

NZASE
scientist
profile

Ocean Mercier

Born where and when

Wellington, 1975; Ngāti Porou.

Schools

Northland School, Wellington Girls' College.
Subjects - Physics, Chemistry, Statistics.

How she got into science

"Great teachers at secondary school - Joseph Fernandez set up a Physics Club for us."

Training and jobs

BSc (Hons) in physics and maths

PhD in condensed matter physics.

Associate Professor at Victoria University, teaching Māori and indigenous science.

Presenter of *Project Mātauranga*, a science series on Māori TV.

Fields of science

Physics, Mātauranga Māori.

Highlights

1 Building an innovative probe to measure how the entrapped liquid in Antarctic sea ice was moving and thus transferring heat between air and ocean. "The probe is a portable MRI scanner, using the earth's magnetic field instead of a huge man-made magnet. It's a unique and clever device using the kiwi ingenuity of Paul Callaghan and Mark Hunter."

2 Presenting *Project Mātauranga*, which featured traditional and contemporary Māori science innovations, and provided one of very

few TV shows to focus on local science.

"From a Māori and Indigenous perspective, the science we are doing here is world-leading. So it's important to be aware of how research here is contributing to the country."

3 Contributing to *Te Whata Kura*

Ahupungao, short films about physics concepts in te reo Māori and English.

4 Introducing map-based activities into Victoria University's Te Kawa a Māui / School of Maori studies programme and building the online *Te Kawa a Māui Atlas*. She told *Curious Minds*:

"I get to indulge my love of the outdoors, our whenua, maps and navigation (I'm an orienteer) while also exploring how Māori mapping can further the interests of our people."

5 Presenting her research around the world.

Current research

- How te taiao (the environment) advocacy connects communities to places.
- Building our knowledge of the oceans in a way that supports iwi interests.
- Understanding groundwater with mātauranga-ā-iwi.
- Māori perceptions of new biotechnological controls for pest wasps.

Mātauranga Maori

Ocean learnt te reo Māori through university papers after her PhD. She "jumped at the chance" to teach a Māori Science course, which focused on Māori knowledge and mātauranga, and how they can be considered scientific. Ocean gives the examples of Māori and Pacific peoples navigating the earth with astronomy, creating medicines with botany, and growing food with biology.



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Ocean says traditional Māori knowledge was compiled from observation, trial and error, making hypotheses and theories. Ocean also describes the mauri (energy) of all things with mass as giving all matter potentiality, whether it is classified as living or non-living. She says this is a Māori understanding of thermodynamics and relativity.

She also sees interesting parallels between quantum physics and mātauranga Māori. “In both understandings, there is a relationship between the observed and the observer, with no such thing as objective knowledge. In a quantum universe, it is impossible to be objective when making an observation.”

“Preparing for the Māori Science course was the first time I had read about the philosophers behind Western science. Despite spending eight years studying physics at university and two teaching science to students, my courses had never reflected on the philosophy, history and biases of science, and the ways science binds to empire, capitalism and colonisation. I had become a handmaiden to a particular type of science, but in Aotearoa we have the opportunity to draw innovation from indigenous knowledge.”

Ocean continues to develop courses that explore indigenous knowledges and science. “Since 2004 I’ve been involved in a richer conversation around science, that opens its arms to mātauranga, as opposed to ranking it below Western science.”



Interface of sciences

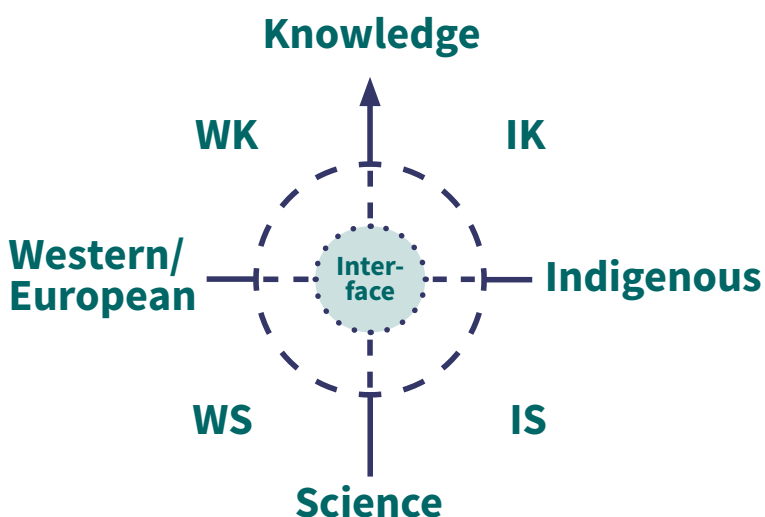
Ocean has developed a model of the interface between the knowledge and science of Western and Indigenous communities (below), based on principles suggested by Mason Durie. Science in this model includes observation, experimentation and theory. The model treats both systems as equal, respecting each other, with neither used to measure the value of the other.

Research and other projects at the interface of these systems is based on principles of mutual respect, shared benefits, human dignity, and discovery. Studies assessed by her students found that those led by Māori had a much better chance of creating partnerships that benefited Māori equally, and where indigenous peoples retained control over their knowledge.

Links

- [Te Whata Kura Ahupungao](#), physics videos.
- [Ocean’s article](#) about indigenous knowledges for the classroom (search for her name).
- Ocean commenting on [DiscoveryCamp](#) for Māori and Pacific secondary students
- [Ocean’s academic article](#) about the interface model
- [Project Mātauranga](#) episode about restoring rimu and matai in Tuhoe country.
- Mason Durie. (2005). *Nga Tai Matatū: Tides of Māori endurance*. Oxford University Press.

Interface model



Ngā Kupu

Māramatanga - Understanding
Mātai ahupūngao - Physics
Mātai arorangi - Astronomy
Mātai koiora - Biology
Matauranga-ā-iwi - Specialist iwi knowledge
Mōhiotanga/mōhioranga - know-how, common knowledge

From Paekupu



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