developed in consultation with industry.
A vibrant carpet of lush and leggy sunflowers, up to two metres high, stands tall and pretty on a wedge of land in central Morwell.

Their bright yellow heads, almost the size of dinner plates, are slightly cocked – as if they are quietly listening to the sporadic, excited chatter about their presence.

This block of land, at the corner of Church and Buckley streets, was a petrol station long ago but for years has been a vacant eyesore, chocked high with weeds, rubbish and junk.

Now it literally stops traffic. The sunflowers are intoxicating. People stop to take photos.

Carloads of locals – both young and old – pull up to admire this unexpected, dazzling sea of yellow right in the centre of town. Others simply smile as they walk past.

The sunflowers were planted here and at four other sites across the Latrobe Valley in Gippsland, Victoria, as part of an innovative RMIT project to rejuvenate vacant land and unite struggling regional communities.

The idea grew out of a living sunflower art installation that Ben Morieson, an RMIT alumnus, planted in North Melbourne last year.

It was just over a year ago that Morwell residents wore masks to protect themselves from the toxic smoke and ash blowing in a nearby coalmine fire that burnt for 45 days.

For a region already grappling with high levels of youth unemployment and continuing job cuts, it was yet another blow.

This project, known as Get Sunflowered, is community engagement at its best – fostering goodwill and empowerment while creating something to be proud of.

Led by RMIT’s Office of Urban Transformations Research Lab as part of the Reactivate Latrobe Valley initiative, it saw 100,000 sunflower seeds strategically planted across three hectares in Moe, Traralgon and Morwell.

About 150 local volunteers were involved in the sunflower seeding process, from the initial grooming and levelling of the sites to the sowing.

Thousands of sturdy, healthy flowers perched on thick stems created a striking vista in the most unlikely places – from the old Moe hospital site to an overgrown tennis court in Traralgon.

However, this is much more than an art installation. It is helping a range of disconnected groups engage with their local community.

“They are the happy by-product of what the project is really about – making connections across the community and helping people understand that they can transform their own city,” says ReActivate Latrobe Valley co-director Craig Douglas, a senior lecturer in the School of Architecture and Design.

Douglas says the project drew support from a range of local industry and government including Gippsland Water, Nuseed, Regional Development Victoria and Latrobe City Council.

Latrobe City Mayor Dale Harriman says that the community welcomes the bright displays. “Seeing these previously empty spaces transformed into mass plantings of sunflowers has brought such cheer to our city.

“It is such a simple concept that has far-reaching outcomes in terms of community pride, connections and social networking.”

This rejuvenation project in the Valley has been incredibly successful in connecting the community with each other, says Re-Activate co-director, Associate Professor Rosalea Monacella.

“Historically, this area has gone through an incredible amount of change that has led to fragmentation. By bringing life back to these neglected sites with sunflowers we are acknowledging that there are a whole range of qualities that already exist,” she says.
His previous position was Vice-Chancellor of The Open University, the largest university in the United Kingdom.

Before joining The Open University, he was General Manager Worldwide Education Products Group at Microsoft, following executive leadership roles at Novell and other IT companies integrating technology and learning systems.

“I am delighted and honoured to be here at RMIT, a university with a great past and an even greater future,” Martin says. “Global, urban and connected, RMIT is positioned to build on its excellent reputation in the years ahead. “I come pre-wired with a strong belief in the importance of providing the best possible student experience, enabling students to apply their skills and launch successful careers, and in ensuring RMIT’s research continues on a trajectory of excellence.”

RMIT’s Chancellor, Dr Ziggy Switkowski AO, has welcomed Martin Bean.

“He is an executive with strong international relationships within the higher education sector and in industry built over many years, and he brings a wealth of commercial and operational experience to the RMIT community.

“In addition, having successfully managed higher education reform amid the widespread regulatory changes within the UK system in recent years, he is perfectly positioned to lead RMIT through the changing regulatory landscape currently being shaped by the Federal Government.”

Awarded an Honorary Doctor of Laws from the University of London in 2013, Martin has a Bachelor of Education degree from the University of Technology, Sydney.

At the invitation of the UK Government, Martin developed and launched FutureLearn in December 2012, the UK’s response to the Massive Open Online Courses (MOOCs) movement.

Under his leadership The Open University has made its award-winning course materials available to more than 200,000 enrolled students via tablets and smartphones.

He has won numerous awards in the US and UK for his contribution to education and was awarded a Commander of the Order of the British Empire in the 2015 United Kingdom New Year’s Honours list, for services to higher education.

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LIBERATING INITIATIVE

RMIT has a bold vision to build entrepreneurial capacity in Australia.

The University has a long history of creating entrepreneurs. Now it aims to add vital seed funding to its unique suite of entrepreneur support programs.

The New Enterprise Investment Fund (NEIF) program, launched earlier this year, consists of three key pillars: funding, mentorship and access to an extensive support network.

Eddie McGuire AM, chair of the NEIF board, says: “The New Enterprise Investment Fund is inspired.

“We will provide young entrepreneurs with an opportunity to get their commercial ideas off the ground, instil in them the work ethic and dedication needed to grow a business, and offer them the support of seasoned businesspeople to bring about success.

“The result will be innovative and forward-thinking businesses that provide work opportunities for future generations.”

Find out how you can enable RMIT graduates to go out, make a mark on the world, and help drive Australia’s future.

www.rmit.edu.au/students/neif

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Student entrepreneurs from RMIT Vietnam were the winners of the 2014 RMIT Business Plan Competition, one of the biggest programs of its type in Australia. The team behind Nutrimens (pictured with RMIT’s Professor Ian Palmer) won the $25,000 first prize for their innovative business idea to deliver ready-to-cook kits to busy city workers.
SEEDS OF CHANGE

See story, Page 22.