

Art–Science Collaboration: Blending the Boundaries of Practice

This article introduces the rationale of the Art + Science project for 2018. The articles following, in Part I, present some of the resulting collaborations between scientists and artists as case studies in the "Oceans" project for 2018.

The Art + Oceans Project was the sixth in the ongoing 'Art + Science' Project series, where artists collaborate with scientists individually, or in pairs, to develop artworks for public exhibition relating to science interpreted in a broad context.

That aim is creative cooperation – not the illustration of scientific research, but the speculative imagery that comes from the mind and hand of the artist in response to a close acquaintance with the actuality of scientific processes and ideas – or even commentary from the left field upon something that scientists take for granted, as part of their unconscious sense of normality and rationality.

It is always hoped that not only artists and scientists can gain from this creative association, extending their respective cognitive and visual worlds, but that they can both offer the public, the community in which the artists and scientists work and live, as well as future artists and scientists – young people of today – an opportunity and incentive to look afresh, or anew, into aspects of their own bodies or worlds of enquiry to which they had previously paid little attention.¹

In Art + Oceans, collaborators tackled the complexities of our changing marine environment; working together over several months (from October 2017 to July 2018), they produced many generative interactions between art and science. The large group exhibition (held in the Otago Museum's HD Skinner Annex, 23 July–5 August 2018) represented 26 collaborations between artists (including graduates, staff and senior students of the Dunedin School of Art and the School of Design at Otago Polytechnic) and scientists (from University of Otago science departments including Surveying, Physics, Anatomy, Chemistry, Botany, Marine Science, Physical Education and Science Communication; as well as the University of British Columbia; the Cawthron Institute; Landcare Research; the National Institute of Water and Atmospheric Research (NIWA); and research collectives including Coastal Acidification: Rate, Impacts & Management (CARIM) and the Sustainable Seas National Science Challenge).

In addition to typical sci-art collaborations between professional scientist and artist – where the effect is science inspiring art, and maybe drawing in some public interest² – Art + Oceans fostered some more novel forms of collaboration. In several instances, it included scientists, who were also artists, co-creating a final collaborative artwork. Some of these scientists started out as artists, either practised or in-training, but at least one found their way into a new creative role for the first time. One scientist even collaborated as a scientist, but then, coming full circle, made their own artwork in response to their artist's responsive work to their science. Yet another collaboration included an artist, a scientist and an artist–scientist, along with multiple 'citizen artists,' co-creating through the social art contributions of the public.

SCIENTISTS CO-CREATING ARTWORK

Working together to co-create a piece exploring marine microbial ecology, scientist–artist Blair Thompson collaborated with artist Thomas Lord. Having painted together previously, they decided to produce a collaborative painting that allowed them to observe forms that mimicked those found in the 'natural' marine world. Blair's research into marine microbial ecology and biochemistry examines the enzymatic role of bacteria, which is so critical to remineralisation of organic material in the oceans that it is considered the rate-limiting step in productivity of marine food webs and serves as 'gatekeeper' of the marine carbon cycle. Considering the microbes' enormous effect on global biogeochemical cycles and the earth's climate, Blair and Thomas aimed to mix art and ecological awareness overtly. From their mixing and agitating of mediums made from acrylic paints and seawater containing millions of microbes, forms appeared in the painting surface involving the artists in a process as 'ecological partners.'

In Art + Oceans, scientist Christina McGraw found herself leaving the lab and entering the art studio for the first time. Co-creating with artist Hope Duncan, they made a 3D sculptural work inspired by Christina's research on the chemistry of calcium carbonate in marine organisms under acidifying oceans, as well as her methodologies utilising fibreoptics. Quite simply, calcium carbonate structures, vital for many marine invertebrates, lose their stability when pH becomes sufficiently low. Using lab- and studio-grown crystals, lights and fabrics, their artwork aimed to provoke reflection on the susceptibility of marine organisms to the effects of ocean acidification by presenting the beauty of marine invertebrates under fantastical scenarios of calcium carbonate encrustation. In essence, turning the science on its head, they recreated a jellyfish (known for its beautiful, fluid-like movement through water) encrusted with calcium carbonate. As ocean acidification will not affect such a scenario, their work aimed to provoke with an image of the extreme, to push viewers to confront the reality on hand now.

After their artist collaborator had made the final artwork, another scientist responded to it with their own artwork. Scientist Morgan Meyers, already engaged with arts practice through evening painting classes, had her reflective piece exhibited together with that of her collaborating artist, Martin Kean. During their collaboration, Morgan was also intent on introducing a science communication role into the artwork, a digital piece that the artist was already developing to be interactively responsive to a viewer's body movements. Morgan's research examines the effect of ocean acidification on phytoplankton (single-celled, photosynthetic organisms). Martin's final digital piece portrayed different acidic scenarios and their effects on the ecosystem, which the viewer could modulate physically. Morgan decided to challenge herself to produce her own contribution, focusing on a

form of zooplankton (small drifting marine animals) called copepods. As both her research and her favoured artistic medium were water-based, she was inspired to combine the two, taking it a step further to incorporate “specific characteristics of the type of water relevant to my research; water that is saltier, more carbonated, and more acidic than the water one typically uses with watercolours.” Curious about how different solutions might interact with the pigments in the paints to produce various effects on paper, she also noted that the chemical presence of these non-traditional elements would be likely to compromise the quality of the paper and artwork over time. “This effect, while undesirable from an artwork-preservation standpoint, further communicates the detrimental effects ocean acidification will have on marine life in the coming years.”

In a final act of science communication, the pair printed and distributed postcards of the painting alongside information on ocean acidification and what the public could do to act. As Morgan noted, it is important in science communication to find commonalities to connect with an audience, and view the science together from a shared perspective: “Through this collaboration I’ve developed more ways of discovering those crucial connections. ... I definitely view creative processes as beneficial to my research.”

Co-creating an artwork with the public, artist Lynn Taylor and artist–scientist Jenny Rock worked with scientist Ro Allen on a project about coccolithophore phytoplankton under acidifying oceans. They developed multiple methods to involve visitors at the ‘Ōku Moana’³ interactive exhibition, part of the 2018 New Zealand International Science Festival. One of their approaches used laser-cut images, comparing healthy and unhealthy forms of the organism’s ornate exoskeleton. The public made rubbings of these and attached them to giant sculptures of unhealthy and healthy coccolithophores, co-creating as ‘citizen artists’ to produce the final works which were exhibited in Art + Oceans.

OTHER WORKS OF CO-CREATION

Collaboration at the art–science interface, particularly in academic settings, often involves scientists being consulted at the beginning of a project to inspire artists, either in method or in topic. The resulting artwork then evolves under the artist’s terms, with the resulting piece overwhelmingly their creation. Acts of co-creation are different and rarer. The former description aligns with what might be understood as cooperative interaction, whereas collaboration aims to equalise power. Collaborative co-creation involves a partnership in which both parties co-determine aims, process and outcomes and work toward them through power sharing and reciprocity.⁴ Such co-creative interaction has been shown to facilitate innovative idea-generation and critical thinking.⁵

Many final works of the Art + Oceans collaborations certainly approached co-creation. When power relations are freed, co-creative potential is unleashed.⁶ Several other extended interactions of collaboration were also observed where boundaries blended productively, between disciplines, between art and science, and between science and forms of traditional ecological knowledge.

In one instance, an artist joined two scientists from different disciplines to inspire their future scientific interaction. Artist Becky Cameron joined together in conversation scientists Emily Tidey and Candida Savage. The latter is a marine biologist studying ecosystem function around physical processes such as the effects of sediment transport into estuaries. Emily, a researcher in surveying of physical marine environments, is interested in coastal habitat mapping. Part of Becky’s work as

an artist explored both physical and biological aspects of estuaries as well as the use of sound to visualise artwork. Through her connection, the idea of mapping estuaries as a new avenue of joint research emerged.

In many collaborations, artists recognised the scientific method in their arts process. As artist Emily Brain described it: “An artist’s workshop can be a lot like a laboratory. We start with an idea, a theory. Then we combine materials, mix chemicals, run tests, record the results, and then test again until we either get the result we want or find something we could never have predicted.” Working with scientist Rebecca Zitoun, who studies the impacts of ocean acidification and rising temperatures on metal-cycling critical to aquatic organisms, Emily combined copper and silver to create curious hydrothermal environments where biota might struggle or thrive. She viewed her pieces as “both laboratory and experiment.”

Finally, Art + Oceans also fostered works that considered aspects of traditional ecological knowledge as science. Anne Marie Jackson’s scientific research examined kaitiakitanga of the marine environment and its implications for resource management today. This inspired artists Pam McKinlay and Jesse-James Pickery to examine whakatauki from collections in historical archives; their work references these sources, rich in traditional Māori knowledge, that can help develop indicators for contemporary marine management. Collectively, their work asked the question: How can we protect and care for all that exists, and maintain its potential and ensure wise management and conduct? As scientist Georgia Moana Bell noted, “Our people were scientists. A lot of our tikanga developed from mātauranga relating to our environment. It’s an old kaupapa to look after our marine environment, and it’s something that our ancestors wanted – to ensure there is kaimoana for future generations, and to look after the other inhabitants we share this world with.” Her collaborating artist, Heramaahina Eketone, carved a traditional patu, but when accidentally broken, she asked of it and of our ecosystems: “E aha ana te aha? Is this broken carving still a taonga? Can we fix this?”

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Jenny and Pam were co-coordinators of the Art + Science Project for 2018.

1. *Art & Genetics: He Toi Iratanga: Exhibition Catalogue 2017*, curated by Peter Stupples (Dunedin, 2017), 2.
2. P Glinkowski and A Bamford, *Insight and Exchange: An Evaluation of the Wellcome Trust’s Sciart Programme* (London: Wellcome Trust, 2009), https://wellcome.ac.uk/sites/default/files/wtx057228_0.pdf.
3. New Zealand International Science Festival, 6-15 July 2018, Dunedin, <http://www.scifest.org.nz/events/ku-moana> (accessed 15 August 2018).
4. N Simon, *The Participatory Museum* (Santa Cruz, CA: Museum 2.0, 2010).
5. ZF Gamson, “Collaborative Learning Comes of Age,” *Change: The Magazine of Higher Learning*, 26:5 (1994), 44-9.
6. J Rock, M McGuire and A Rogers, “Multidisciplinary Perspectives on Co-creation,” *Science Communication*, 40:4 (2018), 541-52.