Auckland NOW

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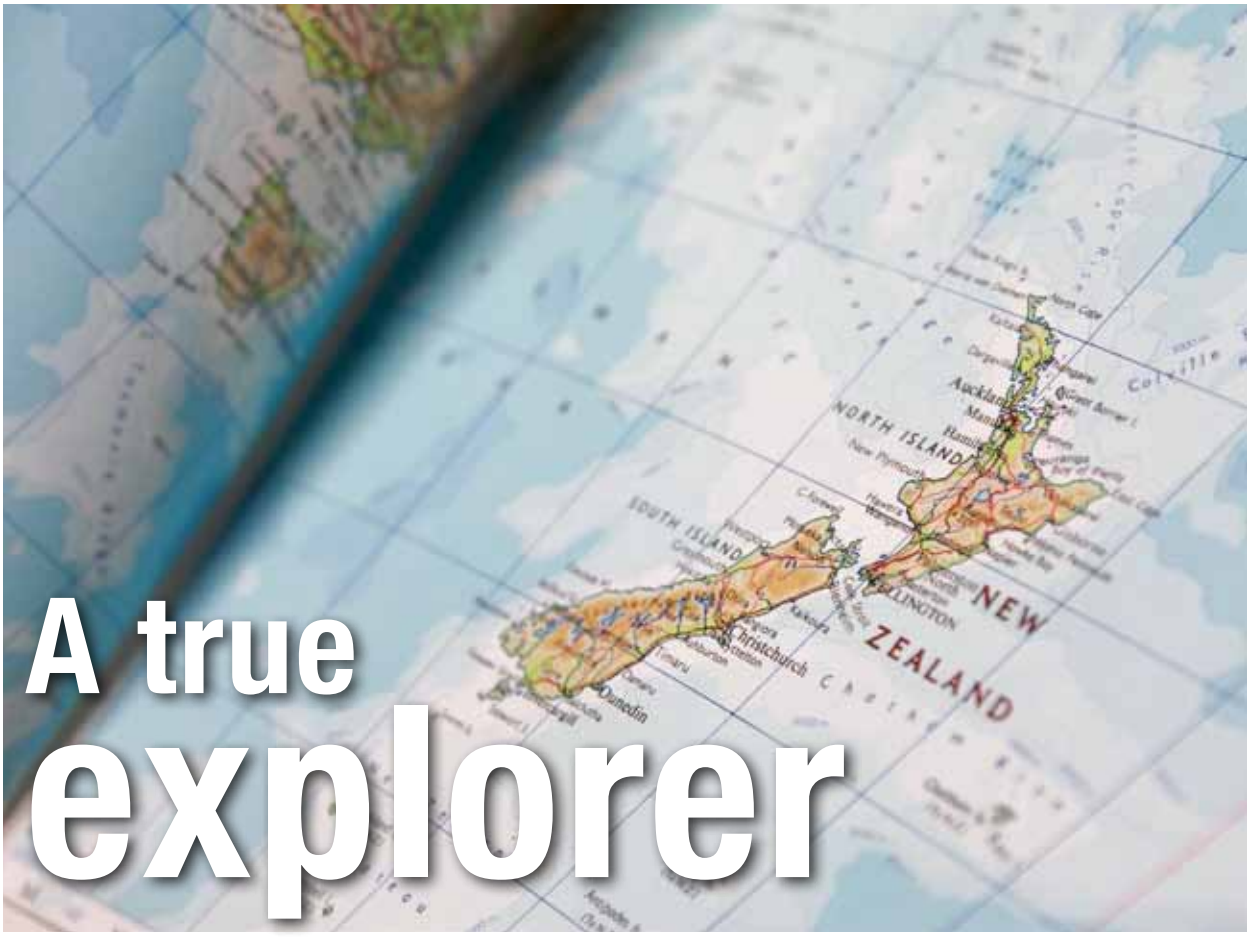
Re-imagining the past
Dame Anne Salmond explores other worlds

Underwater world
Our new interpretive centre at Leigh

Wireless cars
Streamlining electric car technology

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND
Te Whare Wānanga o Tāmaki Makaurau



A true explorer

Like her famous subjects Captain James Cook and Captain William Bligh, eminent anthropologist and writer Dame Anne Salmond is a master at exploring other worlds.

"Writing about the past is like entering another world," she says, "And if you don't take it that seriously, you probably won't understand all that much."

As a young lecturer in Māori Studies and Anthropology at The University of Auckland in the 1970s, Anne formed a unique connection with Māori elders Eruera and Amiria Stirling of Te Whaanau-a-Apanui and Ngati Porou. "For 20 years I spent time with the Stirlings, delving into Māori culture and language and thinking to some extent in that language, living on marae and realising it was a different world, that there was another way of thinking, a different way of being."

Her time with the Stirlings led to three award-winning books – *Hui: A Study of Maori Ceremonial Gatherings; Amiria: The Life Story of a Māori Woman*; and *Eruera: Teachings of a Māori Elder*.

Her next literary voyage was to research and reconstruct first encounters between Māori and European explorers, again immersing herself to give readers a sense of being on both sides of the story. *When Two Worlds: First Meetings Between Māori and Europeans 1642-1772* came out, most readers had never thought of exploration in that way.

"It had largely been a tale told from the decks of the ships," says Anne. "It was a new thought that on the other side of these encounters were Māori individuals who had their own agendas, their own beliefs about the world and their own ways of dealing with strangers, all of which shaped what happened."

More recently Anne has turned her focus to the Pacific, publishing *The Trial of the Cannibal Dog: Captain Cook's Encounters in the South Seas* and then *Aphrodite's Island: the European Discovery of Tahiti*, which is now being translated into French. Her new book *Bligh* comes out in September, and again her research has been prodigious. "I try to go to the places, talk to the descendants, and read as much as I possibly can about both sides of the encounters. When I'm writing I spend many hours in that time and place in my imagination."

Now a Distinguished Professor at the University, Anne is acclaimed in New Zealand and overseas. She is a Dame Commander of the British Empire for services to New Zealand history and recently won a 2011 Kea World Class New Zealander award. She is one of an elite group of foreign associates in the American National Academy of Sciences and is the only New Zealander to also be a fellow of the British Academy for the Humanities and Social Sciences.

Anne's current Marsden project, Te Ao Tawhito, aims to reconstruct Māori life as it was before the first Europeans landed. "We're using archaeology, early Māori manuscripts, eyewitness accounts, tribal history, Waitangi Tribunal and Land Court reports to produce a book and documentary.

"It is probably a Māori and Pacific perception that the past is not dead, the past lives," she says. "My experience of writing is exactly that – the past continues to be active in the present."

Sixth sense

Every spring, godwits end their winter soujourn in the north Pacific and head south on a non-stop 10,000km flight across five different windbelts. They don't have a GPS or flight plan to guide them but with pinpoint accuracy they come to the New Zealand Islands – a target perhaps two to three degrees wide when they set off.

"Isn't that magic?" says Professor Michael Walker of The University of Auckland's School of Biological Sciences. His research includes studies seeking to understand how animals navigate using the Earth's magnetic field.

Scientists have thought since the 1800s that animals such as petrels, godwits, turtles, trout, sharks and whales might use a "sixth sense" to navigate across the planet. But it wasn't until the 1970s that magnetite (F_3O_4), a magnetic mineral used in early compasses, was found inside the heads of birds.

"Our hypothesis is that magnetite enables the animals to extract information about latitude and longitude within the Earth's magnetic field. This tells them where they are relative to where they want to go," says Mike.

In an international scientific collaboration working with American, German and English scientists, Mike and his team are using freshwater trout to try to understand how magnetite is arranged inside cells and how the cells pass on information about the magnetic field to the brain.

"If we can work out how the animals are moving then we can potentially reconstruct paths in environments where GPS doesn't work, such as under the sea. A device could be developed to track fish migratory patterns to help manage a fishery."

Mike is also working with homing pigeons. Their ability to navigate according to the Earth's magnetic field could eventually help scientists study far-off planets. He has been looking at data from around the world that has been collected over many decades as they fly home.

"There was one pattern that appeared in the 1970s that was never seen again. But then I found it in someone else's data in Germany and discovered there's a logical pattern. The latitude lines are very slightly curved, too small for the animal to detect, so it generates a systematic error." As a result of analysing the data Mike's team can predict the pattern.

"This research means that, for example, if we wanted to send a space probe to a planet with a magnetic field we'd be able to programme it to take account of these errors along the way. That may be a long way off, but conceptually it's possible now, thanks to pigeons."

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Power trip

Driving through the congested streets of London is stressful enough without worrying about having to stop to plug in your electric car. Wireless technology, pioneered at The University of Auckland, aims to relieve the anxiety and encourage drivers to switch to cleaner, more efficient electric power.

Inductive Power Technology (IPT) uses magnetic fields instead of cables to recharge the car, says Anthony Thomson, CEO of London-based company HaloIPT. Rather than needing to be plugged in, HaloIPT cars charge automatically when parked over a transmitting pad embedded in the road.

HaloIPT is one of the most exciting spin-outs from UniServices, the University of Auckland's commercialisation company, and its technology has been taken up by UK companies including Rolls-Royce.

HaloIPT's wireless charging pads are designed to transmit from under asphalt, through water, ice and snow and can power vehicles ranging from small city cars to trucks and buses.

"This is an enabling technology for electric vehicles because drivers don't want the hassle of plugging in their cars," says Anthony. "Having charging pads around the city will mean they will fret less about running out of charge." Further down the track HaloIPT aims to link cities with "charging lanes" so vehicles can drive along the open road and pick up power en route.

HaloIPT is expanding in the UK thanks to financial backing from UniServices, Arup global engineering and design consultancy, the Trans Tasman Commercialisation Fund and the NZ Venture Investment Fund. It has provided two IPT cars for the Technology Strategy Board's electric vehicle trial - the first in the world to test wireless cars alongside plug-ins.

HaloIPT has also been asked to trial its technology in four electric-fleet vehicles owned by Transport for London, the city's public transport provider, and for car-share schemes in Oxford and Copenhagen. And to prove that electric vehicles can be more than just ultra-urban shopping carts, the technology was recently showcased in a Rolls-Royce Phantom featured at the Geneva Motorshow. "Electric vehicles can be luxury cars too," says Anthony.

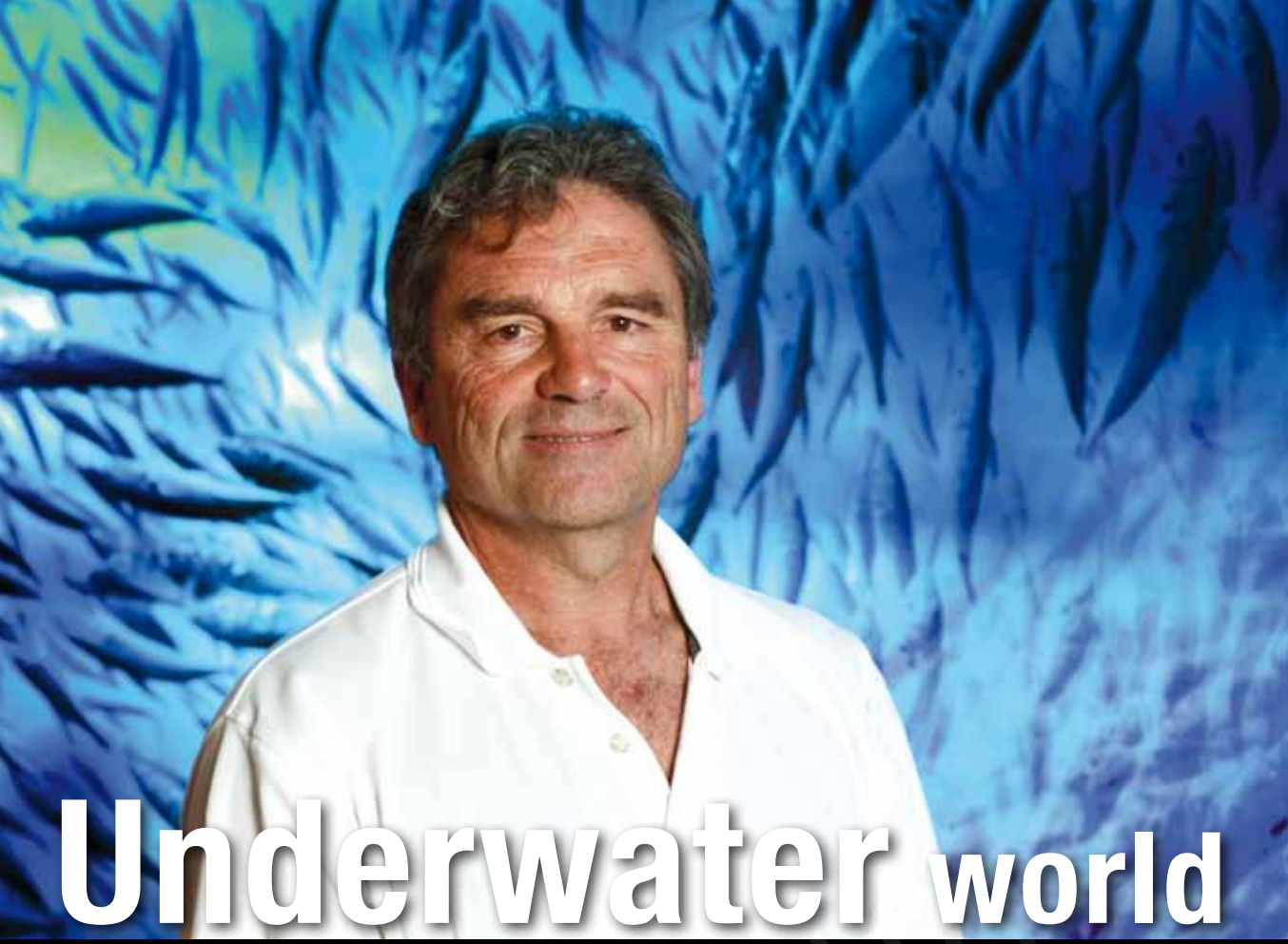
While there is international competition to develop wireless charging for cars, Anthony says HaloIPT has the leading edge. "Our technology has superior performance with hardware that is less than 40 percent of the size and weight of competitors. That means lower cost too."

Though the company is London-based, HaloIPT's research and development is firmly planted in Auckland. The University's Power Electronics Group, leaders in developing Inductive Power Transfer (IPT), are constantly refining the technology, looking for ways to improve performance, add features and integrate safety systems.

"Reducing size, weight and cost is key to the auto industry, so that's a huge focus for the team," says Anthony. "The technology is assembled and tested in Auckland so we can closely monitor quality.

"It feels like the electric vehicle has come of age. We have created world-leading technology for electric vehicles that will shape the way we drive in the future," he says.

www.haloipt.com



Underwater world

It's hard to understand marine scientist John Montgomery when he's underwater with a snorkel in his mouth - but much easier when he is leading you through The University of Auckland's new Interpretive Centre at the Leigh Marine Campus.

Entering one of the eight display pavilions is like walking in an underwater world. A spotlight of refracted light, known as the Snell's window phenomenon, beams through from above and strange shapes float by, followed by the explanation: "These are phytoplankton - plants of the ocean that turn energy from sunlight into biological material at the bottom of the food chain."

The Interpretive Centre, which officially opens in June, is a key part of a $10 million redevelopment of the University's Leigh Marine Laboratory and Campus based at Goat Island Marine Reserve, 90km north of Auckland.

"We are replicating a sense of being underwater by incorporating graphics over glass panels," says John, the director of the laboratory and Professor of Marine Science. "The centre shows processes within the ocean, the University's marine research, and provides hands-on tuition for school groups."

Unlike other education centres around the world, Leigh is the only one attached to a marine reserve. "We're hoping many of the visitors to the reserve (about 350,000 each year including 600 school children) will go snorkelling down at the reserve and then come and make sense of what they've seen in our centre," says John.

The Goat Island Marine Reserve was set up in 1975, the first in New Zealand and the first in the world to ban all fishing and gathering. Snapper and crayfish that were decimated by overfishing have come back and the coastal area now teems with fish, sponges, shell beds and seaweed forests.

This is fertile ground for the 40 postgraduate Marine Science students and staff at the Leigh Campus. Their leading research projects include an Engineering Science computer model to follow snapper larvae and breeding patterns; tagging and tracking great white sharks and marlin; experiments in growing sea cucumbers on mussel farms; and studies into reef ecology and energy flows.

All the research at Leigh aims to enhance the marine environment. One project looks at the ability of fish to sense low oxygen levels. "This is becoming an issue worldwide with oxygen-depleted areas due to nutrient enrichment and global warming," says John. "We're trying to find out if fish know they're entering a low oxygen area and if they do, can they then find their way out of trouble?"

John is working with Environment Waikato, the Department of Conservation and Auckland City to reverse deterioration of the Hauraki Gulf marine environment. The laboratory is also a leading player in international initiatives such as the Global Register of Marine Species and these will feature at the centre.

"New Zealand is world leader in marine conservation and fisheries management. Surveys show our public sector will need about 500 MSc and PhD Marine Science graduates over the next ten years," says John. "We see the centre as a wonderful opportunity to create a shop-front for Marine Science, and Science in general."

Chinese experience

听而易忘, 见而易记, 做而易懂 -- 孔子

I hear and I forget
I see and I remember
I do and I understand
– Confucius, Chinese philosopher

Alannah Manson was a 15-year-old student at Marist College, in Mt Albert when she entered a speech competition through The University of Auckland's Confucius Institute. It was the beginning of a fruitful relationship that has taken her all the way to China.

Each year while studying Chinese at school and then at The University of Auckland Alannah competed in the institute's speech and essay competitions as a way to improve her Mandarin. In 2009 she won the University competition and was funded by the Confucius Institute to go to Beijing to compete against other international students. From there she went to Qingdao in Shangdong (the home province of Confucius).

"We practised our Chinese with the locals as we visited the 2008 Olympics site, practised Tai Chi with a Daoist monk and sampled the seafood and beer that Qingdao is famous for."

She also developed a taste for studying in China. Having made it through to the semi-finals and a third placing in the competition, she returned later in the year on a Confucius Institute scholarship as part of the University's Chinese Language Study Abroad programme.

The University's Confucius Institute was the first established in New Zealand and is one of over 300 world-wide. It is based on the City Campus and is run in partnership with one of China's most prestigious universities, Fudan. "Our aim," says director Nora Yao, "is to foster understanding of Chinese language and culture in New Zealand schools, businesses and the community. The institute is also a platform to encourage understanding between the two countries".

For Alannah, who is studying for an LLB and completing a BA majoring in Chinese and Politics, the Institute has been crucial to her proficiency in Mandarin as she aims to work in China. "The institute has enabled me to get the best kind of language practice a student can get," says Alannah. "It's given me the opportunity to become fully immersed in Chinese language and culture."

www.confuciusinstitute.ac.nz

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