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.

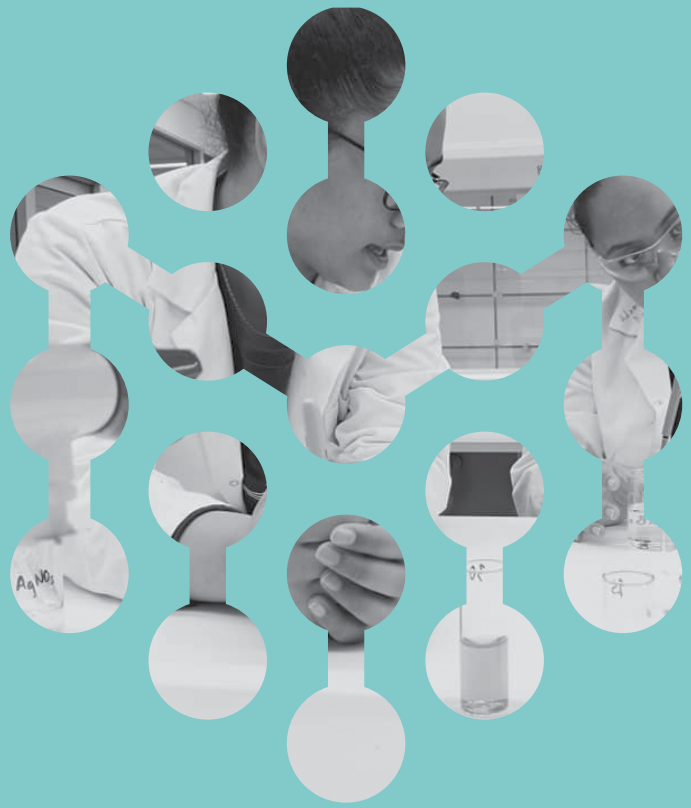
We train PhD students who create real impact in industry and the deep tech economy. Since 2002, our students and Investigators have spun-out 27 new hi-tech start-up companies.

Te Mana Tangata Whakawhanake
MacDiarmid Institute
Advanced Materials & Nanotechnology
macdiarmid.ac.nz

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.

Te Mana Tangata Whakawhanake
MacDiarmid Institute
Advanced Materials & Nanotechnology



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 since 2002 our community has grown to encompass 852 research alumni.

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.

CO-DIRECTORS

Professor
Nicola Gaston

Professor
Justin Hodgkiss

DEPUTY DIRECTORS

Associate Professor
Natalie Plank

Deputy Director
Commercialisation and Industry Engagement

Associate Professor
Pauline Harris

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Associate Professor
Anna Garden

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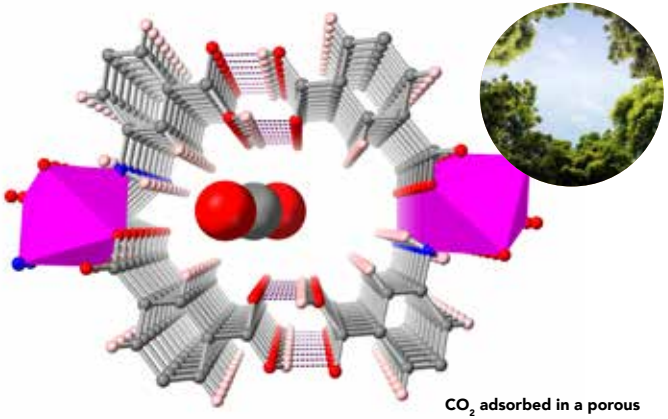
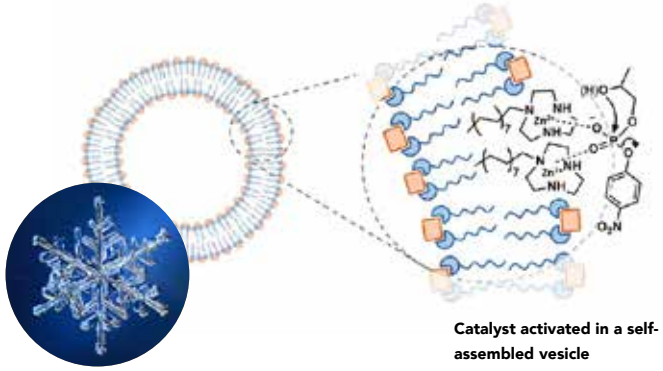
Outreach and Education



CO_2 adsorbed in a porous metal-organic framework

TOWARDS ZERO CARBON

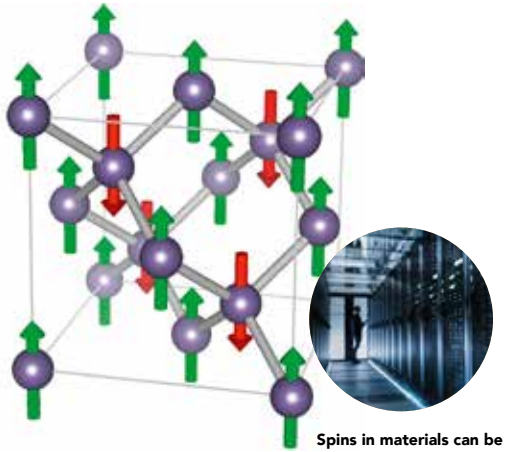
Our **Catalytic Architectures** research supports New Zealand's goal for 'net zero' carbon emissions by 2050 by exploring new materials that will capture CO_2 from air and key waste streams, and decarbonise the energy sector by designing new catalysts able to transform captured CO_2 into green fuels.



Catalyst activated in a self-assembled vesicle

TOWARDS ZERO WASTE - RECONFIGURABLE SYSTEMS

Using the efficiency of biological systems as an inspiration for next-generation sustainable materials, our **Reconfigurable Systems** research aims to create new materials that are recyclable or reconfigurable, using abundant raw materials or waste. Locally available materials will be employed as a priority, including for objects co-designed with Māori communities.



Spins in materials can be used for low-power computing

TOWARDS LOW ENERGY TECH

Globally, the data centres that our phones and computers rely on use almost ten times the annual electricity of New Zealand. Our **Hardware for Future Computing** research will develop computers able to process information more efficiently, as the human brain does. We'll also develop computing that uses far less energy than current technologies, using quantum properties of materials.

Materials science understood as reliant on natural resources

SUSTAINABLE RESOURCE USE

Mātauranga Māori has deep insight to offer into issues of sustainability that intersect with our research on waste, energy, and carbon minimisation. This research explores the integration of science and Mātauranga to address sustainability challenges, including the sustainable use of endemic materials for innovative technologies, and the use of materials technologies for mana whenua led environmental remediation.