

# Auckland June 2010 NOW

## **Modelling the future**

Auckland is pioneering computer modelling of the human body

## **Reading write**

Raising literacy levels in our schools

## **Top film-maker**

Tackling human rights atrocities on screen



**THE UNIVERSITY  
OF AUCKLAND**

**NEW ZEALAND**

Te Whare Wānanga o Tāmaki Makaurau



# Revving up business

When Ally Chang was asked what she wanted to be when she grew up, chances are she didn't reply "a biotechnology entrepreneur".

But the 29-year-old biomedical researcher is among a new breed of students, part of The University of Auckland Business School's "entrepreneurial ecosystem" that fosters and mentors young entrepreneurs to create start-up companies. A recent US publication says that although the focus is usually on job growth in existing companies, it is in fact "the start-ups... the spin offs, that truly embody new job creation"<sup>1</sup>.

In 2000 the University embarked on an ambitious plan to become a "revving engine" for New Zealand's new knowledge-based economy. Two years later the Business School took over that mantle and plans were drawn up for the state-of-the-art Owen G. Glenn building to house professors in entrepreneurship, innovation and knowledge management. But most importantly key initiatives were put in place to encourage students to be business savvy and create start ups from their research.

"In particular we wanted to support the creation of an entrepreneurial mindset within faculties like medicine, science and engineering," says Geoff Whitcher, director of the University's Centre for Entrepreneurial Learning.

In 2003 he chaired the steering committee that set up Spark - a student-led entrepreneurial challenge. Prizes worth over \$120,000 are won each year for categories ranging from new ideas through to fully developed products and business plans. Spark has kick-started more than 50 companies and 180 jobs.

Many of these companies are at the forefront of technology, such as BrightMinds Labs, designers of computer games to help autistic children; PowerbyProxi, international slip ring

wireless power experts; and INRO, a robotics company pioneering a driverless forklift. Companies like these have had help from another part of the University's entrepreneurial ecosystem: the ICEHOUSE, a business growth incubator founded by the Business School and now run independently, with an investment arm ICE Angels keen to support early stage ventures. Auckland UniServices Ltd, the largest university commercialisation company in Australasia, is another key player in taking new research to market.

Another student-led initiative is Chiasma, which encourages ideas, networking, careers and business in biotechnology.

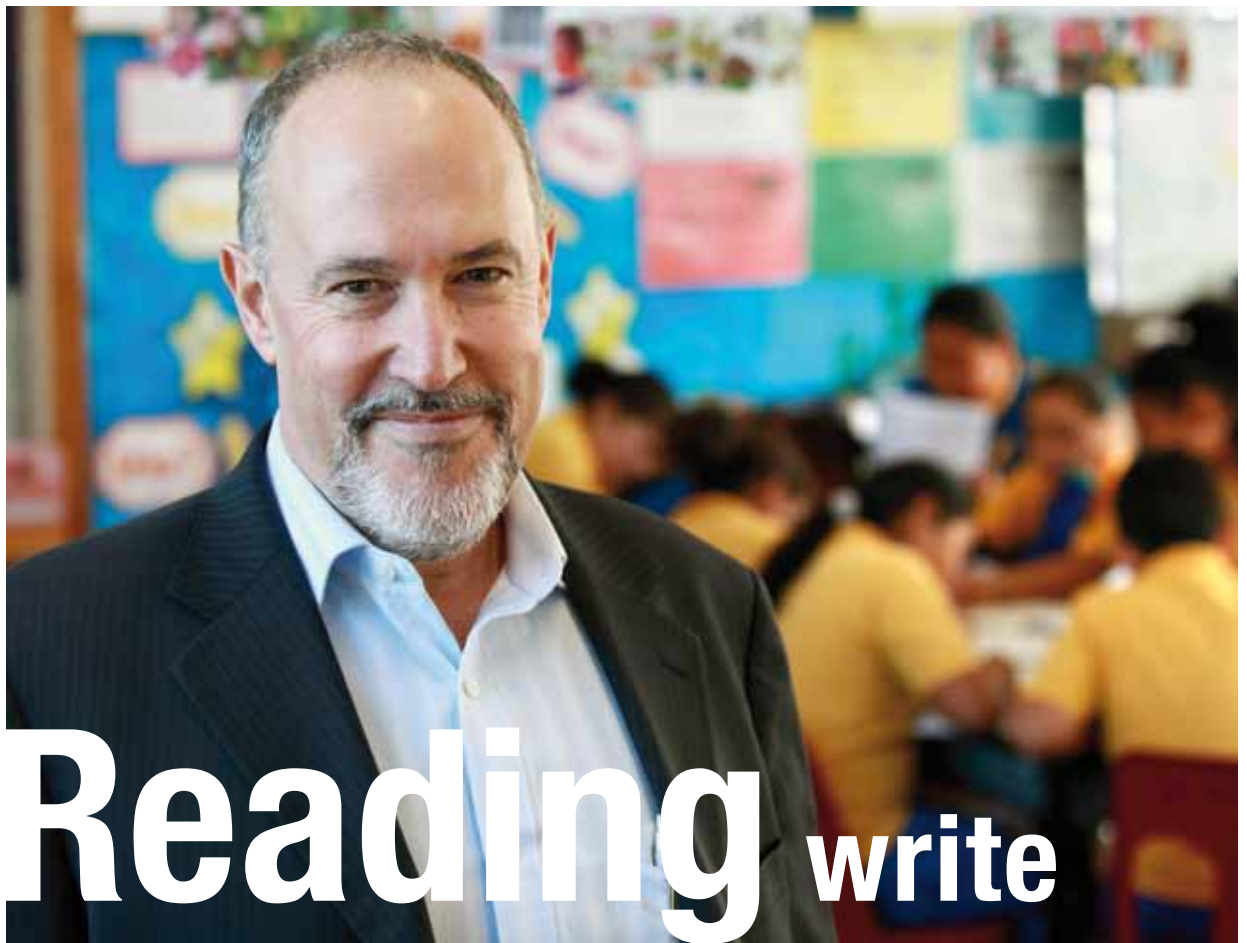
For students like Ally Chang the entrepreneurial ecosystem has opened up a whole new world. In 2006 she won Chiasma's bio entrepreneurship innovation prize and then in 2009 she developed a business idea from her PhD Ophthalmology research which turned non-nerve cells into nerve cells in the human eye. This won both the Chiasma I-Volve award and the 2009 Spark Business Idea Challenge. Now Ally's start-up CERPIS is applying for a patent while she has won a place on the prestigious MBA programme at Cornell University in the US.

For the young business-savvy scientist, the future is clear. "When I return from Cornell I want to work in business development in a biotech company and take New Zealand biotechnology to the world."

Ally is well on her way to achieving that dream.

<sup>1</sup>"High Growth Firms and the Future of the American Economy", from the US-based Kauffman: Foundation of Entrepreneurship

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Low literacy levels among Māori and Pacific Island primary school children pose one of the greatest challenges to New Zealand's future.

One researcher who is answering this challenge is Professor Stuart McNaughton, director of the Faculty of Education's Woolf Fisher Research Centre. For nearly a decade, he and his team have worked with more than 50 primary schools, involving more than 10,000 children, to come up with a programme to raise literacy levels using evidence-based inquiry.

"Our aim is to help teachers fine-tune their approach, to help them identify where and what the problems are in teaching and learning, and to help them find their own solutions," says Stuart.

For example, teachers at decile one Wymondley Primary School in Otara were struggling with poor reading comprehension among their predominantly Pacific Island students. With help from the Woolf Fisher Research Centre they changed their teaching strategies and focused on linking reading and writing and building vocabulary using ongoing evidence about what works.

"One of the problems with our children is they often don't have experiences to provide context," explains school Principal Tone Kolose. "So, for example, we took them on a trip to Goat Island to give them an experience of the sea. They were then able to link that back into their writing and language comprehension."

Over several years Wymondley teachers have continued to problem-solve and check their effectiveness working with the Woolf Fisher team. Now many of the children are reading at the national average or above.

Stuart believes cultural diversity in schools is a strength, not a disadvantage. "The cultural and language resources we have

in schools can be used to develop literacy levels," he says.

The Woolf Fisher team has also been working on the West Coast of the South Island after the local development agency decided to focus on literacy to improve economic growth in the region.

The challenge was a bit different as these children were already reading and writing at around the national average. Over three years researchers worked with 33 primary schools and early childhood centres to improve on that. They developed a customised programme that identified students' strengths and weaknesses and adapted teaching methods to fit. The programme also encouraged teachers across the region to meet to solve problems and share ideas and experiences.

The results were outstanding. After three years, 41 percent of students were reading at high or very high levels. The national average is 23 percent.

The Woolf Fisher Research Centre's advances in literacy have attracted attention overseas and the centre is advising teachers in Australia and working with colleagues in Singapore, the US and Europe.

"This research is solving an international problem, that elsewhere hasn't been effectively solved. It enables children to make much greater gains than they would otherwise," says Stuart. "Higher literacy enables students to come to grips with the curriculum better and access all the interesting things there are to learn in primary school, high school and beyond."

[www.education.auckland.ac.nz/uoa/home/about/centres/wfrc](http://www.education.auckland.ac.nz/uoa/home/about/centres/wfrc)



# Straight Shooting

Film-maker Annie Goldson knows how to tell tough stories and she is not afraid of getting personal.

Her documentaries include a mother's quest for justice after Indonesian soldiers gunned down her son; the colonial hangover, religious evangelicalism and homophobia behind the murder of a Red Cross staff member in Fiji; the plight of young Afghan refugees in Auckland; and a New Zealander's search for answers after the Khmer Rouge killed his brother.

Annie, who is Associate Professor of Film, Television and Media Studies at the University, makes internationally acclaimed human rights documentaries. By following personal stories she takes her audience into the heart of historical conflicts in the Asian region, shedding fresh light on complex issues.

"I've always had a strong sense of social justice but I don't follow a particular political agenda," Annie says. "Rather I want to explore history and context as a way of engaging audiences."

She has strong links with documentary-makers around the world and a wealth of hands-on experience to pass on to her students. "Documentary-making takes passion, commitment and endurance."

A former Radio New Zealand journalist, Annie taught herself film-making on the streets of New York. She completed an MA in Film Studies at New York University, her PhD at The University of Auckland, and in 2007 was awarded a New Zealand Order of Merit (ONZM) for services to film.

Her first major human rights film, *Punitive Damage*, came out in 1999 just as Suharto lost power in Indonesia and the East Timorese were seeking independence. It tells the story of

Helen Todd's four-year struggle to hold the Indonesian Government accountable for her son's death in the 1991 Dili massacre.

In 2005 Annie made *Pacific Solutions* about day-to-day life for a group of Afghani boys, refugees in Mangere. Her 2008 documentary, *An Island Calling*, dissected the 2001 murders of Fiji Red Cross boss John Scott and his male partner. It was critically acclaimed around the world and won Best Documentary at the Qantas Film and Television Awards.

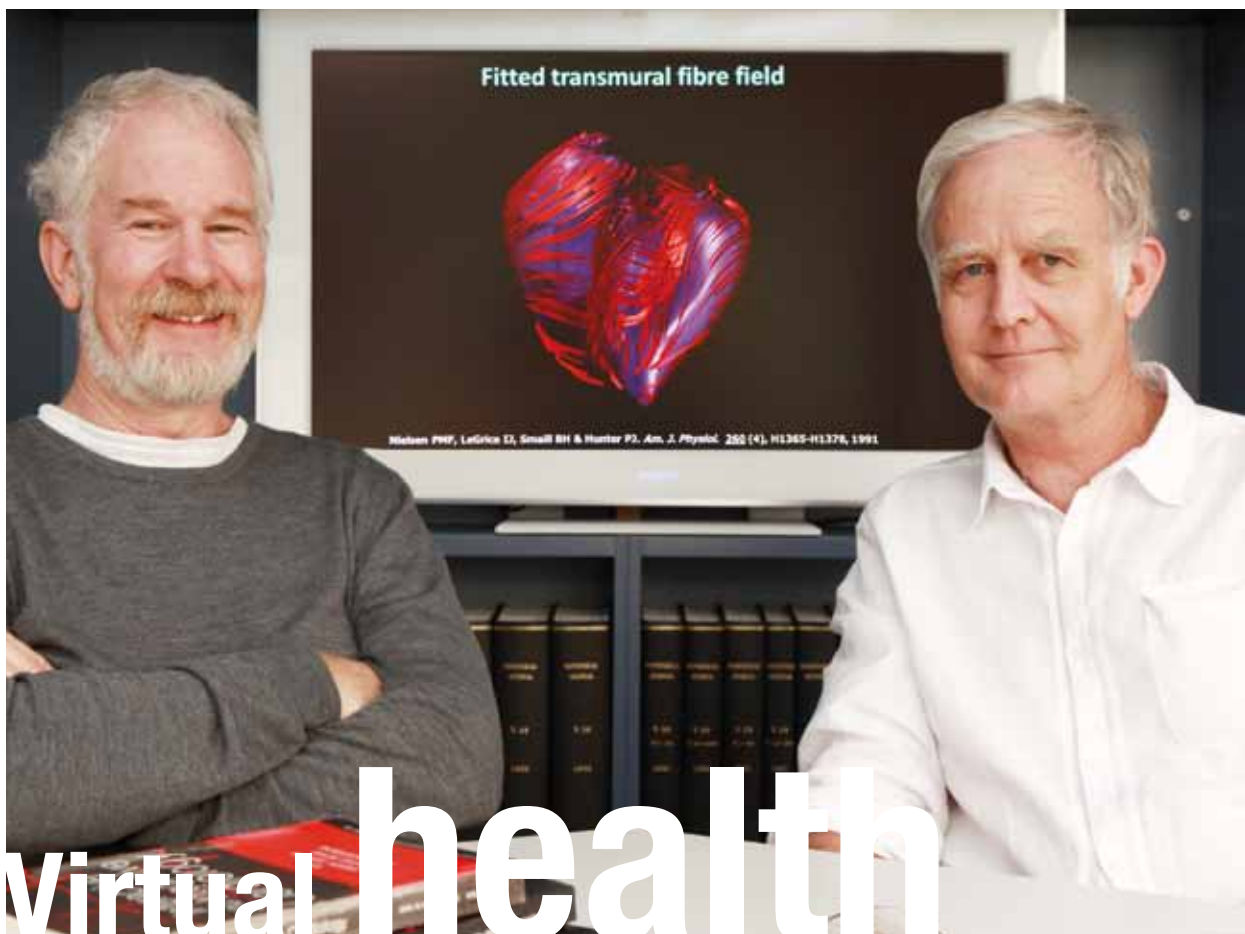
Now Annie is prising open a devastating period in Southeast Asian history – the reign of Pol Pot and his Khmer Rouge followers. More than 1.5 million Cambodians were killed by the regime, and so was a New Zealand yachting enthusiast called Kerry Hamill. In *Brother Number One*, Annie follows champion rower Rob Hamill who goes to Cambodia to find out what happened when his brother was captured, tortured and killed in 1978.

While the film crew waits for the War Crimes Tribunal to sentence Comrade Duch, the official responsible for Kerry's death, Annie and her team are building an international audience for *Brother Number One*.

"The new digital climate gives educational possibilities that enhance the impact of a film," says Annie. The film's website and outreach programme include New Zealand Cambodians telling their stories, a film-maker's diary, and articles by historians, journalists and human rights lawyers.

[www.brothernnumberone.co.nz](http://www.brothernnumberone.co.nz)

[www.op.co.nz](http://www.op.co.nz)



# Virtual health

Imagine seeing a fully animated version of your body - right down to cells, proteins and genes - flash up on the doctor's computer screen. Your scan results are fed into this digital profile to track the progression of disease, and the doctor uses the information to decide the next step for treatment.

It may sound futuristic but the University's Auckland Bioengineering Institute (ABI) is a world leader at creating computer models of the human body. Known as computational physiology, this technique combines maths, computer science, engineering and biology.

"I have no doubt that the key to healthcare in 20 years will be to have a high quality, predictive and personalised representation of your body by using maths," says ABI director, Professor Peter Hunter. "The body has to obey the laws of physics and by bringing in those equations we're able to better understand how you as an individual operate."

Peter, who received the 2009 Rutherford Medal, New Zealand's top science honour, created with Associate Professor Bruce Smaill the world's first anatomical computer model of the human heart in the 1990s. That work spawned many projects and in 2001 he and Bruce formed the pioneering, multi-disciplinary institute.

The ABI's team of 50 researchers and 80 postgraduate students in collaboration with the University's Maurice Wilkins Centre is leading the international Physiome Project to make computer models of the body's 12 organ systems. "The idea is to create mathematical models that link genes, cells, organs and the whole body into one cohesive framework that will be a resource for diagnosing and treating patients, surgical planning, education and designing medical devices," says Peter. This could be the key to lower cost and improved healthcare.

Oxford, Iowa and Vanderbilt universities are among those involved in the Physiome Project, with Auckland leading work on multi-scale models of lung and heart function. "The lung team is also working with local clinicians using structure-based models to understand the development of symptoms of pulmonary hypertension," says team leader, Associate Professor Merryn Tawhai.

While it is still early days, ABI heart models are already being used for diagnosis at Auckland Hospital and by Philips Healthcare in the UK, who make heart-imaging equipment.

The ABI's gastrointestinal team, led by Professor Andrew Pullan, is working to help surgeons understand gastro-oesophageal reflux disease and fecal incontinence. And a PhD student's work to map the spread of melanoma from the skin to the lymph nodes could soon have clinical applications.

Spin-out company eBONZ uses modelling of bone and musculoskeletal systems to help plan surgery for patients, while Telemetry Research, another spin-out, provides wireless devices that are implanted to monitor and collect physiological data.

Of the future Peter Hunter predicts that the combination of ABI instrumentation and models of the anatomy and physiology of the human body "could, when coupled with the right investment, research and commercial partnerships, enable New Zealand to develop a world-leading medical device industry".

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

**Photo above:** Bruce Smaill (left) and Peter Hunter.

**Cover photo:** Merryn Tawhai with computer lung model.



# Young scientist

Ask 17-year-old Alex Temu anything about the feeding habits of banded kokopu, and it's likely he'll know the answer.

The deputy head boy at Tāmaki College is hooked on the native fish – and environmental research – thanks to LENSscience, The University of Auckland's scheme to bring schools and scientists together.

Alex has been studying kokopu at St John's Reserve in St Heliers bringing the results of his fieldwork back to the University-based LENSscience classroom.

"I wanted to try environmental science and it's been a great experience," says Alex, who has studied several topics since joining the mentor programme when it was launched by the Liggins Institute in 2006.

LENSscience links directly to the secondary school curriculum, providing opportunities for school students and teachers to work with scientists and learn about the latest advances in the

life sciences and applied biomedical research. In 2009, more than 3,000 students from 86 Auckland, Northland and Bay of Plenty schools attended programmes researching topics ranging from the spread of sea lettuce in the Manukau Harbour to how the chemical bisphenol A (BPA) may travel across the placenta. A further 1,000 senior biology students participated in live seminars broadcast to nearly 90 schools across New Zealand.

For Alex, the programme has "opened new gateways" and next year he plans to study biomedicine at the University.

"LENSscience has helped me have big dreams," he says. "I want to be a doctor and a researcher and I want to find a cure for a disease, probably diabetes because I'm a Pacific Islander [he is Cook Island/Māori] and there are a lot of Pacific Islanders who have diabetes."

<http://tinyurl.com/2g8oqmm>