



PLANT & FOOD RESEARCH

Jason Johnston works on automated monitoring of stored fresh produce at Plant and Food Research.

NEW ZEALAND

A small science community offers opportunities in a dramatic landscape, but can also limit career progression.

BY ANNABEL MCGILVRAY

When mathematician Alys Clark left the United Kingdom to do her master's degree in Australia, she only intended to be gone for a year. She ended up following her course with a PhD, before moving “across the ditch” to take up a job in New Zealand. Seven years after leaving home, she's still there, living with her New Zealand husband and their young son amid ferns and kauri trees, just a short drive from the black sands of the country's west-coast beaches.

“It's pretty amazing, in that you can drive for half an hour and you are on the beach and not far away are the mountains,” says Clark, who uses mathematics and physics to create virtual organs and identify early pathological changes at the University of Auckland. In 2014, Clark was awarded a five-year Rutherford Discovery Fellowship, which she is now using to mathematically model the physical processes involved in early pregnancy.

Beyond the natural beauty on her doorstep, Clark feels at home in what she describes as a collegial, informal and inclusive research culture. “The senior academics are very approachable and supportive of researchers going off and setting up their own projects. The whole way of life is a little more relaxed than back home in the UK.”

New Zealand has a population of less than 5 million and spends just 1.2% of its gross domestic product on research and development — half the international average, according to the Organisation for Economic Co-operation and Development. As a result, the science community is small and the scope for career

progression is limited, particularly in academia. “It's not always an easy environment to stay in if you want a long-term career,” says Clark.

But for others, the small pool has advantages. Having previously worked in his native Germany, as well as Switzerland and the United Kingdom, meteorologist Olaf Morgenstern moved to New Zealand to continue his climate-modelling research in one of the field's most challenging environments. Before the move, a colleague told him that whereas in larger communities he may be a small fish in a big pond, in New Zealand, “the pond is all yours”. Indeed, since arriving to take a position at the National Institute of Water and Atmospheric Research in 2008, Morgenstern has become something of a big fish: last year he took on a job in Wellington, leading the Earth system modelling and prediction programme for the Deep South National Science Challenge, the country's Antarctic climate-science endeavour.

A growing interest in climate science and modelling in New Zealand in recent years fits well with the country's conventional strengths in Earth and environmental sciences. In the Asia-Pacific region, New Zealand leads the field, according to the *Nature Index*, which assesses research performance on the basis of contributions to high-quality publications. Agricultural research is a particular strength, driven by both government-owned research institutes and large corporations, such as the multinational dairy cooperative Fonterra. Although New Zealand's dramatic landscape is central to its appeal to many international researchers, for others, such as Morgenstern, the country's beauty is just an attractive backdrop to the scientific challenges and opportunities that it provides. ■



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BRUCE CAMPBELL

Chief operating officer at Plant and Food Research, headquartered in Auckland

What aspects of working life in New Zealand make it appealing?

You can pursue an international-standard career, while also having a good work-life balance. There's recognition of the importance of family and a collegial work environment.

What distinguishes the country's research culture?

Plant and Food Research is one of seven government-owned Crown Research Institutes. Organizations such as ours have strong links with universities and industry groups, with secondments happening both ways, providing opportunities for diverse experiences. Because we are a small country, there are good opportunities for researchers to connect to key decision-makers in government and influence science-related policies. Science in New Zealand is currently undergoing reform to make the system much more collaborative between stakeholders such as research institutions, industry and government.

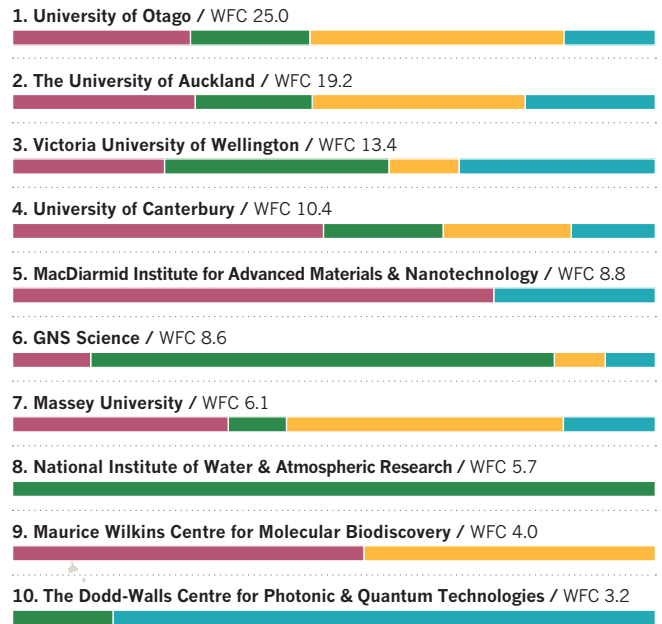
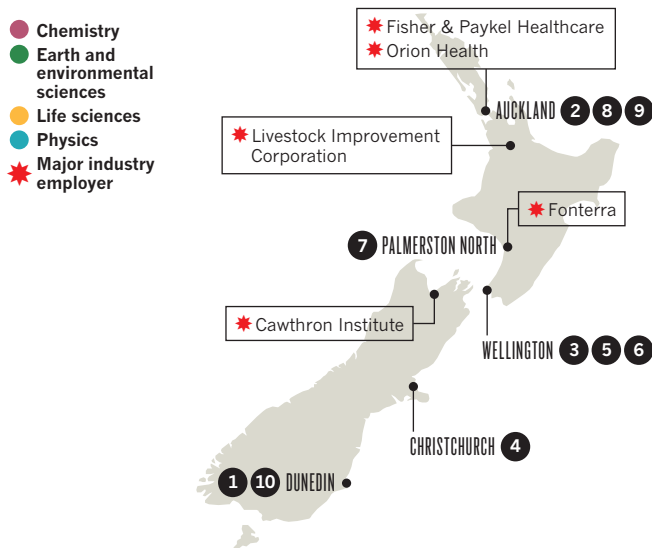
Does New Zealand's location make international collaborations difficult?

When you're working with researchers in other countries, there can be a perception that you're a long way away. We work hard to break down that barrier with modern digital communications. And scientists here probably spend more time on aeroplanes than those in other parts of the world. But it's only an overnight flight to the western United States or around 24 hours to Europe. Isolation can also stimulate innovation, and the physical environment in New Zealand is conducive to thinking about different ways of doing things, which is a great starting point for science. **A.M.**

This interview has been edited for length and clarity.

WHERE TO WORK

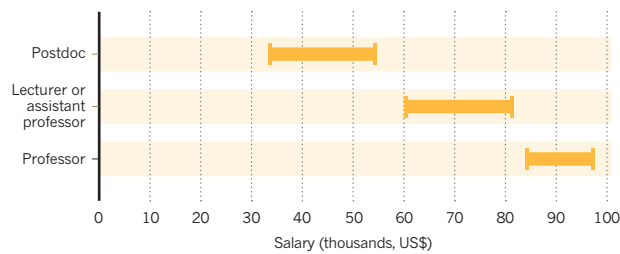
The top ten institutions in New Zealand, based on research output included in the 2015 *Nature Index*, May 1 2015–April 30 2016, shown as weighted fractional count (WFC), a measure of the relative contribution of an author to an article weighted to correct for imbalances between subjects. Bars are divided according to the proportion that each subject area contributes to the overall score.



Overlaps in subject areas may cause some distortion to relative subject proportions.

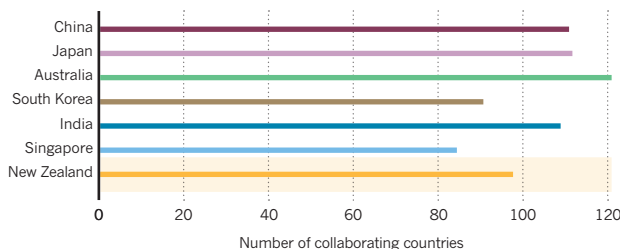
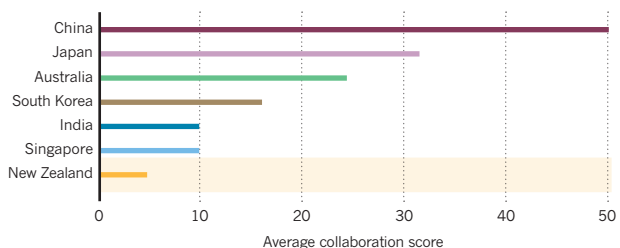
SALARIES

The relative gap between the best and worst paid in New Zealand is the smallest of those in the Asia-Pacific countries profiled, according to data collected in *Nature's* interviews.



COLLABORATIONS

New Zealand's average collaboration score (top) — the sum of *Nature Index's* fractional count (the relative contribution of authors to an article) for international collaborations divided by the number of countries New Zealand collaborates with.



RESEARCH FOCUS

Perched on the edge of the Southern Ocean, New Zealand is an ideal base from which to assess the roles that the Antarctic and its surrounding waters have in climate change.

Motivated by the most recent report by the Intergovernmental Panel on Climate Change — which says that existing international climate models do not accurately account for the unusual cloud-cover patterns caused by the low-pressure systems that dominate in the Antarctic — the New Zealand government has established the Deep South National Science Challenge. The multidisciplinary collaboration's mission is to better measure the changes occurring now, and more reliably predict what might happen in the future.

Deep South researchers are creating their own modelling system based on ongoing observations, and sharing their data with international groups to improve global modelling. Their results will also inform policies about domestic issues that could be affected by climate change.

Deep South is 1 of 11 National Science Challenges established by the New Zealand government to address issues of national and international significance. The others include Ageing Well, Sustainable Seas, and Building Better Homes, Towns, and Cities. The aim is to bring together publicly funded Crown Research Institutes, non-government bodies and business to tackle these challenges. The government is backing the plan with NZ\$1.6 billion (US\$1.2 billion) over a decade.

OPPORTUNITIES & CONTACTS

- The government's New Zealand Now service offers personalized e-mails about jobs opportunities, including those in research, as well as information on studying, working and living in the country.
- New Zealand International Doctoral Research Scholarships provide university tuition fees, living expenses and medical insurance for three years for international students undertaking a PhD in the country.
- The Li Lairong Horticultural Research Fellowship is available to Chinese students for research placements of up to three-month with Plant and Food Research, a government-owned institute. ■