

# Auckland <sup>2010</sup> **NOW**

## **Brain power**

Brain centre sparks new research

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The next generation of healthcare workers

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Preserving ancient treasures



**THE UNIVERSITY  
OF AUCKLAND**

**NEW ZEALAND**

Te Whare Wānanga o Tāmaki Makaurau



# Brain power

Each day in New Zealand an average of 21 people have a stroke. They may lose their speech, be partially paralysed and become confused. The new Centre for Brain Research (CBR) at The University of Auckland aims to improve their recovery.

Launched in 2009 and housed in a new state-of-the-art \$16 million hub, the CBR is tackling neurological diseases by bringing together more than 200 University researchers to work with leading neurologists, neurosurgeons and physicians from Auckland's District Health Boards.

"Our research is all about multidisciplinary team approaches," says Professor Richard Faull, the Centre's director and an internationally-renowned brain scientist.

A large study underway at Auckland City Hospital is investigating how to reduce or reverse the loss of function in stroke patients. It involves three experts: Professor Alan Barber, head of the Auckland District Health Board's Stroke Service and Deputy Director of the CBR, Dr Cathy Stinear, a senior lecturer in applied clinical neuroscience, and movement neuroscientist, Associate Professor Winston Byblow.

"By putting scientists and a neurologist together, it's sparked off new ideas and initiatives," enthuses Cathy. The team has already trialled new ways to "prime" the brain before a patient begins physical rehabilitation, showing this can improve recovery of hand and arm function. For example, when bursts of magnetic stimulation were delivered to the part of the brain that controls the upper limbs, the brain became more receptive to rehabilitation exercises and helped patients relearn certain movements.

Now the researchers have come up with new ways to measure the brain's potential for recovery after a stroke. This will eventually allow rehabilitation teams to tailor programmes for each patient.

Promoting plasticity or flexibility in the brain in order to help recovery from neural disorders is a theme of much CBR research. Vision neuroscientist Dr Ben Thompson is working with a pharmacist and a psychiatrist to investigate how a common anti-depressant may work on the brain to help adults regain sight in a lazy eye.

Other research involves psychologists who are looking at the impact of neurodegenerative disorders such as Huntington's, Parkinson's and motor neurone diseases on patients' decision-making and thought-processing.

The CBR is home to the Neurological Foundation of New Zealand Human Brain Bank, which provides tissue for leading international research into epilepsy, Huntington's, Alzheimer's and Parkinson's disease.

The brain bank was founded by Richard Faull, whose own research showed that stem cells in the diseased human brain have the potential to form new cells.

The CBR's work includes stem cell technology, gene therapy, biomedical imaging, drug technologies and therapeutic trials.

It works closely with charities such as the Stroke Foundation and Parkinson's New Zealand and next year a Brain Recovery Clinic will open at the University's Tāmaki Campus linking people in the community with top clinicians and scientists on site.

"One in five New Zealanders will experience brain disease in their lifetime," says Richard Faull. "Our ultimate goal is to translate our research to the benefit of the wider community."

[www.cbr.auckland.ac.nz](http://www.cbr.auckland.ac.nz)

[www.youtube.com/researchworkswonders](https://www.youtube.com/researchworkswonders)

**Photo:** Richard Faull, Cathy Stinear, Alan Barber and Winston Byblow.



# Preserving our taonga

What looked like a piece of driftwood poking up through damp sand at Muriwai Beach turned out to be something much more important for local iwi and The University of Auckland.

The piece of wood was part of a seven-metre waka from pre-European times and, rather like a doctor, Dilys Johns (above), Director of the University's National Conservation Laboratory for Wet Organic Archaeological Materials, was called out to save it.

Now the ancient Māori taonga (treasure) is one of about 1500 in the care of the University's laboratory, which has specialist scientific expertise in conserving waterlogged organic artefacts. "That usually means wood, plant material, shell, fibre or bone found in swamps, wetlands and rivers," says Dilys.

Without pottery and metals, Māori used organic materials to make domestic goods and artworks before Europeans arrived. Miraculously many of these artefacts have survived because they've been in anaerobic conditions, which limit bacterial decay.

"Often an artefact's degraded cells are plumped up with water," explains Dilys. "If that is allowed to evaporate off, the fragile cells collapse, causing irreversible degradation. So we always keep taonga fully immersed in water during and after excavation."

Back at the laboratory each artefact is immersed in Polyethylene Glycol (PEG). Slowly, over months and often years, water inside the artefact is exchanged for PEG. Finally, any remaining moisture is driven off in a freeze drier and the artefact is ready for storage or display.

Since the late 1980s the laboratory has worked with iwi and museums to preserve thousands of artefacts from more than 170 sites across New Zealand. These include an ornately carved paepae (meeting house bench) now on display at New

Plymouth's Puke Ariki Museum and large collections of fibrework – fishnets, baskets, mats and cloak sections – which would not have survived without the laboratory.

Dilys is one of only about 80 archaeologists worldwide with the specialist skills to preserve wet organic materials and the laboratory, the only one in the South Pacific, includes four satellite labs at important archaeological sites around New Zealand. One is by the new Canterbury town of Pegasus where many valuable artefacts were found in a wetland near Kaiapoi Pa – a Ngāi Tahu, Ngāi Tuahuriri stronghold in the 18th century.

The laboratory has close relationships with more than 35 iwi authorities. Most taonga come under the New Zealand Protected Objects Act, which requires any freshly excavated artefact to be professionally conserved. For Dilys each artefact, whether it is a waterlogged bowl, a small river waka, or a piece of canoe rigging, is an irreplaceable treasure with an important story to tell.

"These artefacts are not only an archaeological window into our past," she says. "More importantly they are a tangible link to their source communities' kin."

"By hosting this laboratory the University encourages artefact conservation in our communities, supports wetland sustainability research, and facilitates the dissemination of conservation science to support iwi and heritage personnel nationwide."

<http://tinyurl.com/2e99z2s>

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# Meet a healthbot

It is 10am at a rest home in Auckland. A small silver robot with a colourful touch screen on its chest rolls down the corridor stopping at rooms to remind residents to take their medication, helping to check blood pressure and even telling the odd joke.

This may sound futuristic but Selwyn Retirement Village in Auckland is already working with The University of Auckland's Advanced Robotics Laboratory to create a "healthbot" – a robot that can take on routine tasks and entertain elderly residents.

In 2006 researchers from South Korea's Electronics and Telecommunications Research Institute (ETRI) began talking to Auckland electrical engineers about combining Korean expertise in building domestic robots with the University's expertise in writing software programmes for robots to interact with humans.

"We decided to focus on robotics to help look after older people because many countries are struggling to maintain quality care as their population ages," says Dr Bruce MacDonald, Director of the Robotics Laboratory.

"The idea was that we'd use robot hardware from Korea and then develop the software here, creating a westernised robot and trialling and testing it in a westernised setting."

Bruce put together a multidisciplinary team that included engineers and computer scientists as well as the human touch with medical specialists Dr Liz Broadbent, a Senior Lecturer in Psychological Medicine and Ngaire Kerse, Professor of General Practice and Primary HealthCare.

One of the first steps was to discuss the project with residents at Selwyn Village who were surprisingly receptive to the idea. When asked what tasks robots could perform for them and

what a robot should look like, they described an intelligent machine that represented a middle-aged human, was about 1.2 metres in height and had a clear, easily understood voice.

With this feedback the University team started work on Charlie, their first "healthbot", and developed software that would allow it to detect residents' falls, call for help, monitor the location of residents, help with tasks such as measuring blood pressure as well as play a few games and tell jokes.

Last year Charlie was put to the test with Selwyn Village residents giving the robot a score of eight out of ten for performing some key tasks. Many expressed a desire to see even more internet technology made accessible on the robot and the Advanced Robotics Laboratory is now refining Charlie's software for more trials later this year.

As a result of the Korean collaboration, the Robotics Laboratory is developing a software framework and applications for older care – for example medication management – that it wants to commercialise with New Zealand companies. In the meantime ETRI has created its own commercialisation company following the example of UniServices - the University's research commercialisation company.

"New Zealand is the ideal test bed laboratory for Korea's electronic and robotic expertise," says Bruce. "By combining our expertise with theirs we can develop top-quality export products and services for the western health market."

[www.csi.ac.nz/healthbots](http://www.csi.ac.nz/healthbots)

[www.youtube.com/researchworkswonders](http://www.youtube.com/researchworkswonders)

**Photo:** Mrs Audrey Moates with Charlie.



# Going global

As obesity and the risk of diabetes increase around the world, so does the need for researchers to work together to try to manage the disease.

And it is not just in medical research. University of Auckland health economist, Associate Professor Toni Ashton, has just been invited to be part of an international team studying how chronic diseases such as diabetes can be managed efficiently, no matter how wealthy or poor the country.

The invitation came as the result of a conference in Nanjing, China. Toni was the only New Zealander among 40 prominent public health leaders discussing the challenge of chronic disease in the Asia-Pacific. Her fellow delegates included a leading health economist with the World Bank, the director of Cardiovascular Disease at Nanjing's Gulou Hospital and the World Health Organisation's director for the Western Pacific.

"There was a lot of excellent discussion about alternative modes and settings of chronic disease management and their different economic implications," says Toni. "New Zealand and Australia stood out as two countries that are focusing on improving responses at the primary care level rather than relying on hospital services."

Toni was part of this international gathering because The University of Auckland is the only New Zealand member of the Association of Pacific Rim Universities (APRU). This consortium of 42 leading research universities promotes scientific, educational and cultural collaboration among the 16 Asia-Pacific Economic Co-operation countries. With leading universities such as Stanford, British Columbia, Southern California, Sydney, Fudan and Tokyo, APRU offers unique opportunities for Auckland researchers to work internationally.

"Though APRU member countries may be competitors in the global economy we have much more to gain in fostering co-operation and

mutual benefit," says APRU's Interim Chair, Professor Wei Yang of Zhejiang University, China.

The University of Auckland is also the only New Zealand member of two other international networks. Universitas 21 (U21) has 23 members from 15 countries and all are leading research-intensive universities. It focuses on developments in teaching and learning, administrative benchmarking, and offers exchanges for staff and students. Last year four University of Auckland staff won U21 fellowships to Australia, Asia, Canada and Britain; undergraduate and postgraduate students went to U21 summer schools and research conferences; and academic staff went to conferences on Food Security, Water Futures for Sustainable Cities and Energy and Technology.

This year the University was invited to join the Worldwide Universities Network (WUN), a group of 16 research-intensive institutions that include the University of Sydney, Zhejiang University and Pennsylvania State University. WUN focuses on global research challenges including climate change, globalisation, cultural understanding and public health.

"We are delighted that The University of Auckland, known for its commitment to international engagement and internationalisation, has decided to join WUN," says Chief Executive, Professor John Hearn. "This adds great strengths in research and education to the network, as well as a leading presence in the Pacific."

[www.auckland.ac.nz/uoq/home/about/international-strategy/international-affiliations](http://www.auckland.ac.nz/uoq/home/about/international-strategy/international-affiliations)

# Our Library

The internet has revolutionised the way students gather information but Google has its limitations when it comes to writing an honours dissertation on Nero's golden palace.

Ancient History student Gemma Barlow (pictured) relies on The University of Auckland Library to study the Roman emperor's architectural masterpiece. She visits the General Library most days to study, talk to the subject librarian, search online collections, take out books and order interloan items. She is also a regular visitor at the Fine Arts and Architecture libraries on campus.

Each year the University spends \$20 million on the Library collections, which include 800 databases, 87,000 electronic journals, 340,000 electronic books, as well as print, multimedia and micro text collections totalling 2.2 million items. The Library also holds unique manuscript and archive collections.

"The library has been absolutely vital to my research," says Gemma, who began her undergraduate degree majoring in French and Classics in 2005. "I couldn't have achieved what I have without it."

And while most students have internet sites like Facebook as their home page, the 24-year-old prefers The University of Auckland Library website: "That's how important the library is to me," she laughs.

The University's library system covers five campuses, includes 13 subject-specific libraries, four Information Commons facilities, and has 4600 study spaces and 1100 computer workstations. "This enables us to provide a unique learning and support environment to our students," says University Librarian Janet Copsey.

"It also makes us by far the largest university library system in New Zealand and ranks us alongside the top five university libraries in Australia."

[www.library.auckland.ac.nz](http://www.library.auckland.ac.nz)