

APR 15



STEP BY STEP

The new device helping stroke and spinal injury patients walk again

LEARNING LA VIDA LOCA

Co-designed assessments improving student success

TAKING THE LONG VIEW

Why reducing short-sightedness really is child's play

ANNE DWYER



Photographer: Jesse Taylor

DEPUTY VICE-CHANCELLOR (CORPORATE SERVICES)

What are you working on at the moment?

Our re-energised focus on excellence across the university has all in Corporate Services focused on what that means for service delivery, both internally and externally, to support the university's commitment to learning and research excellence.

Excellence is at the core of our Managing for Performance program, our work on new service models for student administration, renewal of IT capabilities to leverage new innovations and meet the rapidly changing needs for teaching and research technologies and our focus on marketing transformation for a new competitive paradigm. Of course we have a lot of hard work ahead of all of us; academics and professional staff alike. But I sense a renewed vigour in the UTS community, which is both inspiring and energising. If we continue to sharpen our focus on our core objectives then we will only be working on what matters most to the success of the university.

I am very committed to ensuring that UTS continues to be a place of significant engagement for staff and to growing our capability in working with all staff on their success and career development which ultimately is how UTS will succeed.

Following the opening of all the new buildings at UTS, which is your favourite new space and why?

I do have my 'Colorbond' moments. Usually when I'm in my office where I have a great view of the new Faculty of Science and Graduate School of Health building. And, of course,

it houses my favourite new space – the Super Lab. If you haven't seen it, it's worth a peek from one of its observation windows. It occupies the entire length of level 1 (52 metres end-to-end) and can accommodate more than 200 students at a time. The technology is impressive and with touchscreen monitors and microphones on each workbench, multiple classes can be concurrently scheduled in the Super Lab.

If you could witness any event, past, present or future, what would it be?

I am a big traveller. I especially love to visit those places least touched by humans – like the Arctic and the Antarctic – and witness Mother Nature in all her unsullied glory. So, if I could go back in time, I would want to be aboard the HMS Beagle alongside Charles Darwin. Perhaps not for the entire voyage which lasted almost five years, but to sail, in the early 19th century, from England down and around South America to the Galapagos Islands – that really would have been something.

Tea or coffee?

Coffee – strong.

What is the thing you most wish you excelled at?

I wish I could sing. In fact, I would be content just to be able to carry a tune. I remember one year being kicked out of the Egansford Public School eisteddfod and another year being asked to lip-sync. This does not deter me from belting out Happy Birthday and other family celebratory songs to the great embarrassment of my nieces and nephews.



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The Interaction Studio's Stepping Tiles in use at Bankstown-Lidcombe Hospital. Image supplied by Bert Bongers.

NEXT ISSUE

The next issue will be released on Monday 4 May 2015.

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Send your story ideas, opinions and events to u@uts.edu.au

**discover, engage, empower,
deliver, sustain**

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STEP BY STEP.



If you've had a stroke, spinal injury or fall, the physical rehabilitation can often be arduous, and the day-to-day progress can seem small. A team of UTS researchers is designing interactive technology to motivate patients, provide them with real-time feedback and ultimately improve recovery outcomes.

With its pressure-sensitive floor tiles and responsive feedback screen, the Interactivation Studio's latest project sounds a lot like an arcade dance game. But rather than being a source of entertainment for the young and fit, it is in fact a physical rehabilitation tool designed to enhance and stimulate physiotherapy sessions in hospitals.

"One exercise patients do a lot is standing, balancing and stepping," explains Associate Professor Bert Bongers. "Stepping is a way of training yourself and getting your coordination back – and it also helps with fall prevention."

Bongers and his team have developed the system of Interactive Stepping Tiles and visual interface to address these rehabilitation needs in a more engaging format. As the patient steps from a central

tile to a second module, their movement and weight distribution is recorded and fed to the screen, giving real-time feedback.

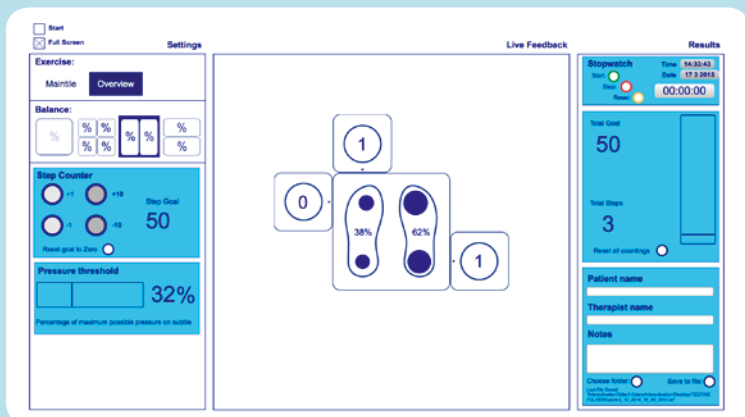
The technologies supporting this project are mostly readily available – it's the way the team is using them to encourage human-computer interaction during physiotherapy that makes it so cutting-edge.

"There are four sensors in the central tile, so when you rock your feet back and forth you can see corresponding circles get bigger and smaller on the screens as the weight distribution changes," says Research Assistant Albert Ong.

The visual interface is really important, explains Research Assistant Annie McKinnon. "We're trying to encourage patients to keep their head up and eyes forward, because if they look at their feet, their centre of balance is wrong."



Bert Bongers, Michelle Pickrell, Stefan Lie, Annie McKinnon, Albert Ong



Visual interface for the Stepping Tiles

“There’s also a motivational aspect,” adds Lecturer and PhD candidate Stefan Lie. “Patients can see their previous number of steps on screen so they can try to beat their record or they can place a second tile module further away than before, which makes people more engaged with the tool.”

By capturing even the smallest improvements during physiotherapy, patients can see progress that would normally be imperceptible to them. Health professionals can also focus on facilitating more complex improvements to balance and gait, leaving the tiles to do the counting.

“People learning to use their bodies again require accurate feedback about their attempts to perform a task such as standing and stepping,” explains Senior Physiotherapist at Bankstown-Lidcombe Hospital Karl Schurr. “This technology is important because it gives immediate feedback about a patient’s success in generating force with their legs – no matter how small.”

The Interactivation Studio has worked closely with physiotherapists like Schurr to test, develop and improve products like the Interactive Rehabilitation Tiles with real patients.

Using interactive technology to enhance rehabilitation practice is something Bongers has been investigating since 2009 with medical researcher Stuart Smith, currently Professor at the University of the Sunshine Coast, formerly of Neuroscience Research Australia. They have developed a number of interconnecting interactive modules, including wearables.

The Stepping Tiles are now in use at several hospitals around Australia and The Netherlands, and is part of a National Health and Medical Research Council-funded comparative study of interactive rehabilitation technologies by a team led by Professor Cathie Sherrington at The George Institute.

The first prototype of the product was developed in the studio by Rebecca Hall, for her industrial design undergraduate project in 2012. As a research assistant, Hall went on to redesign the tiles for 3D printing on demand, alongside Dutch intern Victor Donker who also developed the visual interface.

“We need a diverse range of people, with different backgrounds like industrial design, graphic design, sound design, engineering, and to continuously involve people from a medical background,” says Bongers. “The diversity of the team reflects the complexity of the problem space.”

Considerations need to be made not just for the development of the interface but also for the design of the physical tiles. Lie has worked on using new manufacturing technologies and techniques like 3D

printing and laser cutting to make the tiles available to a wider audience whilst still being customisable.

“We’ve made the tile as lean as possible because you pay for the amount of material used and the time it takes with a process like 3D printing. The more economical we are, the cheaper it is.”

McKinnon, who redesigned the software, uses her background in sound design to look at how sound fits into the equation to help patients better understand the visual feedback.

“There are some really interesting things to consider with designing in a hospital,” says McKinnon. “With sound in particular, you have to realise that some patients are very sensitive to noises, so using sound effectively is difficult. And lots of sounds in hospitals are ‘beeps’.

“We don’t want everything to just be ‘beeps’ because at the moment your fridge sounds like your microwave, sounds like your toaster – it would be great to have sound mean a bit more!”

“THIS TECHNOLOGY IS IMPORTANT BECAUSE IT GIVES IMMEDIATE FEEDBACK ABOUT A PATIENT’S SUCCESS IN GENERATING FORCE WITH THEIR LEGS – NO MATTER HOW SMALL.”



The Stepping Tiles in use in the Brain Injury Unit at Liverpool Hospital

Says Ong, “If you make something, you can’t just expect for it to be used in the way you imagined. You don’t know how it’s going to go until you give the product to the end users and check it out.”

Visiting hospitals and seeing the tiles in action is essential for the whole team.

“The best part of our collaboration is when we all get to go out to the hospital – we all have different perspectives and look at different aspects of the tiles,” says PhD candidate Michelle Pickrell, who works with patients and health professionals to find out what parts of interactive rehabilitation technology work well for them.

“There are so many limitations to consider when designing a product like this,” she says. “Does it need to connect to Wi-Fi? Does the hospital have Wi-Fi? Is it easy to set up? Any of these things can mean the product is ultimately put in a cupboard and never used.”

The team brings their notes and observations back to the Interactivation Studio to work on implementing feedback, enhancing the design and repeating the process.

“The studio is such a living place,” says Bongers. “We do a lot of tests and trials here, and it can be very exciting when we try something new and discuss how things can be done differently.”

Ultimately, the technology developed through this collaboration for the tiles will have far-reaching applications in the realm of interactive physiotherapy and rehabilitation.

Schurr says, “I think this is just the beginning of an exciting era of research which will change the outcomes for thousands of people trying to regain control over their bodies and improve their rehabilitation outcomes.”

Hannah Jenkins

Marketing and Communication Unit

Photographer (B Bongers, M Pickrell, S Lie,

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Other images supplied by: Bert Bongers

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