CHYLD MATTERS
Improving health outcomes for children

LEADING THE CHARGE
Imitating natural systems to harvest energy

HEALING THEATRE
The positive power of the imagination
Imagine taking a group of yellow plastic ducks and sorting them into two buckets. Put the little ducks in the little bucket and the big ducks in the big bucket. When you’ve achieved this, reverse the action and put the little ducks in the big bucket. Sounds easy? Now ask a two-year-old to do it.

This test, Ducks in Buckets, measures working memory and response inhibition in toddlers and pre-schoolers. It is one of many tests some 400 two-year-olds across New Zealand have recently completed as part of The University of Auckland’s world-leading study into the connection between hypoglycaemia (low blood sugar levels) in newborn babies and subsequent brain damage.

Around the globe it is generally agreed that as many as 15 percent of newborn babies have periods of hypoglycaemia.

“At present no one anywhere in the world knows which babies will suffer brain damage or what glucose concentrations will trigger the damage,” says Distinguished Professor Jane Harding, who is leading the University’s CHYLD (Children with Hypoglycaemia and their Later Development) study.

“It is likely that the duration, severity and frequency of the hypoglycaemic episodes are all important factors. So the question we’re trying to answer is, when does hypoglycaemia matter?”

Jane, who is also Deputy Vice-Chancellor (Research) at the University, has been awarded a $2.4 million grant from the United States National Institutes of Health (NIH). It is very rare for researchers outside the US to get this funding, but Jane’s team already had a unique cohort of nearly 600 children whose blood glucose concentrations were monitored very carefully over the first few days after their birth.

The NIH recognised that with this population of babies the Auckland team had a head start and could do the study better than anyone else in the world.

Since 2011, 406 two-year-olds, originally from Hamilton but now scattered around the country, have been tested for brain function, vision, cognitive and language development, memory, growth, general health and family environment. The research teams are now starting to analyse these data while assessments are beginning on nearly 200 more children in the cohort as they reach the age of four and half.

In the meantime the CHYLD project has led to new multi-disciplinary collaborations across the University involving psychologists, statisticians, vision scientists and bio-engineers as well as paediatricians. The project is also attracting international students, including a Ukrainian doctor and a Filipina psychologist both joining CHYLD to study for PhDs.

As the children grow older and their families move to different parts of New Zealand, experts from throughout the country have become involved in CHYLD, including paediatricians, nurses and ophthalmologists. Canterbury University bio-engineers are collaborating with the Auckland team on analysis of the continuous glucose monitoring data.

The CHYLD study is also hoping to inform national health policy as study data will be compared with the Ministry of Health’s B4 School Check. “This will provide important validation of the testing techniques used in both.”

But for Jane the ultimate aim is to improve outcomes for babies and their families around the world. “I think we have the opportunity to shed light on an international problem,” she says. “We really don’t know which babies are at risk of problems due to hypoglycaemia and we have the potential to change that and to change practice around the world.”
In the 1850s Auckland’s grand Government House was the scene of political manoeuvring, strategic meetings and formal entertainment. It was at the heart of New Zealand’s colonial society.

Colonel Thomas Gore Browne, the fourth Governor of New Zealand, and his wife Harriet Louisa hosted weekly “At Homes” where “you meet everyone worth knowing, and have excellent music in one room while there was dancing in another”.

Today the stately building known as Old Government House and its spacious grounds are the jewel in the crown of the University’s portfolio of 18 historic buildings. “Each year we put significant investment and resources such as planners, architects and skilled trades staff into maintaining and restoring our heritage buildings,” says Peter Fehl, Director Property Services.

The University has owned Old Government House since 1969 and it has been the home of the Staff Common Room Club ever since. The stately rooms are also available for meetings, functions and public lectures.

“There is a tendency to view Old Government House as a relic of the past,” says Russell Stone, Emeritus Professor of History. “But it is a perpetual reminder of the University’s close links with the beginnings of the New Zealand colony and of Auckland itself.”

It was also the home of Queen Victoria’s son Prince Albert for seven months in 1868, and on Christmas Day in 1953 Queen Elizabeth II delivered her first Commonwealth broadcast from the House, conveying the sad news of the Tangiwai train disaster.

Old Government House is one of four buildings on the University’s City Campus designated Category 1 by the New Zealand Historic Places Trust for their “special or outstanding historical or cultural heritage.”

The Art Deco Kenneth Myers building in Shortland Street once housed Auckland’s oldest radio station 1YA while the Gothic-style Old Arts building in Princes Street with its distinctive 54-metre clock tower is considered a national icon as well as an architectural landmark for Auckland.

Princes Street, at the heart of the City Campus, has a precinct of heritage buildings and sites including the Old Jewish Synagogue which is leased by the University and Alfred Nathan House, the University’s administrative headquarters. Behind these an 85-metre long remnant of the Barracks Wall that enclosed 1,000 British troops until 1870, stretches across the University campus and adjoins Old Choral Hall on Symonds Street. The Hall opened in 1872 for musical activities, balls, social events and even ladies’ roller-skating. In 1883 it was the venue for the opening ceremony of Auckland University College and has been used for teaching since 1891 and 1925. The building has since been divided into separate lecture theatres and today many of its offices house the University’s international relations staff.

“The University’s good relationship with the Auckland Council and Historic Places Trust has enabled us to actively use these buildings, which is essential for their health,” says Peter Fehl.

“We are proud to be able to maintain and enjoy these places that hold so much history.”

www.auckland.ac.nz/uoa/home/about/the-university/university-history

From The Governor and his Northern House by G.A. Wood
Going to the gym is a great way to recharge your batteries, clear your head and get the heart pumping but the energy you expend could also be used to charge up your cellphone or iPod. The University of Auckland’s Biomimetics Laboratory has come up with electronic technology to harness energy from human movements such as a foot hitting a treadmill, or an arm pumping up and down.

“We’ve developed a soft, flexible, low-cost human power generator that can fit into a shoe,” says Biomimetics Lab leader, Associate Professor Iain Anderson (Engineering Science).

A normal shoe dissipates energy as the heel strikes the ground and the energy is lost as heat. “Our generator converts the energy to electricity instead,” adds Dr Tom McKay who works alongside Iain in the Lab. “This doesn’t change how the shoe feels to wear but the electrical energy is harvested and could be used to charge a phone or MP3 player.”

Based at the Auckland Bioengineering Institute, the Biomimetics Laboratory is a world leader in imitating natural systems and applying them to robotics. It has pioneered soft electronics for “artificial muscles” – electronic energy harvesters made of stretchy rubber – that can move the limbs of robots as well as transform movement into electricity.

Their world-leading research could one day mean that machines are driven by soft muscle-like actuators rather than heavy gearboxes or linkages, and that robots can be lightweight and agile.

“Artificial muscles will revolutionise prosthetics and even clothing,” says Iain. “Anything that is soft and flexible is potentially wearable too. Researchers could, for instance, develop wearable systems that can change colour and texture - just like an octopus skin.”

Iain is in Switzerland collaborating on a project at the Microsystems for Space Technologies Lab of the École Polytechnique Fédérale de Lausanne. “The goal is to design and make generators compact and reliable,” says Tom, who has also worked on the Swiss collaboration.

“This same technology could be used for autonomous robotics or for powering remote sensors and we are also looking at ways to harvest energy from the environment, such as swaying tree branches or ocean waves.”

The Auckland lab manufactures its own electronics for testing and developing new artificial muscle devices; its systems are now used at several research labs and universities around the world.

The lab’s innovation is already paying dividends. Two former students, Ben O’Brien and Todd Gisby – along with Iain and the University’s commercialisation company UniServices have started a company called StretchSense (www.stretchsense.com).

The company specialises in making artificial muscle sensors that measure human movement. The sensors are soft, lightweight and very stretchy so they don’t interfere with the motion that is being studied. The technology could be applied in many areas, from animation for movies and computer games to measuring joint movements after surgery.

“While StretchSense seeks new commercial opportunities in artificial muscle sensing we will continue to brainstorm and collaborate to do good science, keeping an eye out for more opportunities,” says Iain.

www.biomimeticslab.com
As the emergency crews pulled out of Christchurch following the February 2011 earthquake a different team of rescue workers from The University of Auckland went in. Rather than driving cranes and diggers, they relied on the machinery of children’s imagination to clear the rubble and start healing.

Associate Professor Peter O’Connor, Director of the Faculty of Education’s Critical Research Unit in Applied Theatre, uses drama and storytelling to treat trauma. As schools reopened in Christchurch, Peter’s team set up the “Teaspoon of Light” programme, working with teachers to help children make sense of what was happening and share their experiences.

“The Arts transport us to somewhere else,” says Peter. “So we said to Christchurch seven-year-olds: ‘Don’t tell us a story about what happened in the quake, but imagine yourself as someone who knows how to fix a torn cloth of dreams and tell us what needs to be done’.”

Here’s the recipe that one group came up with:

1 tsp of light in the darkest tunnel
10 cups of love
2 tsp of belief
½ a cup of adventure
¾ a cup of hope

They imagined a cloud bowl, mixed the ingredients, and saw “the light go through everything”. Peter says the children were making positive statements about their world, rather than seeing themselves as victims of the earthquake.

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“A lot of teachers were very moved by the Teaspoon of Light Programme,” says Ginny Thorner, director of the Christchurch Learning Through the Arts Trust, which worked with the University. “Teachers were surprised at how the acting got children out of themselves and one even said she saw the light come back into a child’s eyes for the first time since the quake.”

The Teaspoon of Light programme is funded by the Mental Health Foundation and UNESCO. It has already been the subject of three academic papers published in international journals. On-going research in Christchurch by the University’s Applied Theatre Research Unit is also reinforcing international evidence that the Arts play a significant role in building community resilience post disaster.

But Peter’s drama workshops are not confined to disaster zones. He also works in prisons, rest homes and psychiatric units. He recently created a modern-day 30-minute Romeo and Juliet with teenage serious offenders locked up in a Youth Justice facility.

“You can’t sit down with 16-year-old offenders and talk about love but you can make theatre with them about it,” says Peter. “When you populate a place like a prison with stories that are positive, powerful and hopeful it shifts the culture of the institution and there is evidence to suggest it reduces reoffending.”

Another project focuses on rest homes in West Auckland. High school students working with a PhD researcher are hearing about the lives of residents in their 70s, 80s and 90s. They will turn their conversations into plays to be performed back to the storytellers.

“Applied theatre heals communities and allows us to imagine and tell stories of how our lives might be different and better, no matter how old we are,” says Peter.

“When you see yourself in a role there is an opportunity to learn deeply about yourself. We have children in Christchurch working in Teaspoon of Light shops mixing up light remedies for customers and while they’re pretending to help others, they’re actually learning and helping themselves.”

www.education.auckland.ac.nz
Concert pianist John Chen has received standing ovations in prestigious concert chambers around the world, but one of his most enthralled and appreciative audiences was at Chengelo Secondary School near Mkushi in Zambia.

John is an Assistant Lecturer in Chamber Music at Hochschule für Musik und Theater in Hamburg and is studying for his Doctorate in Musical Arts at the University of Auckland, but he still makes time to travel to Zambia to teach music and maths. “I love the quiet sincerity and friendliness of the people there.”

The Chengelo school hall is a long way from the Sydney Opera House where John, aged 18, became the youngest-ever winner of the Sydney International Piano competition in 2004.

His success comes as no surprise to University of Auckland Senior Music Teacher Rae De Lisle. “John is one of the best pianists New Zealand has ever produced,” she says. “His integrity comes through in his playing. He’s not interested in showing off. There’s a brilliance about him.”

John, who was born in Malaysia, began his piano studies aged three and Rae became his teacher when he was eight. He left school at 14 to study with Rae at the University and he achieved his masters aged 18. Since then he has performed and given masterclasses across Europe, Africa, Asia and Australasia, made recordings of his favoured French composers Debussy and Ravel and given world premieres of works by New Zealand composers such as Jenny McLeod, Ross Harris and Gao Ping.

John was the University of Auckland’s Young Alumnus of the Year in 2008 and is now studying for his doctorate on the German Romantic Fugue at his alma mater, under the wing of Rae de Lisle. This involves writing a thesis and five performances. For the first of these he played from memory Bach’s Well-Tempered Clavier, Book I at the University’s School of Music last winter receiving a standing ovation for the 100-minute performance.

John’s next concert at the School of Music is on October 16 where he will play Schumann 4 Fugues op 72, Bach French Overture and Schubert Sonata in A major D959.

www.creative.auckland.ac.nz/uoaborn
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John is one of the best pianists New Zealand has ever produced

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