

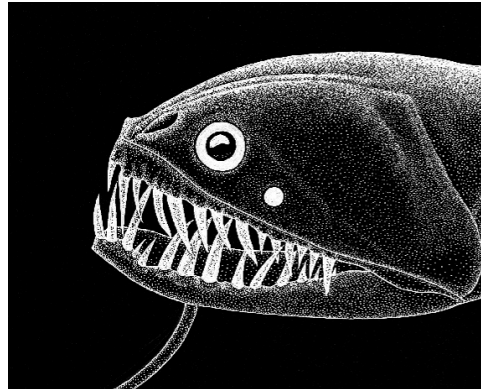
DAVID GREEN

**Illustrating the Unseeable:  
Reconnecting Art and Science  
Symposium,**

28 October 2009, hosted by  
Electronic Arts, Dunedin School of Art,  
Otago Polytechnic, Dunedin,  
New Zealand

Figure 1. Peter Batson, *Idiacanthus, Black Dragon Fish* (2002), ink on paper, stipple, drawn as negative and inverted, 297 x 420mm. Reproduced with permission of the artist.

Figure 2. Mike Paulin, *Virtual Dogfish two* (2009), University of Otago Department of Zoology, screen grab. Reproduced with permission. <http://www.otago.ac.nz/neurozoo/virtualdogfish2.html>



ANALOGUE

During the first hundred years of cinema, visual effects were created by setting up a real-world mechanical equivalent in order to fake what a given phenomenon looked like and to capture it (kicking and screaming) onto film. The most common approach was to use scale-model miniatures. Where *Brobdingnagian* motion was concerned, over-cranking the camera created scale and mass in a diminutive object. At the more compelling end of visual effects were elaborate scenarios such as 'Buddy' Gillespie and Jack Gaylord's 12-metre muslin sock mounted on a steel gantry and rotated while a truckload of fuller's earth was blown through it with a huge compressor, creating the eerily authentic-looking cyclone effect in MGM's *The Wizard of Oz* in 1939.<sup>1</sup>

The secure and efficient capture of these moments was vital. The random organic nature of the emulsion matrix causes generational loss during film-to-film image transfer, so in the days

of film post-production all image elements had to be captured on original negative whenever possible. Otherwise the filmmakers had to create complex film sandwiches and multiple passes using light valves, pushing images one generation away from the original, which could look pretty soupy if all the exposures weren't perfect. Any generational loss beyond that resided somewhere along the spectrum of visual disaster. For these filmmakers, the apotheosis would be to make visual effects seamless by hiding the tortuous making process and contriving to get the effect shots to look absolutely 'real.' In the trenches, this was considered the pivotal strategy in the double-negative pursuit of 'suspension of disbelief.'<sup>2</sup> The desire for reality was a rich provider of concrete problems and reminiscent of the parallel pursuit in fine arts of representational painting prior to the advent of photography in the mid-nineteenth century.

## DIGITAL

*I exhume this history to make the point that, with the emergence of digital reproduction and computer-generated imagery, reality wars cease to matter. Instead of making one reality the equivalent of another, new 'real' worlds are now constructed from the ground up; pixel by pixel, iteration by iteration, generation by generation if need be. In a sense there is no 'loss.' Visual culture receivers finally sate themselves on photorealistic and seamless effects created by teeming armies of pixel-shifters. Photorealism has become a problem that money can solve. The core contrivances of the early producers of visual effects cease to be important as every last viewer on the planet becomes visually literate.*

*And, once again, a new engagement emerges in the production of intuitive visual representations of theoretical concepts; impressionistic visualisations, to my thinking, of scientific ideas in particular; making visible unseeable theoretical and intuitive worlds.*

*Immerse a scientist in 40 years of study and chances are that the esoteric plane in which she has been marooned coalesces in her mind as a sort of visual trope or collection of tropes. If time-based visual artists could somehow peer in, they might be able to intuit the phenomena well enough to represent it using the new tools – given their absolute freedom from any limitations presented by the physical world.*

## ILLUSTRATING THE UNSEEABLE

The symposium “Illustrating the Unseeable” was provoked by a series of informal and interdisciplinary engagements between faculty at Dunedin School of Art at Otago Polytechnic and the University of Otago as enthusiasts shared their projects. The following example demonstrates the increasingly polymathic nature of research and was the catalyst that led to my proposition to develop the symposium, and the ongoing threads of the event itself.

Karsten Schneider had lived in Berlin and practised as a street artist before writing a doctoral thesis from data collected while observing the Doubtful Sound dolphin pod over a period of three years. As part of his research documentation he visualised a new and intriguing concept,

postulating the idea of shared echolocation among dolphins; the construct being that, when one dolphin ‘pings,’ the radiated ‘afterimage’ of reflected sonar is received not exclusively by the emitting animal but collectively by the hunting group, enabling a perceptual synergy contributing to more effective hunting interactions. To better visualise this, Schneider developed the ability to animate.

In early 2009 Schneider showed me images of an animated vector graphic latticework swirling around the figure of a palaeontologist who was to introduce a variety of scientific concepts to the viewer as visual references emanate from the graphic device. In the context of science communication the visual metaphors were conceptually clear, aesthetically compelling and refreshingly innovative. However, the off-shore producer of the documentary rejected it as being ‘too cutting-edge!’ Yet within the terms of the world of visual effects, the project was sound and descriptive. Plainly a bridge needed to be made.

The same week Karsten shared with me his soon-to-be-rejected animations, I observed a media cultures lecture in which Susan Ballard shared images drawn from research relating to digital aesthetics, experimental sound and video, visual culture, and media ecologies. I noticed that the group of artists she highlighted frequently engaged in scientific discourse within or alongside the framework of their arts practice. It occurred to me that, if the multinational corporate production hierarchy didn’t take to Schneider’s innovative graphics, they certainly wouldn’t welcome the creative store of conceptual frameworks represented in Ballard’s cache – not, that is, unless an appetite was cultivated beyond the bounds of their approval stages. In this way, the idea of the symposium was born.

On 28 October 2009 Ballard and I hosted “Illustrating the Unseeable: Reconnecting Art and Science” at the Dunedin School of Art. Eighteen ten-minute presentations given by scientists and artists linked to Dunedin charted an intellectually, viscerally and visually exhilarating day’s journey.

Otago Polytechnic Chief Executive Phil Ker opened the symposium, followed by Ballard, who set the stage by sharing images and descriptions of a selection of internationally acclaimed artworks that “operated on the edge of wonder, both

scientific and artistic.” She concluded her talk with a time-based work by SemiConductor (Ruth Jarman and Joe Gerhardt) imaging the ‘secret lives’ of invisible magnetic fields, set in NASA’s Space Sciences Laboratories at UC Berkeley.<sup>3</sup>

*Culture* was the descriptor of the first set of presentations made by Professor Geoff Wyvill, computer scientist, University of Otago; Bridie Lonie, lecturer in art theory, Dunedin School of Art; Assoc. Professor Mike Paulin, lecturer in zoology and consultant to NASA on sensor systems for autonomous robots, University of Otago; and Peter Stupples, lecturer in art theory, Dunedin School of Art. Geoff Wyvill pointed out that needlessly complex language often disguises meaning in writings pertaining to art and science. He illustrated this point by identifying a textual ‘Gordian knot,’ only to cut through to its simple meaning using clear concise wording, reminding participants that ideas are the currency and words only the conduit. Bridie Lonie countered that language must be considered an actant or active contributor and co-definer of meaning within any art or science discourse.<sup>4</sup> Mike Paulin demonstrated his *Virtual Dogfish*; a neuroanatomically detailed computer-generated shark in a virtual ocean setting, imbedded with computational models of the physics of the environment, sense organs, sensory neurons and the brain in dynamic interrelationship with virtual prey (see figure 2). Peter Stupples addressed the significant impact new discoveries in the field of neuroscience have had on traditional interpretations within art history.

Under the rubric of *Collaboration* presented Felicity Molloy, dance practitioner and lecturer; artist Claire Beynon; and Julian Priest, network activist. Felicity Molloy described her contribution to “Spacemaking,” a collaborative interdisciplinary studio project investigating form through architecture and dance at Unitec Institute of Technology, Auckland, New Zealand. A creative feedback loop was initiated with architecture students by drawings of spaces as body paradigms. Dance students responded to their drawings through movement; the architecture students then ‘mapped’ the dancers’ kinetic responses, channelling that movement into individual propositions for either a stage set or a performance art pavilion. Clare Beynon spoke about her two seasons in Antarctica producing work which

focuses in on the parallels between image-making and scientific processes, in collaboration with scientist Samuel Bowser.<sup>5</sup> Julian Priest spoke of his work as a network activist, often requiring negotiations between his inner artist and inner scientist.<sup>6</sup> He articulated the distinction between art in the service of science journalism, and art and science working in collaboration towards perceiving the world in new ways.

During lunch, Amos Mann illustrated through silent performance a series of surprising geometric anomalies using only scissors, newspaper and a glue stick. Afterward Mike Paulin demonstrated his “Brushbots:” cockroach-like mini-robots, made with a toothbrush head, cell-phone vibrator, watch battery and light sensor, that appear to seek refuge in any available shadow.

The next group spoke under the heading of *Genesis*, with short presentations by artist Nicola Gibbons; Andrew Last, metalsmith and lecturer in jewellery and metalsmithing, Dunedin School of Art; Stu Smith, animator and computer scientist, Animation Research Ltd.; Peter Batson, marine biologist and director, DeepOcean Quest Productions; and Chris Ebbert, lecturer, School of Design, Otago Polytechnic. Gibbons spoke about her fine arts painting practice which focuses on the form and texture relationships between the micro and the macro, inspired and informed through scientific imaging. Last described his process of collaboration with Johanna Zellmer when they were commissioned to create sterling silver vessels for architectural firm OCTA Associates, leading to a series of unpredictable intermediate outcomes as materiality rebelled against the dictates of computer-aided design. Smith detailed an iterative journey of scientific visualisation in the development of real-time sports graphics for motorcar races. He was able to convey individual driver performances, illustrating operative decisions by adding secondary graphics to computer-generated car models that indicate the directional g-forces acting on cars running a racecourse in real time. Batson often reconstructs his dramatic images of deep-sea fish species as illustrations or computer-generated models interpolated from the virtually exploded bodies of animals dragged to the surface from thousands of metres below (see figure 1). Batson reminds us that the lion’s share of our planet’s surface

lies under kilometres of water, receives no light and is as inaccessible as outer space. Ebbert recommended collaborating with your computer-aided design program and sharing the burden of decision-making by preserving certain random parameters, so outcomes – rather than being prescriptive, dull and predictable – can surprise and refresh.

The fourth series of talks flew under the banner of *Object*. Presentations were given by Alastair Regan, School of Design, Otago Polytechnic; Pete Gorman, MFA candidate, Dunedin School of Art; Dr. Paul Trotman, medical practitioner, writer, and filmmaker; Dr. Karsten Schneider, marine biologist and animator; and Dr. Mark McGuire, lecturer in Design Studies, University of Otago. Regan shared an experiential journey taken early in his career when he was engaged to redesign an off-site industrial control room in Sweden. He found that experienced workers engage with the apparatus in complex feedback loops extending well beyond isolated screen data into the visual, haptic and sonic realms. Regan discovered that, in order to maintain safety and efficiency, these channels also require data flow to the point of control. Gorman showed documentation of a performance piece that involved the earthing of two metal rods in order to receive, amplify and manipulate magnetic fields generated from nearby power mains in order to convert them into sound.<sup>7</sup> He is also interested in exploring the sonification of naturally occurring signals derived from seemingly 'inert' objects in nature. Trotman screened scenes from his acclaimed documentary *Donated to Science* (2009).<sup>8</sup> His film explores the complex emotional responses first-year medical students have to human dissection and the strong emotional bond that is activated when the donors are given voice. McGuire mapped the idea of global warming through a varied set of site-specific installations conceived by artists to confront urban dwellers with augured environmental outcomes in experiential ways. Schneider projected highly complex and refined examples of his broadcast animations for scientific visualisation, along with his very first animated sequence showing a pod of dolphins sharing their sonar 'view' of echolocated fish.

The presentations were concluded with a plenary session guided by the composer, musician, science writer and Natural History New Zealand's

head researcher Marcus Turner. Leoni Schmidt, head of the Dunedin School of Art, closed the conference by reintroducing the notion of echolocation as a method for connectivity. It was a very stimulating day and, by the end of it, I came to realise that my initial prompt had been overly simplistic. Having seen the primary focus as artists and designers in the service of scientific dissemination, through the day I came to realise that what was more interesting was the kind of collaboration between artists and scientists Julian Priest had identified. Ballard's selections by Superconductor; the space dialogue and redux between architects and dancers described by Felicity Molloy; Clare Beynon's Antarctic collaboration with Samuel Bowser; Mark McGuire's selection of urban artists responding to global warming in situ; and Stu Smith making graphic the visceral are all examples of collaborations that do not only illustrate pre-existing concepts, but beyond that synergise, synthesise and illuminate nascent ones. The symposium demonstrated the value that the creative process, with its intuitive integration, can add to the material of scientific investigation. Rather than being a relationship of servant to master, the symposium suggested that the art/science relationship can be a partnership without boundary.

- 1 Jay Scarfone and William Stillman, *The Wizardry of Oz: The Artistry and Magic of the 1939 M-G-M Classic* (New York: Applause Theatre and Cinema Books, 2004), 152.
- 2 See Alexander Mackendrick, *On Film-making: An Introduction to the Craft of the Director*, ed. Paul Cronin (New York: Faber and Faber, 2004), 111.
- 3 SemiConductor, *Magnetic Movie* (2007), 4:47 mins HD, 16:9, sound. An Animate Projects commission for Channel 4 in association with Arts Council England. See <http://www.semiconductorfilms.com/root/soundfilms.htm> [accessed 20 Oct 2010].
- 4 See Bridie Lonie's essay, "Representation, Use and Presentation" in this issue.
- 5 See Claire Beynon's essay, "Nature's Little Masons" in this issue.
- 6 See Julian Priest's prose poem, "The Future Network" in this issue.
- 7 See Pete Gorman's essay, "Mains Hum" in this issue.
- 8 See also the discussion of Trotman's film in Cushla McKinney's review of *Artscience* in this issue.