

## OBITUARY

Sir Paul Callaghan 1947 – 2012

Scientist with an inspiring curiosity

Barely a month before his death an obviously illness-racked Sir Paul Callaghan stood in front of an audience to talk about Zealandia. He didn't need to be there – ecologist Charles Daugherty had offered to step in. He was so ill he warned the crowd he might tire and need to sit. Or he might have to hand over to Professor Daugherty if he couldn't make it through. But he just couldn't waste the opportunity to promote a pet project.

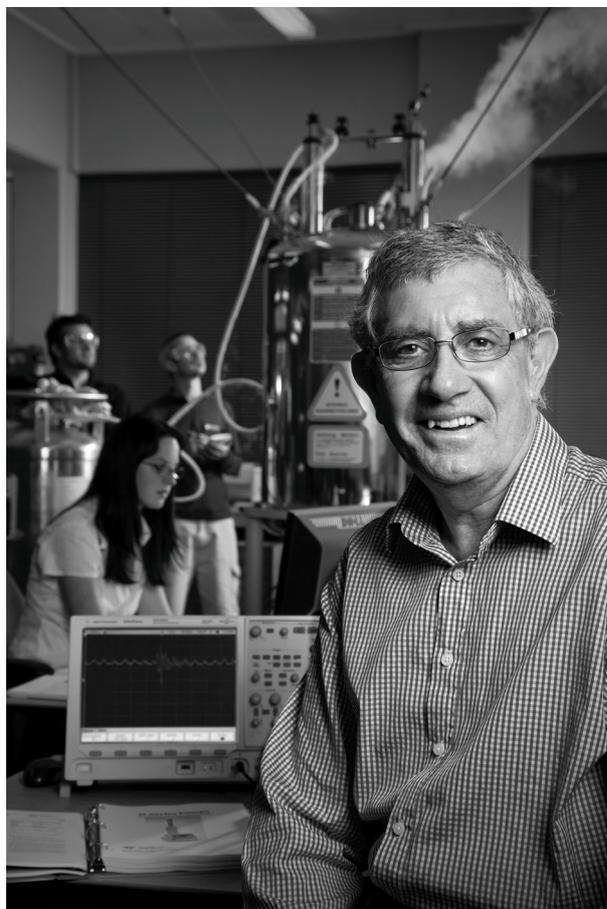
The effort cost him dearly – he landed in hospital two days later, where he remained for a month before being allowed home to die last week. It's a measure of the man that, despite the consequences of that talk, he told *The Dominion Post* he'd do it all again.

World class scientist, leader, passionate advocate for a better, more prosperous New Zealand, Sir Paul's contribution is difficult to quantify or classify. Sir Paul's accolades and achievements are too numerous to list here but include the Rutherford Prize, the Sir Peter Blake medal for leadership, Principal Companion of the New Zealand Order of Merit. In 2010, he won the international Gadiünther Laukien prize for his ground-breaking work using radio waves to detect the motion of molecules.

During the past year, as 2011 New Zealander of the Year he toured the country packing out lecture theatres and town halls promoting his vision for New Zealand, gaining traction for his dual message of fostering a niche high-tech economy that will lift New Zealand out of the economic doldrums, and looking after the natural environment that gives New Zealand its point of difference, its ability to attract star talent despite lower pay. But it is for science that Sir Paul will be most widely remembered.

His curiosity and penchant for experimentation started early. Brought up on a quarter acre section in Wanganui, Sir Paul hardly had the illustrious beginning his later achievements might suggest. His father, Ernest, a draper and mother, Mavis, had less than a year of secondary school education between them. He went to Wanganui Tech – not the posh Collegiate across town – and spent his time blowing up rocks with Molotov cocktails. The 200-metre nearby tunnel made a fabulous echo chamber. He made his first crystal set radio at primary school, and was excited to pick up two stations. He was exuberant and troublesome and caned more than the average teen. Fortunately Wanganui was a forgiving place and, despite frequent cornerings by police and traffic cops, he talked his way out of any serious trouble.

Those early scientific experiments segued into Sir Paul studying maths and physics at Victoria University, funding his study with a part-time job at the Imlay freezing works. He excelled, winning a scholarship to study low temperature physics at Oxford University.



Having worked with some of the best brains, and best facilities, in the science world, Sir Paul returned to New Zealand in 1974 to lecture at a tiny fledgling physics department in sleepy Palmerston North, where he worked for 27 years, eventually heading up the department. Here Sir Paul defined both his career and his pragmatic approach to science.

There was no physics equipment, but the chemistry department had just bought a nuclear magnetic resonance (NMR) spectrometer. Rather than being the impetuous child that demands to work on their scientific field whatever, Sir Paul looked at his skills and what was available, and began research using the NMR spectrometer.

PhD student Andrew Coy, who has worked with Sir Paul for 25 years and now runs Magritek – the NMR company Sir Paul co-founded – remembers an inspiring teacher with an extraordinary capacity for work. "He was just always so energising and passionate about what he did. When I was doing my PhD we'd be sitting there doing some experiments getting all excited and suddenly it would be 3am. I would drag myself back into the lab in the morning and Paul had already been in there and started the next experiment and was excited about the results of the next one."

It was an age of practical pioneers. Few students did their doctorates in New Zealand and research funds and knowledge were scarce. If the equipment didn't fit the purpose, you made your own.

That adaptability set up Sir Paul for one of his most significant scientific contributions, using NMR to measure brine content in Antarctic sea ice, helping scientists better understand the global climate structure. A complex and unique system, the sea ice was beyond the capabilities of existing measuring tools. So Sir Paul designed and built new hardware specifically for the purpose. He first visited Antarctica in 1994, but returned again and again to refine his experiments.

In 2001, Sir Paul moved to Wellington and Victoria University and spearheaded the campaign to launch a centre of research excellence. They won funding and set up the MacDiarmid Institute, with Sir Paul as its inaugural director.

Present director Professor Kathryn McGrath, who collaborated with Sir Paul for 12 years, says it is impossible to divorce Sir Paul's scientific achievements from his impact on fellow scientists. "He got his energy from other people, he sparked off other people all the time. There's nothing more exciting than if you think something is really cool and then someone that you respect starts to also say it is really cool. Once he became involved with something and was invigorated by it he was a bit of a machine really."

Before Sir Paul was diagnosed with bowel cancer in 2008, colleagues knew something was seriously wrong. They assumed he had worked himself into the ground. The joke around the office was that, while Sir Paul was having chemotherapy, he worked for the first time at the rate of a normal person.

But he also had a life. When he wasn't in the lab, Sir Paul was usually out walking, or spending time with wife Miang. At international conferences he would take the opportunity to climb some nearby mountain. And he'd go out for drinks with colleagues – always the young ones. Leave the old fogies to themselves.

For all his contribution to fundamental science, one of Sir Paul's proudest achievements was setting up a company to commercialise his NMR technology. Magritek was born in 2004, with two staff and enough cash to see them through six months. It makes and sells portable NMR measuring devices using a scaled down version of the science used in magnetic resonance imaging (MRI) scans. Eight years on, the company has expanded its range, employs 23 staff and sells to international oil companies and pharmaceutical companies.

In later years, Sir Paul earned a reputation as a science communicator, fronting a show with Kim Hill on Radio New Zealand and giving talks around the country. Inspired by the example of Nobel Prize winner Alan MacDiarmid, Sir Paul was desperate to convince New Zealanders that science could be interesting and comprehensible. In 2009, he wrote *Wool to Weta*, about his vision for transforming New Zealand's culture and economy.

He obviously loved talking – Professor Daugherty knew after ten minutes of that Zealandia talk that Sir Paul would make it through to the end. "You could see him gaining strength. I've heard him speak on many occasions on a whole range of topics and it used to really annoy me that he never gave a bad one. Evolutionary biologists like me always get frustrated when physicists start telling us about evolution. But he always had something interesting to say."

Professor Daugherty first worked with Sir Paul when he was asked, after being diagnosed with cancer, to review the Allan Wilson centre, with which Professor Daugherty was involved. "Working on that I saw how perceptive he was, and how committed to helping others. He had nothing to gain by doing this, he just thought it was the right thing to do."

Scientist to the end, Sir Paul took advantage of a break between chemotherapy treatments to experiment with controversial vitamin C treatment. When it didn't work, he courageously made public his experience to debunk the treatment.

Sir Paul's reach was extraordinary and he will be mourned around the world. In Sir Paul's last week, Professor McGrath dreamed that the research centre he founded was leaking from every orifice. "I took that as a metaphor, in part that he was such a force in all aspects. He loved teaching, he loved fundamental science, he loved to communicate, he loved to support people. There is not going to be a person like him for a while. There will be other people that have his characteristics, but I may not know them. He makes you want to be better. Everybody needs that I think."

*Professor Sir Paul Terence Callaghan, scientist; b Whanganui, 19 August 1947; m Susan Audrey Roberts (dis), m Miang Lim; 1s 1d; d Wellington, March 24, aged 64.*

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**The Dominion Post, Wellington**

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