https://doi.org/10.34074/scop.1022025

TŪRANGAWAEWAE: AN ART+SCIENCE PROJECT

Scientist: Simon Cox
Artist: Sarah Shackleton

Tūrangawaewae is one of the most well-known and powerful Māori concepts.[1] As tūranga means "standing place," and waewae "the feet," it is most commonly translated as "a place to stand."[2] But simple translation misses a deeper spiritual meaning. Tūrangawaewae are places where we feel connected and empowered.[3] They are our foundation, our place in the world, our home. Connection to place and the whenua (land) is fundamental to Māori identity, and not unfamiliar to Pākehā. It shapes our thinking, our way of being, our priorities and values.

Connection to the land is a familiar concept for earth scientists, as it forms a large part of their daily lives and is often a raison d'être for their work. After more than three decades mapping geology and observing landscapes, the way in which Simon Cox (Principal Scientist, GNS Science) understands and 'reads' the landscape has gradually evolved. While he was initially trained to see a static, old and 'timeless land' of hard rocks and deep geological time, New Zealand's active tectonics and natural hazard events have shown Simon a more dynamic, lively and dramatic set of processes that continue to shape Papatūānuku (mother earth).

But how might the 'spirituality' of tūrangawaewae and this sense of connectedness be captured, quantified or represented? Is it possible that art can show some of the depth, complexity and layering of thought that enables scientists to feel empowered to provide recommendations and advice?

Over the past decade, science in New Zealand has also been changing and beginning to embrace a policy framework which seeks to unlock the innovation potential of Māori knowledge.[4] Vision Mātauranga,[5] a New Zealand government science policy initiative, seeks such opportunities by recognising and valuing cultural perspectives and expertise – for example, through the use of kawa (cultural practices) and tikanga (cultural principles) to examine, analyse and understand the world. Among the fundamental underlying principles of mātauranga Māori is the human element and the need to first understand the holistic interdependence between people and their environment (whanaungatanga),[6] in contrast to Western science, which typically begins the process of understanding through close observations of something, or someone, in isolation of wider systems. Among the places where whanaungatanga becomes most acutely important, deeply felt and easily explored are our tūrangawaewae.

Working at the interface of two world views should enable new ways of doing things, finding answers and problem solving.[7] The "Tūrangawaewae" exhibition explores a spiritual side of earth science and connectedness to the landscape, one that will not be found in technical scientific manuscripts and equations. As a collaboration between art and science, the concept behind it may have been complex, but its execution is relatively simple. Sarah Shackleton (visual artist) and Simon Cox (scientist) decided to use video as a way to create a combined artwork, which would tie together their shared Pākehā feeling for the land. While the world locked down and turned to online-only relationships during Covid, Simon recorded his immediate thoughts via a stream of consciousness as he looked at, and read, the landscape. Warrington Beach, where he lives near Dunedin city, provided the setting for physical walks and mental wanderings. A set of 'online lectures' were created from Simon's views to the east, south, west and north of Warrington, exploring some of the science behind tectonics, earthquakes, sea-level rise and climate change across Te Waipounamu – the South Island of New Zealand. Using these recordings, Sarah tapped into her memories of Te Waipounamu, generating the series of artworks she called "Tūrangawaewae."

Figure 1. Warrington Beach, where a number of 'stream of consciousness' lectures about the way an earth scientist views, reads and thinks about the landscape were recorded by Simon Cox. Photograph: Simon Cox, 2020.

"As a scientist, it's my job to try and observe things differently," says Simon in the introductory lecture. "I draw on the depth of time that I have learnt through geology, think about processes and rates of occurrence, and consider how these generate hazards and impact our lives." A sunrise (Figure 1) is a beautiful, simple example of this. People tend to look at the picture and immediately say, "Oh wow, that's a cool sunrise." But actually, it's not a sunrise at all – at least no more than the earth is flat. When beautiful things like a sunrise, or landscapes, dominate our view, it's very easy to forget that we're on a huge round planet orbiting the sun and simply slowly rotating into the path of the sun's rays.

In order to (re)discover that the earth is not flat, scientists must rethink and continually test how we think about our world. That is why there is such value in the juxtaposition of different world views through Vision Mātauranga. Since earth scientists are looking at earth processes over extreme depths of time, they also develop a unique perspective on our landscape and its changes, a process which creates a very strong sense of tūrangawaewae.

Although living in Spain, on the other side of the planet, Te Waipounamu is the birthplace of visual artist Sarah Shackleton. It is a place where she has stood, where she has family and is still very connected to. The land, the mountains and the power of Te Waipounamu are central to the development of Sarah's artwork.[8] Projecting Simon's videos onto canvas, Sarah dissected his lectures into a series of complex lines, shapes, colours and textures, reconstructing the science as a chaos of layers on the surface of each painting. In the manner of a scientific experiment, Simon teased Sarah with images and views with potential to evoke an old sense of belonging. As she painted the land of her birth and layers upon layers of the science behind it, Sarah's connectedness did indeed evolve. And all the while, the artistic side of the project was both projected and mirrored in video.

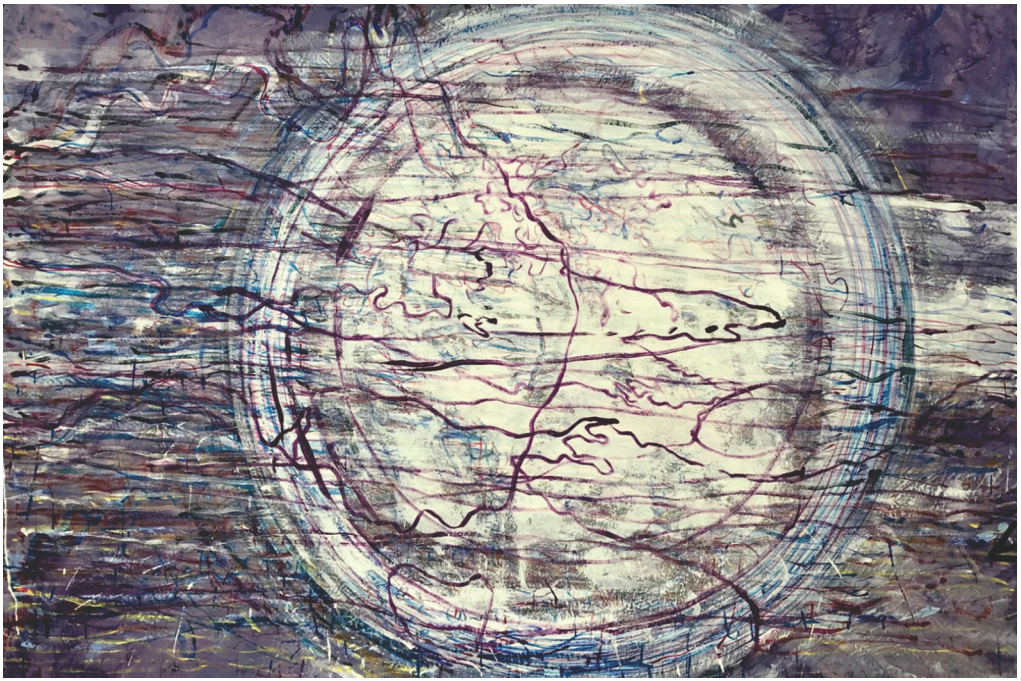

Figure 2. Sarah Shackleton, *Introduction*, 2020, acrylic on canvas, 130 × 195 cm.
Simon's video lectures were projected onto a wall and painted into five canvasses, with the evolution of each painting filmed as it was created. This work explores concepts of tūrangawaewae and connectedness with the land, our 'blue marble' and earth systems driven by the dissipation of energy.

The work *Introduction* (Figure 2) captures how many planetary-scale processes are driven by the dissipation of energy. With its incredibly thin atmospheric layer, our blue planet is delicate and vulnerable to even the slightest change. Stream-of-consciousness thought patterns follow along the lines of energy. The sun shines on the atmosphere, the atmosphere warms up, the air tries to move and takes water with it. The sea warms up, water expands, local sea levels rise, and ocean currents develop. The kinetic energy of waves and wind hit the coast and are absorbed by the land as it erodes. Earth's tectonic plates shift in response to dissipation of thermonuclear energy within the planet, causing landmasses to be uplifted, disturbing the ocean currents and atmosphere, which in turn causes rain, landslides and erosion. Aotearoa New Zealand is just a 'tiny rock' that pokes up out of the Southern Ocean into the full force of a westerly atmospheric circulation – which in turn shapes the way Te Waipounamu is eroded, deformed and uplifted, and controls our climate, the availability of fresh water, natural hazards and our ability to inhabit the land.

The works *East*, *South*, *North* and *West* (Figures 3-6) also reflect layers of geological processes and thoughts generated by the landscape and processes shaping Te Waipounamu. Keywords: blue planet, vulnerability, climate change, ice sheets, sea-level rise, groundwater, plate tectonics, volcanoes, earthquakes, rainfall, mountains, landslides, glaciers, erosion, landscape change, hazard, risk, society.

Represented by five large canvasses and digital recordings, "Tūrangawaewae" was an art and science collaboration that evolved through the heterogeneous stratification of geological processes, landscape evolution, scientific musings, online lectures, painting and drawing, digital editing and artistic expression. Transcripts of these earth science ponderings, online lectures, a compilation of the film projected in the Dunedin Art and Earth Science exhibition (17-22 May 2021) and reproductions of canvasses can all be viewed online.[9]

Figure 3.
Sarah Shackleton,
East, 2020,
acrylic on canvas,
130 × 195 cm.

East encompasses a view out across the vast, yet relatively unknown, Pacific Ocean at sunrise. The painting captures thoughts about earth's rotation, our delicate atmosphere, climate change, sea-level rise and the dissipation of wave energy by New Zealand's coastline. Looking out across the horizon generates a realisation of the incredible volume of seawater that is marching slowly towards us. There has been a massive change to the planet and we're now committed to putting up with it. You can't just run away!

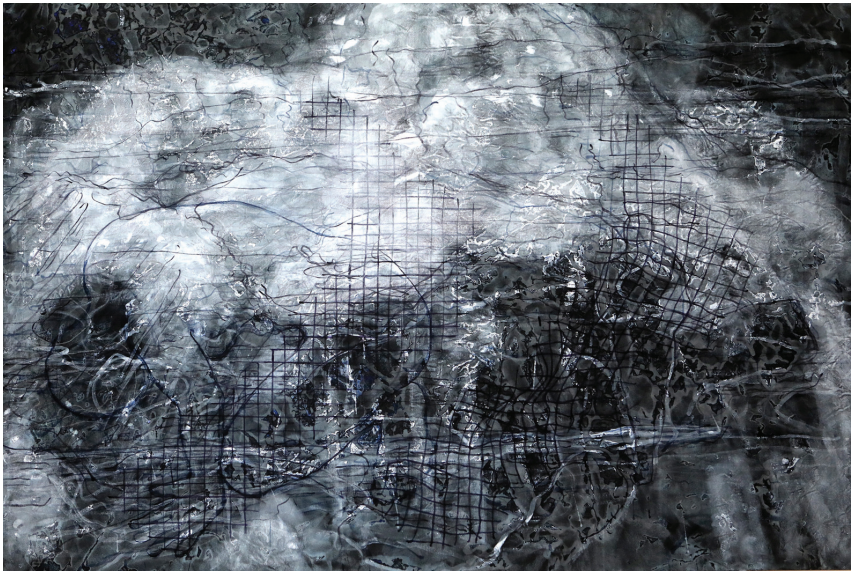

Figure 4.
Sarah Shackleton,
South, 2020,
acrylic on canvas,
130 × 195 cm.

South is generated from a view of the hills of Dunedin and the neighbouring Miocene volcano, once the site of a violent eruption dissipating energy from earth's mantle. But do the volcanic rocks and Papatūānuku hide other secrets? Geologists have tended to think of the volcano as the main local land-forming event, but the rocks are disrupted by fault lines and there is very real potential for earthquakes beneath the city of Dunedin. Looking at the landscape, one should be concerned if the 'absence of evidence' is really 'evidence of absence!'

Figure 5.
Sarah Shackleton,
West, 2020,
acrylic on canvas,
130 × 195 cm.

West embraces a view of sunsets and the Southern Alps, where the geology of Te Waipounamu is shaped by the interaction between tectonic motion and atmospheric circulation. Uplift on the Alpine Fault creates our weather patterns, our clouds and rain and fundamental aspects of our climate and hydrological cycle. It has exposed schist bedrock, carries the pounamu and gold on which our country was built, and will be important for the future supply of water.

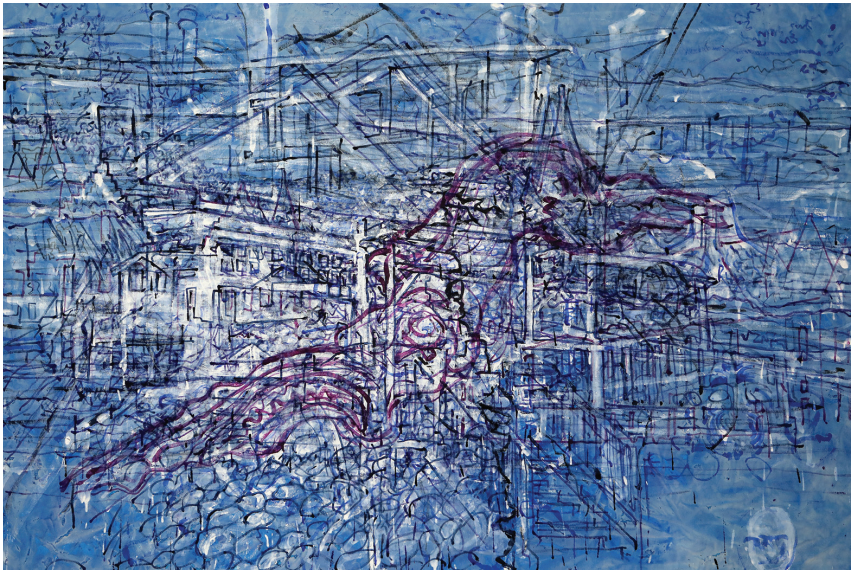

Figure 6.
Sarah Shackleton,
North, 2020,
acrylic on canvas,
130 × 195 cm.

North takes in a view of a rapidly shifting sand-spit, old marine terraces and landslides on which Otago coastal communities have been developed. The painting contains imagery of the former Seacliff Hospital, the Dunedin suburb of Abbotsford, a Warrington Beach house and a driftwood carving on the beach that is periodically exhumed by wind and shifted by waves and tide. The local sedimentary rocks are weak and slippery, causing mobility and interactions between the land and the sea.

Sarah Shackleton (www.sarahshackleton.com) is a visual artist who was born in Dunedin, but has been living and working in Zaragoza, Spain, since 1991. From early on, since the 1980s, Sarah has looked to the land and mountains for inspiration in her artwork. Already then, Sarah sought to uncover some of the energy lying under the surface of the land and capture the forces leading to the formation of the mountains in the Southern Alps of New Zealand in her series of large gestural landscapes, *Core of the Land*. Sarah's work, which explores the interaction of nature and culture, has been regularly exhibited in Spain. She completed an individual show, "Blue: The Way it Was," in Zaragoza on 15 May 2021. The "Tūrangawaewae" series of canvases and vídeo formed part of the group show "¿S.A. de prójimos?" in Zaragoza in April 2021, an exhibition that brought together art and science. Sarah is an integral part of the local art community in Zaragoza, but still looks for connections to her homeland.

Simon Cox (ORCID ID 0000-0001-5899-8035) is a Principal Scientist at GNS Science in Dunedin. He has a deep interest in the outdoors, where his passions for climbing, skiing, surfing and exploration are regularly fulfilled. His geological career was initially dominated by interests in tectonics, the Southern Alps, Antarctica and mineral exploration. During the past decade he has been more focussed on geological hazards – landslides, the Alpine Fault, earthquake hydrology and shallow groundwater. A recipient of multiple national geoscience awards, Simon maintains close ties with local iwi/Māori, supervises research students, collaborates internationally and is cited globally. He is widely recognised as a public speaker and communicator of science, with a wide network of science end-users.

1 "Tūrangawaewae – A Place to Stand," *Te Ara: The Encyclopaedia of New Zealand*, https://teara.govt.nz/en/papatuanuku-the-land/page-5 (accessed 21 June 2021).

2 *The Māori Dictionary*, s.v. tūrangawaewae, https://maoridictionary.co.nz/ (accessed 21 June 2021).

3 *Te Ara*, "Tūrangawaewae."

4 Ministry of Research, Science and Technology, *Vision Mātauranga: Unlocking the Innovation Potential of Māori Knowledge, Resources and People*, 2007, https://www.mbie.govt.nz/assets/9916d28d7b/vision-matauranga-booklet.pdf_(accessed 21 June 2021).

5 Ministry of Business, Innovation and Employment, "Vision Mātauranga," 2018, https://www.mbie.govt.nz/science-and-technology/science-and-innovation/agencies-policies-and-budget-initiatives/vision-matauranga-policy/__(accessed 21 June 2021).

6 Rauika Māngai, *A Guide to Vision Mātauranga: Lessons from Māori Voices in the New Zealand Science Sector*, 2020, http://www.maramatanga.co.nz/sites/default/files/Rauika%20Ma%CC%84ngai_A%20Guide%20to%20Vision%20Ma%CC%84tauranga_FINAL.pdf_(accessed 21 June 2021). See the comments by Sir Mason Durie, p. 25.

7 Ministry of Research, Science and Technology, *Vision Mātauranga*; Rauika Māngai, *A Guide*.

8 https://www.sarahshackleton.com

9 https://www.sarahshackleton.com/index.php/project/turangawaewae/