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TECHNOLOGY TRANSFER ESSENTIAL FOR ECONOMIC GROWTH

Welcome to the second edition of Wintec's Research Bulletin. At Wintec, our goal is to provide relevant, accessible and innovative research for businesses, industry and community groups within our region and beyond.

In New Zealand, 97 per cent of all businesses have 19 or fewer staff. They make a tremendous contribution to our Gross Domestic Product and are very skilled and brave entrepreneurs. More often than not they do not have - R&D budgets or additional skills in the business to drive innovation and technological improvement. This can limit the opportunity for commercial gains from new technological developments.

With this in mind, in 2009 Wintec made a number of strategic changes to the way we do research and connect with our stakeholders. Key to engaging with industry was the introduction of a Research, Development and Transfer (RDT) voucher scheme. This is used by a number of tertiary organisations overseas and has been adapted to suit New Zealand and the Wintec approach.

Through the RDT voucher scheme, local businesses - particularly small-to-medium enterprises (SMEs) - can work with Wintec experts to diagnose issues, develop new technologies and produce workable solutions.

Through the RDT voucher scheme we are creating an R&D opportunity for business by improving accessibility to solutions, reducing cost barriers, and taking a more collaborative approach. The type of research to be funded is research that will

- a) solve a problem for industry,
- b) encourage R&D of products/processes, increasing capability and/or capacity,
- c) result in the transfer of knowledge from researchers to industry, and
- d) generate ongoing benefits.

One of Wintec's pilot voucher scheme projects has been successfully completed and is discussed later in this publication. As expected, we have learned a lot from the process and it is fair to say that our partners are more knowledgeable because of this project. A number of other

voucher schemes are now underway and our next edition of the Research Bulletin will highlight learning from those projects.

On a personal note, I have recently taken up a newly created position as International Research Relations Director at Wintec, meaning I will be working more closely with our international partners. For six months, beginning in April, I will be based at one of the world's leading institutes, the Indian Institute of Technology (IIT) in Kharagpur, India, where I will teach research, supervise postgraduate students and explore technology transfer opportunities within India. I am looking forward to these opportunities with the goal of enabling collaborative projects and creating pathways for ideas, staff and student exchange.

I am sure you will enjoy reading some of our research stories in this bulletin and I look forward to providing a report on my IIT secondment.

Dr Surya Pandey



COMMUNITY CONNECTIONS

Disruptions to business information and communications technology (ICT) can be costly in the corporate world, but even more so in the not for profit sector.

As part of Wintec's first project under the Research and Development Voucher Scheme, the School of IT's Jannat Maqbool looked at the potential risks to services for two local not for profit organisations in the event of a disaster affecting their ICT environment.

Jannat, who has more than 10 years experience as an IT manager in the finance industry, says the ICT needs of small community groups tended to be overlooked, but the nature of their data was often critical.

"The two not for profits we worked with are actually dealing with people with disabilities and intellectual disabilities," she says. "Arguably, the information they have is far more important than a finance companies records of sales, for example. It's a history of a person's life and needs to be kept secure."

Using international standards adapted to the local environment, Jannat came up with assessment criteria to test the two organisations ability to restore services after a major or minor interruption.

The review found while they were doing the best they could with limited resources, there was room for improvement. "One of the organisations only had one person taking care of the ICT, so that was a risk in itself," Jannat says. "There was no documentation. That role needed to be backed up and needed to be documented. That was fundamental for the continuity of their ICT service in the event of an earthquake or a fire."

The review also looked at other areas including who had access to the data and even where the computer servers were housed.

"Whether the room was waterproof, whether the door as locked," she says.

"If it's not secure it means somebody can get at the information."

Jannat says while developing a disaster recovery and business continuity plan did not necessarily require a huge investment of time or money, it was usually beyond the reach of stretched community groups.

"Wintec now has the ability to help these organisations without them worrying about the overheads that normally come with that," Jannat says.

"They were both very happy and very welcome to the review. I think at the end they were surprised at how much they actually got out of it.

"One of the organisations is hoping to take it a step further, with some involvement from Wintec, and have a look at the implementation of some of the recommendations."

IT Research Leader Christo Potgieter says the benefits of the voucher scheme were far reaching.

"This is just the beginning of a massive initiative for Wintec," he says.

"It's real world. It's very practical and it links you to the realities of most of New Zealand, where most of our companies are smaller."

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VOUCHER TIMELINE

October

December





“The guide is designed to help people implement best practices rather than simply telling them what not to do”

TALL TALES

Wintec arboriculture tutor Andrew Harrison is aiming high - really high - with a new best practice guide for tree climbing.

The three-time New Zealand Tree Climbing Champion and aerial rescue expert says there is a need in the industry for a comprehensive document covering all aspects of tree climbing, especially given the advances in tree science in the past 10 years.

“There are many new techniques available for climbers and we have more understanding of how trees grow and respond to their environment, particularly when and how trees break or fall apart,” he says.

“However, there is a bit of a gap between the educated arborist and the uneducated arborist and there needs to be some kind of consistency as to what a good standard is for climbing.”

While there is a Code of Practice covering practical arboriculture, Andrew says his guide is designed to help people implement best practices rather than simply telling them what not to do.

“It outlines basic to advanced tree climbing systems in a straight forward and diagrammatic way, with only tried and proven techniques and equipment.”

Qualified arborists are in high demand in New Zealand, with employers ranging from local and district councils to power companies and private firms.

“The rate of growth of trees in New Zealand is very fast compared to many other countries, which does have an impact on tree life expectancy,” Andrew says.

“Also, when people are pruning clearances around power lines they need to create a much larger clearance because the trees will grow back so quickly.”

Andrew says the danger to professional tree climbers is not necessarily falling from extreme heights, but accidents closer to the ground.

“It’s the average heights that cause problems when people are a little bit complacent,” he says.

“One of the major causes of serious accidents is being struck by parts of the tree, so usually it’s a ground worker that gets hit by a falling piece of tree.”

Another hazard is poor technique, which can shorten climbing careers.

“Although we have been called industrial athletes in the past, it does get quite exhausting doing it day in day out,” he says.

“There are ergonomic ways of climbing trees that, when using the right technique with the right application, aren’t as strenuous on the body, so you’ll be able to do it for much longer.”

Andrew is hoping his guide can be used as a training tool across the industry, as well as in the classroom.

“One thing that is challenging as a tutor is the type of person who chooses to be an arborist is someone who doesn’t mind taking risks, so we need to train them to assess the risk and work within some sensible boundaries.

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“We can learn from each other, especially from the differences.”

CHILD'S PLAY

A new joint study has helped reveal some surprising connections between educational beliefs and practices in China and New Zealand.

Li Min from Chengdu University in Sichuan Province, China, sought to compare the basic beliefs underpinning early childhood education (ECE) in New Zealand and his home country during a five-month visit to Wintec last year.

His research drew on surveys and interviews with parents, teachers, students and lecturers as well as first-hand observations of children at childcare centres to see ECE in practice.

While Li gathered data in Hamilton, his colleagues completed a parallel study in Chengdu. The study looked at areas including the aims of ECE, expectations about children's development, the teacher or adult's role in children's development and effective ways of teaching.

Li says the results were unexpected. “New Zealand and China do have differences, but it seems that we have more in common than not,” he says.

“As far as the aim of ECE is concerned, all participants place a lot of importance on children's life-long development and happy life experience.

“Beliefs about the way children learn are also amazingly similar. All participants believe children's own experiences and exploring are more important than peer influences.”

When it came to the differences, Li found they were more in practices than in beliefs.

“Beliefs alone can not decide what will happen in practice. Factors such as the numbers of children and physical environment also help to shape the character of the real education,” he says.

“In China, especially in the city areas, childcare centres do not have too much outdoor natural space. Teachers plan activities in advance and sometimes even do small formal group teaching.

“In New Zealand, children have access to large outdoor spaces and can choose what to do and control activities by themselves and teachers just provide support when necessary.”

Li says culture also has a big influence on educational beliefs, especially parents' beliefs.

“Because New Zealand has a culture attaching lots of importance on the outdoors and linking with nature, ECE activities are strongly linked with all kinds of outdoor activities and natural materials,” he says.

“Some of those activities may be seen as dangerous or messy by Chinese people, such as rope swings and mud play.”

Wintec's School of Education Research Leader Jane Stewart says the insights Li provided were invaluable. “It was amazing to have the two completely different world views compared in terms of early childhood education,” she says.

“I think it helps build strong relationships in the future and from the perspective of staff at Wintec, it broadens our horizons in terms of education in different parts of the world.

“With the increasing diversity of the New Zealand population, it is important to learn about early childhood education and settings other than our own.”

Li is hopeful the common ground he found between the two countries will help facilitate ECE exchange programs.

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HEALTHY HABITATS

“From the plant palettes to the animals and birds and reptiles of that ecosystem - they can get it happening in their own backyards.”



Antoinette van der Weerden wants to help Hamilton residents get back to their roots.

The Wintec landscape tutor is developing a native plant guide based on the different soil types and landforms around the city.

She says reviving the plant palette Hamilton enjoyed before land clearing and urbanisation will give the city a unique identity and help restore precious indigenous ecosystems.

“This is really about introducing people to the natural history of Hamilton and getting them excited about the place we live in,” she says.

“By matching up plants with soil types, Hamilton residents can truly experience the notion of an ecosystem.

Antoinette says there are four basic landforms, each incorporating several soil types, around Hamilton: the low hills, the low plains, the gullies and river areas.

Her guide will offer a variety of native plants associated with each type and ways to incorporate them into home gardens.

“You could look up your street and find out what kind of ecosystem or soil type you had under your feet and that would relate to a range of plants you could access from native plant nurseries,” Antoinette says.

“From a landscape perspective, I would also love people to think about native plants in a way that isn’t just about recreating the bush. It’s not just about restoration. It’s about using plants in a more design-orientated way.

“So, you could have a very modernist landscape that uses natives for your hedges or ground cover.”

Antoinette says her research coincides with other efforts to improve the city’s natural environment including Hamilton City Council’s Gully Restoration project and the release of bell birds into the city for the first time in more than a century.

“It’s all about bringing biodiversity back into the local landscape,” she says.

“The city is a highly maintained environment where we have a lot of control over pests, whether they’re rats or possums or other plants, so it’s a good place to bring some of these more endangered plants and animals.

“People can support this in terms of what they put in their gardens.”

While her guide is aimed at revitalising ecosystems in Hamilton City, she says the same notion can be extended to the surrounding farmland in the Waikato.

“There are already some fabulous examples of balancing farming with the original ecosystems, such as at Lake Kainui in Horsham Downs and at Lake Serpentine near Ohaupo,” she says.

“Hamilton City residents need to embrace these moves too and support them at the urban level. By engaging with the place they live and looking closely at the soils, the plants and the subsequent insect, reptile and bird life, they will have a living connection with this place we all call home.”

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FIELD STUDIES

Artificial hockey turfs harbour a wide range of bacteria, including types that may cause infections in people, according to a Wintec study lead by microbiologist Vivienne Talbot.

Suspicious about the artificial turfs first arose a few years ago when some local hockey players were treated in Waikato Hospital for infections.

With the support of the Waikato Hockey Association, Vivienne surveyed players to find out if there was a connection between infected injuries and bacteria present on the hockey turf.

She took swab samples of the turf before and after major weekends of play and identified many different types of bacteria – those that are common in the environment, but also some that could potentially cause infections.

“It is likely that many of the bacteria were transferred on to the field by players themselves by dirt on their shoes, sweat, saliva and contact of the skin with the turf when players slip or slide across the surface.

“In particular, we found one bacteria, *Staphylococcus aureus*, which has been known to cause infections.

“Players falling over and grazing themselves in the area where the bacteria are present are at a risk of infection and could explain the reported infections in the survey,” she says.

Vivienne is now investigating ways to prevent potentially harmful bacteria from surviving on the playing field, without affecting the turf or stretching budgets.

“Waikato Hockey are proactive and are keen to find ways that will ensure the game remains safe for all players,” she says.

“Because *Staphylococcus aureus* is a bacteria that comes from people – you don’t normally find it in the environment – we want to see how long it can actually stay viable on the turf.

“Once we’ve established that, we want to work with a commercial company, Ecolab, to develop a sanitising product that we can put over the turf to kill or decrease the number of bacteria to a point where they’re not going to cause an infection.

“It’s not a straightforward task. The hockey turfs are very expensive and so you can’t put any product on there that is going to shorten its life span.

“You need to have something that is safe for the players, that’s not going to cause any irritation or problems, and it cannot be expensive.”

If successful, the sanitisation trials may be extended to other types of turfs and sports.

“There is potential to go further, but right now we’re just concentrating on water turfs and finding something that is going to work well in the Waikato.”

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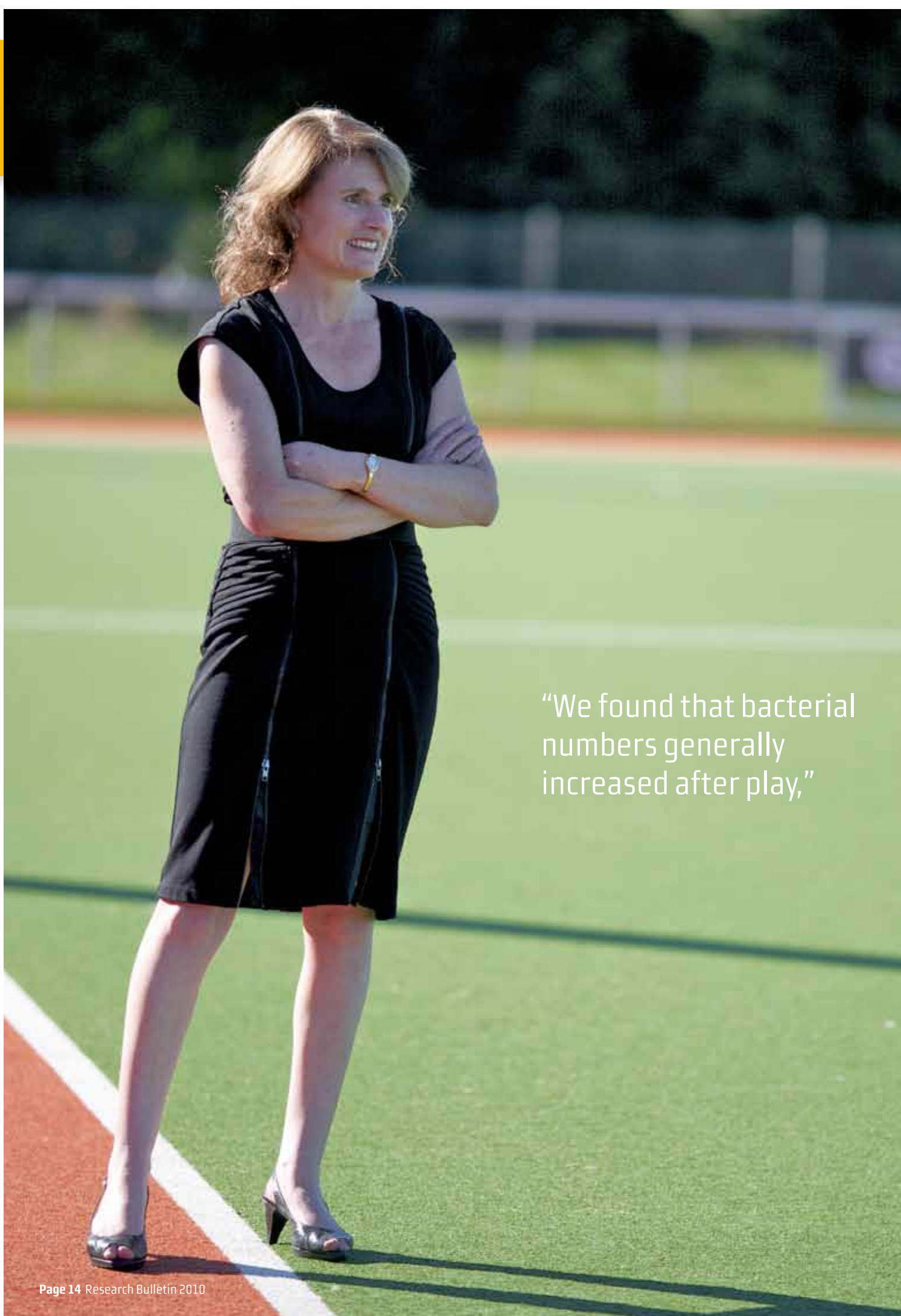
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“We found that bacterial numbers generally increased after play,”

“People see it and they feel like they could just jump into it.”

GLITTERARTI

Something bedazzling happens when artist and Wintec graphic design lecturer Mark Curtis turns down the lights – the floor comes to life.

The three-time finalist for the Wallace Art Award crafts ornate carpets made entirely out of glitter, a material he says relishes being theatrical.

“It’s very sparkly, but when the lights are dimmed it actually gives the impression that the carpet is really solid and really deep even though it barely covers the floor,” he says.

Mark’s glitter carpets, which have used up to 90kg of glitter in some installations, have been exhibited in Wellington, Melbourne and at the Waikato Museum.

While his work primarily explores issues of gender identity, he has also created a commemorative piece for Anzac Day featuring dozens of shimmering red poppies.

His most recent installation, The Diana Suite, created as part of his Wintec research project, touched on the public fixation with Princess Diana.

“We associate glitter as messy and in small quantities and used as a little embellishment to decorate mass produced stuff,” Mark says. “But when you have it in a large amount, it transcends that. It doesn’t have those qualities of being tacky anymore.”

The carpets are constructed similar to printmaking, with Mark laying down colours in sections and using intricate stencils.

“The glitter I use is the highest quality glitter you can get and because it is partly made of polyester, the electro-static charge helps keep it in place,” he says.

“People will touch it because they do not believe it’s not glued. They do not believe it’s just sitting there. That’s where the beauty is – the fact that it’s not permanent and no one can really own it.”

While Mark’s magic carpets may be fleeting – he simply sweeps up the glitter and recycles it for the next project once finished – he enjoys creating art that is accessible to all ages and backgrounds.

“There’s a lot of artwork that’s really hard to get into unless you understand art or you know the artist, whereas with the glitter carpet, it’s kind of got universal access,” he says.

“I’m really keen to get an international show at a public gallery because of its appeal. My aim is to put a proposal document together to send to some of the bigger institutions overseas and hope that perhaps it can be curated over there.”

He is also considering further research into the secret world of glitter.

“There is huge commercial demand for it. Anything that sparkles – from paint to surf boards to motorcycle helmets – that’s glitter,” he says.

“But the wacky thing is they are very secretive about the production of it. You’re not even allowed in the factory where they make it.

“There’s also absolutely nothing on where glitter came from. It would have started as a by-product, surely, but I searched extensively and couldn’t find anything. So there’s a potential book there.”

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“It just seemed very interesting and I think they have a lot of sculptural potential.”



AOTEAROA IN THE ARCHITECTURE

Sculptor Gareth Williams from Wintec’s School of Media Arts enjoys finding the extraordinary in the ordinary as part of his research into vernacular architecture.

“On the road to Coromandel there’s a really remarkable water tank that’s just covered in iron oxide,” he says.

“It’s got what seems like 30 or 40 pipes coming out of it and it’s right next door to a new barn and a couple of new tanks. “Sometimes water sprays out of the top tank in about 10 different directions because it’s full of holes. It’s just an amazing sort of monument in the middle of a paddock.”

Gareth sought out other examples of vernacular architecture in New Zealand’s rural landscape, from tin sheds to water pumps, as part of his sculptural enquiry.

While these structures have the appearance of being crudely assembled, he says they often sit beside ‘designed’ architecture like domestic houses.

“You get this rather strange construction that has been designed functionally as opposed to aesthetically. For example, it might be about getting height with the water or about dealing with the water supply from within the ground with pumps and so on”.

After photographing instances of rural vernacular architecture on site, Gareth was able to render four sculptures on a small scale out of brass and copper.

These were displayed at Waitakaruru Arboretum and Sculpture Park in Hamilton and he hopes to explore other environments, such as maritime or coastal with jetties, boatsheds and storehouses, in future.

While inspired in part by German artists Bernd and Hilla Becher, famous for their black and white photographs of industrial buildings and structures like water towers and silos, Gareth says his work has a more regional focus.

“It relates to a long line of tradition of vernacular structures in New Zealand painting,” he says.

“These different structures can be found internationally of course, but this seems to say something about New Zealanders and how they work.

“Somehow taking these objects and remaking them on a small scale and changing their site or their context raises questions about what it’s for and why it was built and why it was built that way.

“It’s opening me up to some things that are out there in the landscape, but also that are in our history.”

Gareth says it is getting harder to see examples of old or remarkable vernacular architecture from the main roads as many structures are pulled down and replaced, but he hopes his work will help New Zealanders appreciate the landscape from a new perspective.

“These structures are the kind of things that you don’t notice because they’re very ordinary or they’re rather strange or they’re rather ugly. This is drawing attention to them and I think making them in brass and copper tends to make them more important or more precious.”

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“I think that’s definitely got great potential.”

THE WRITE STUFF

It was more than words that helped launch the Australian Association of Writing Programs Conference at Wintec last year.

The annual event for creative and professional writing teachers had never been held outside Australia in its 13-year history, so Media Arts lecturer and AAWP member Gail Pittaway seized the opportunity to showcase Kiwi hospitality.

“We got everybody on stage for the Whakatau, or welcome, which was officiated by our Kaumatua, Tame Pokaia,” she says.

“All these very academic Australian people were panicking about having to sing at the opening ceremony, but I was determined to have a strong Maori opening and closing because the theme of the conference was Margins and Mainstreams.

“Even though the Australians were dominant at this conference, it was on our patch and I wanted to give them that experience of entering into a different culture.

“The Waikato people sang and the Australian people sang and the Australians were thrilled.

“The energy and the atmosphere of that opening session just set the tone for a very warm and generous few days.”

With more than 50 presenters, the conference explored a diverse range of topics around writing theory, research and practice.

Guests included Tony Simpson from the New Zealand Society of Authors and writers Hinemoana Baker and Jeri Kroll.

“We had people from the United States and from the UK as well as from Australia and the publication is an internationally peer reviewed publication,” says Gail, who is also the theatre critic for The Waikato Times.

“Several members of our staff at Wintec were contributors to the conference and those who didn’t present papers were involved as chair people and hosts of events as well.

“There was a variety of outcomes - not just having something presented and published, but being part of the research culture. I think that was of great benefit.”

In a further testament to the success of the conference, the AAWP voted to change its name to the Australasian Association of Writing Programs to recognise its Kiwi connections.

Gail believes it is just as important for local writers to cultivate relationships across the ditch.

“New Zealanders are very loyal readers of our own writers, but we’re a tiny market. The Australians are very inviting and they want people to go to their writing festivals and things like that and that’s where a lot of the commerce and transactions are happening for writers.”

Gail says the conference would not have been possible without the support of Research Director Dr Surya Pandey and Barbara Smithers in the School of Media Arts, together with intern Gemma Davey and Bennett’s Bookshop.

The experience has also given her a few ideas about engaging literature lovers in the wider Waikato community, from celebrating National Poetry Day in July to creating a Hamilton Writers Festival.

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THE RIGHT MOVES

Dairy farmers could soon find managing staff a lot easier thanks to Wintec Bachelor of Information Technology graduate Arno van Niekerk.

As part of his final year project, which all third-year students undertake to help community businesses and organisations, Arno designed an application for Cambridge-based rural recruitment company ATRFegan.

The application allows dairy farmers to easily schedule and manage rosters for each of their employees. This process was previously being completed by hand and could be difficult to update.

“Regular staff might work seven days on, four days off, and then again seven days on, and three days off, for example,” Arno says.

“It varies a lot and plus they have relief staff working on different rotations, so rostering was a little cumbersome and not very reliable or efficient.

“What they wanted was a piece of software where they could specify the different rotations for all the employees and just add or remove employees to the system easily and have it generate these rosters for them.”

Arno spent five months working on the pilot project and is now in discussions to complete the system for the company and even market it commercially.

In addition to the professional experience he gained, Arno says it provided valuable insight into an important local industry.

“I didn’t know anything about dairy farming,” he laughs. “So I learned how they work on the farm with different cows and different set-ups.

“It was an incredible experience because all of a sudden I was out of the classroom and dealing with real clients and making a real impact.

“Wintec pretty much gave me the opportunity to do it and the support they provided was excellent.”

Fellow final year student Owen McKenzie also introduced new technology to some old traditions for his project.

Owen automated the pen and paper system being used at the Waikato Snooker & 8 Ball Club, enabling employees to calculate how long people had been on tables and how much they needed to pay when they left.

“I added many features to the application including a TAB system, allowing customers to put drinks on their table that will be paid for at the end of the booking, as well as an advanced booking feature and a waiting list.”

Creating a better experience for staff and customers was also the driving force behind IT student Maria Twidle’s project.

Maria developed a system known as Project V-Tool for Hamilton-based business broadband provider Velocity Networks.

“The V-Tool uses the latest in web technologies to not only supply the user with a quote, but also display a visual representation of the network services the customer may currently have as well as the new services.”

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