

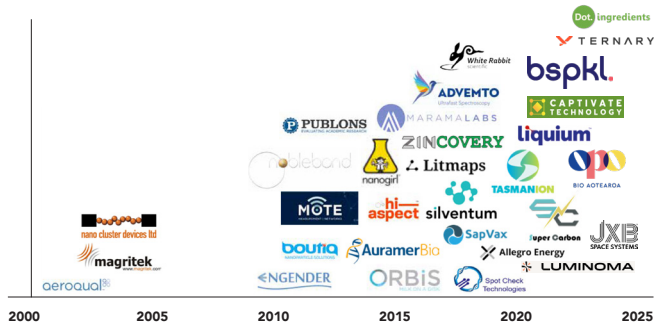
TE MANA TANGATA WHAKAWHANAKE - LEADERSHIP TO INNOVATE SUSTAINABLE MATERIALS

We are funded as a Centre of Research Excellence through the Tertiary Education Commission, and work to build capability and capacity for Aotearoa New Zealand – its future deep tech economy.

We work with schools, run science camps and partner with others to bring science to life for young people and their families, creating the passionate investigators of tomorrow.



Founded in 2002



We train PhD students who create real impact in industry and the deep tech economy. Since 2002, our students and Investigators have spun-out over 30 new hi-tech start-up companies.



We work together and partner with industry and government to address global challenges such as clean water, renewable energy and climate change.



We partner with Whakarewarewa Living Village in Rotorua to explore synergies between the two knowledge systems Mātauranga Māori and contemporary science.



We are a network of leading researchers united in a common goal: to create and explore innovative, sustainable materials that will improve the lives of people in Aotearoa New Zealand and around the world.



About us

The MacDiarmid Institute is named after New Zealander Alan MacDiarmid, whose curiosity and determination saw him awarded with the Nobel Prize in Chemistry in 2000.

Our founding director was scientist, environmentalist and entrepreneur Sir Paul Callaghan, who encouraged scientists to take science out of the lab and into the lives of all New Zealanders.

Over the 20 years our community has grown to encompass 852 research alumni since 2002.

Our impact areas:

- Create a high-earning NZ-trained science workforce
- Improve public understanding of technology for sustainability
- Develop relationships and collaborations with Māori communities
- Commercialise materials research through startups and with industry.

DIRECTOR



Professor Nicola Gaston

“The Institute has not only built upon and grown all of its goals and milestones, but is a bastion of progressive thinking and stability”

From our International Science Advisory Board

DEPUTY DIRECTORS



Associate Professor Natalie Plank

Deputy Director Commercialisation and Industry Engagement



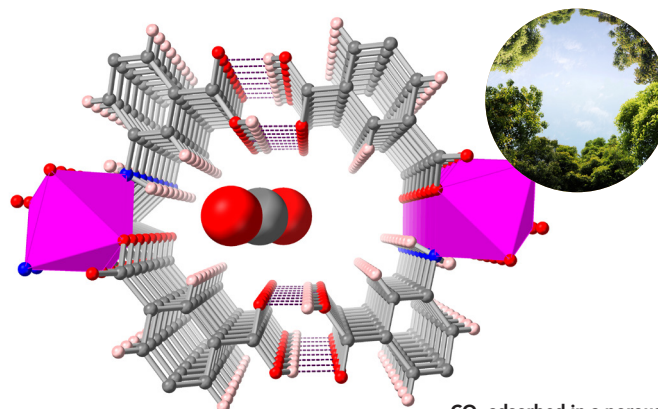
Associate Professor Pauline Harris

Deputy Director Māori



Associate Professor Anna Garden

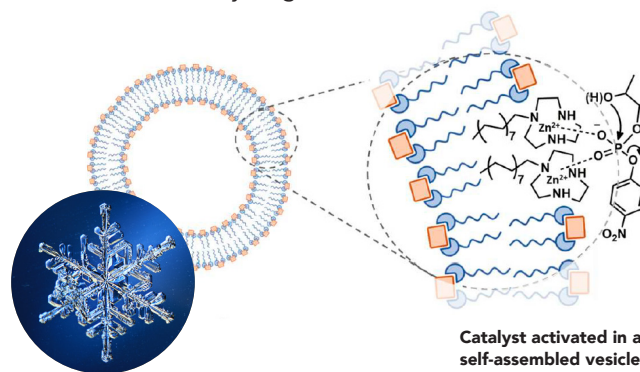
Deputy Director Outreach and Education



CO₂ adsorbed in a porous metal-organic framework

TOWARDS ZERO CARBON

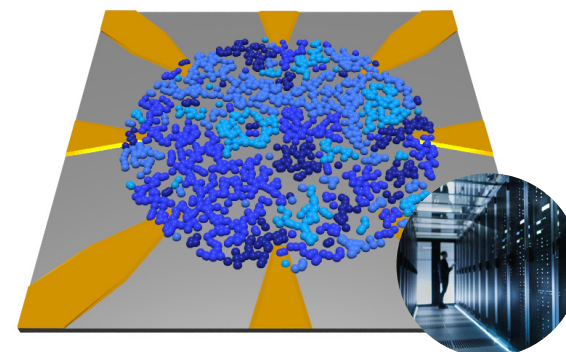
Our **Catalytic Architectures** research supports New Zealand’s goal for ‘net zero’ carbon emissions. We’re combining clever chemistry with innovative engineering to create new materials and tailor their functionality for specific applications, for example using catalysis to convert CO₂ into green fuels as well as creating zero-carbon fuels like hydrogen and ammonia.



Catalyst activated in a self-assembled vesicle

TOWARDS ZERO WASTE

Using the efficiency of biological systems as inspiration for next-generation sustainable materials, our **Reconfigurable Systems** research is developing new materials that are recyclable or reconfigurable, exploring abundant raw materials or waste for use as smart materials, and creating circular materials for commercial applications. It also focuses on the controlled reactions that occur in ‘artificial cells’ that self-regulate and reconfigure for synthetic biology and other functions.



Nanostructured materials mimic random networks of neurons

TOWARDS LOW ENERGY TECH

Data centres worldwide use around five times as much electricity per year as the whole of New Zealand, and worldwide use of AI is projected to increase this power use exponentially. Our **Hardware for Future Computing** research is developing materials for emerging technologies: neuromorphic computing for energy-efficient AI; edge computing for sensing and off-grid problem-solving; and quantum computing for quantum simulation.



Materials science understood as reliant on natural resources

SUSTAINABLE RESOURCE USE

Our **Pūtaiao Māori** research explores new and innovative knowledge, materials, techniques, approaches and tools to explore and grow pūtaiao Māori. This programme has environmental sustainability as a key value and principle, through kaitiakitanga. The programme intersects with our research on waste, energy, and carbon minimisation where we explore and develop pūtaiao Māori at the interface.