

Pay it forward

PHOTOGRAPHY BY ANNA BRIGGS

Antarctic geologist and climatologist Dr Richard Levy is a communicator and educator as much as he is a scientist. He talks to *Sarah Lang*.

Antarctic researcher Richard Levy, who has been to the great white continent a whopping 13 times, enjoys his weeks in a tent there. But when he gets back to Wellington, he appreciates running water, showers, toilets, and beds. “Much of your time in Antarctica is spent melting snow to make water, cooking, keeping warm, with a bit of time left to do your work!”

Richard recently received one of seven Blake Leadership awards, for New Zealand individuals making an exceptional contribution. Richard had won awards before, but mainly for team projects. “The Blake award is special to me because it acknowledges my role in leading teams and driving some things forward.” It recognises that, on top of researching climate change and its challenges, he’s working to translate the science and find ways forward. “But the award also makes me feel slightly uncomfortable, as I fluctuate day to day between introvert and extrovert.”

Richard lives with his wife Amy, a psychotherapist, and daughters Sophia, a nurse graduate, and Maya, a chef. He met Amy while doing his PhD on Antarctica’s 40-million-year-old ice sheets at the University of Nebraska-Lincoln (UNL), known for Antarctic science. “She was a waitress in a cocktail bar. Well, it was a brew pub and my geology mates and I would head there to end the week. Amy was studying for her psychology bachelor’s degree. We chatted briefly but it wasn’t until she bought me a beer that I knew something could happen!”

“I’m lucky my parents let me figure out what I wanted to do, and encouraged my PhD. Because back then, many people would say ‘Why are you doing more study? Get a job!’”

He studied further, doing a master’s in science teaching. “I decided to become a teacher of teachers. I taught at a science-focussed high school and in a middle school. I realised I wasn’t just teaching science but was

responsible to help young people navigate through societal struggles.” He returned to UNL as a researcher in 2003. Five years later, he moved to Wellington to work at Crown research institute GNS Science Te Pū Ao “and Amy and our daughters graciously came with me. My mum was thrilled of course!”

“My time in the field has put pressure on our family,” he admits. “But Amy’s always supported me and acknowledged my work is important. I also benefit from her insight as a psychotherapist, about interacting with people.”

When asked by people what he does for work, he used to simply say a geologist, but people often asked for details. “Then I’d say: ‘I’m trained as a geologist – and, more specifically, as a palaeontologist, I study fossil lifeforms to help interpret environmental change.’ Nowadays, I typically say ‘a geologist and climatologist trying to figure out how our climate will change in the future.’”

Paleoclimatologists use information captured in layers of rock and ice to get insights into the climates during Earth’s different geologic ages. Richard studies microfossils (generally 0.001 to 2 millimetres in size) in rocks and sediments. He specialises in fossil dinoflagellates and diatoms: the microscopic remains of marine algae floating around in the ocean.

“I can take a gram of sediment, dissolve it in water and a bit of acid and so forth, put it on a microscope slide, and discover a whole hidden world. One quick look and it’s wow, I can see what the ocean was like 30 million years ago: the temperature; whether it was fresher or saltier. Then you piece together a jigsaw that tells you how the climate affected the environment then and might do so again.”

Richard spends four days a week as a Principal Scientist at GNS. “I lead our environment-and-climate research theme. We’re always asking, ‘Is our research addressing



what our country, government, and other stakeholders need?' If not, we realign."

Richard spends the remaining day each week as Professor at the Antarctic Research Centre Te Puna Pātio, which has 27 staff and 16 students, at Te Herenga Waka Victoria University of Wellington. "Happily, in my two jobs, the science connects seamlessly."

His first Antarctic trip was as a geology student in 1992, when he was offered a spot on a field team going to Antarctica. Did Richard want to go? Did he what. Even after 13 times, "Excuse the cliché, but Antarctica's awe-inspiring."

Once, a Hercules aircraft couldn't get Richard's research team to their field location, so the pilot of a smaller plane said "Drop them at the South Pole and I'll take them from there." The South Pole was as close as I'll get to a moon landing!"

Richard has led or participated in figuratively and literally ground-breaking ice-drilling projects in Antarctica and elsewhere (including the pioneering international ANDRILL project). He uses data to project sea-level rise, working with "data people" (geologists and statisticians) and climate and ice-sheet modellers.

The Greenland and Antarctic ice sheets – each a mass of glacial ice – are effectively reservoirs containing about 99% of Earth's fresh water (mostly frozen, for now); the Antarctic ice sheet is almost 14 million square kilometres. The Ross Ice Shelf, the size of France, is the world's largest body of floating ice.

Richard is currently co-leading international project SWAIS2C. Next summer, they'll set up camp on the Ross Ice Shelf. "We're trying to determine whether Antarctica's large ice shelves will collapse as earth's temperature pushes towards a two-degrees-celsius rise; if they collapse, sea-level rise will speed up." Their process? "We'll use a special drill to literally pour hot water on top of the ice shelf and melt a hole about 600 metres deep into the ocean cavity below, then lower a special sediment-cutting drill bit from a specialised coring rig to get the sediment beneath the sea floor."

Richard also co-leads, with long-time colleague Tim Naish, the \$7.1-million, multi-organisation NZ SeaRise: Te Tai Pari O Aotearoa programme. It has released sea-level-rise projections for every two kilometres off the coast of New Zealand up to the year 2300. They just got funding to continue this work, focusing on shoreline change and impact.

A typical day? "I get up at 5:30am, feed our golden retriever, and by 7:00am, I'm on my way to work. Mostly, I'm at a computer: writing papers, responding to requests for information, writing funding proposals, supervising students, making sure my team's research is supported and progressing. It's quite diverse. I'm never bored. I'm home at a reasonable hour to help cook, and usually in bed by 10pm." At weekends, he enjoys mountain biking. "I like the hardship of climbing the hill, then the fun of coming down fast, trying to avoid trees. When life's so busy, mountain biking allows me time out, to be in the moment."

He also finds time to speak to groups such as city councils, rangatahi, and science communicators. "Scientific knowledge is hollow if it's not translated well. I try to communicate the climate-change challenge while also highlighting there are ways forward."

If we feel overwhelmed as individuals? "If you access scientific knowledge, and pass that on, we'll get more people on board and put pressure on those in power. Acknowledging climate change is a big challenge – learn about it, but don't get too afraid of it." Richard has read about the psychology of educating people without creating fear. "If I'm ever getting a bit down and dark, Maya says, 'Dad, let's be positive about this. This is our future.' I'm confident we'll get on top of this problem."

Richard grew up in Masterton. "I loved Meccano and Lego. I wanted to build and create things." He studied architectural design for a year at Victoria. "But I had too much fun in my first year, as you do, and didn't do well in several courses. Then I took a geology course and thought, 'Wow this is science: three-dimensional, creative, and you're not always stuck in a lab'. Understanding how the world once was – and cracking open a rock unseen for potentially hundreds of millions of years – fascinated me."

Years later, he and GNS colleagues established an inquiry-focused program, Geocamp. "We keep our mouths shut and let young people be geologists, because research shows if you get hands-on, that's effective."

"I like to listen to and encourage young people, partly because I was once that person given a life-changing opportunity. We should give young people a chance, particularly if they're showing interest and enthusiasm. Don't just look at whether they've got A, B, or C grades. Recognise we all have potential." ■