Abstracts from the Spectra 2018 Symposium: Environment and Bio-Science

Topic: Environment

Listening to aquatic ecosystems: Hydrophonic discoveries enhancing conservation in freshwater and marine environments

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Aquatic ecosystems are complex acoustic environments, where life is reliant on sound to communicate and survive. The impacts of climate change are often readily visible in terrestrial environments, but conservation is challenging in aquatic ecosystems when we cannot see beneath the surface. Increased anthropogenic noise and rising temperatures continue to cause unfathomable ecological disruptions that are dramatically transforming the acoustic ecologies of freshwater and marine ecosystems across the planet.

Conventional environmental monitoring in aquatic ecosystems remains problematic – it is highly invasive, expensive and constrained to restricted areas and manual processing of observations by specialists.[1] Rapid advancements in digital technology have provided opportunities for non-invasive acoustic monitoring that is now accessible, affordable and viable.[2] Listening to freshwater and marine environments with hydrophones can inspire and engage communities to understand aquatic biodiversity and protect ecosystems (Barclay et al. 2018). Mobile applications and interactive experiences that augment real acoustic data with creative responses have the capacity to encourage public engagement and environmental stewardship at a time when the conservation of aquatic ecosystems is a critical priority.[3][4]

This research demonstrates how underwater sound recordings and live audio streams of aquatic ecosystems can provide innovative and effective methods for monitoring freshwater and marine biodiversity. The research brings together specialists in sound art, digital technology, acoustic engineering and environmental sciences to work directly with communities to develop and deploy acoustic sensors that stream data to interactive sound maps and public installations. Every stage of the research process – from methodology design to fieldwork and publications is an equal balance between artistic and scientific perspectives. The projects focus specifically around public engagement and conservation of aquatic ecosystems using accessible and affordable hydrophones.

Hydrophones have been used in the context of creative work since the 1970s, with composers including Maggi Payne, Jana Winderen, Douglas Quin, Chris Watson and David Monacchi regularly incorporating the underwater sounds of freshwater and marine environments into their creative works. Rather than drawing from recordings in scientific databases, each of these composers is also a specialist in environmental field recording and works in situ to record aquatic environments. These approaches to active listening in the field have been influential in the development of recording techniques for both scientific and artistic purposes.
River Listening, Biosphere Soundscapes and Sonic Reef are the three major interdisciplinary projects that have been the focus of this research. They were designed and developed by the author and have used hydrophone recordings to generate new knowledge about aquatic ecosystems that have informed scientific outcomes. The next phase of this research involves combining these projects through the development of a public sound repository and live sound map that will stream real-time freshwater and marine soundscapes for biodiversity monitoring, immersive sound installations and GPS triggered augmented reality experiences that will be disseminated worldwide. The live streams will contribute towards establishing new long-term databases for scientific research, art-science collaborations and public engagement. This open network of hydrophones will provide a global platform to inspire and enhance the conservation of freshwater and marine ecosystems across the planet.[5]

References and notes
5. Supplementary materials can be accessed at http://...

Topic: Bio-Science

On the Emergent Properties of Death – Experiments in Regeneration: The End is a Distant Memory Project

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Death’s durational nature has largely been ignored in everyday understandings of death within Western culture. This issue is explored in artwork installation The End is a Distant Memory (Helen Pynor, 2016) using laboratory experimentation, personal testimony and artistic metaphoric languages.

The laboratory experimental component of the project was undertaken by Pynor in consultation with regeneration biologist Dr Jochen Rink during an extended residency in Rink’s laboratory at The Max Planck Institute of Molecular Cell Biology and Genetics, Dresden. Pynor used tissue culture techniques to extract chicken fibroblast cells from fresh refrigerated, non-frozen chicken meat purchased at a local supermarket. The extracted cells grew and divided under tissue culture conditions, recorded using time-lapse DIC microscopy, with the cell line persisting in culture for 4 months. It is likely that the extracted fibroblast cells adopted a dormant state within the chicken
meat, inactive (not growing or dividing) but alive in the sense that they were capable of regeneration using a tissue culture intervention. This speculation is based on Latil et al.[1] who found that human and mouse skeletal muscle stem cells adopt a dormant state post mortem and retain regenerative capacity for up to 17 days post mortem. The presence of these cells within apparently dead meat or tissue draws attention to the durational nature of death, with cellular death taking place at different rates in different tissues and cell populations after death of the whole organism.

In *The End is a Distant Memory* the philosophical implications of this phenomenon were explored. Of interest was the cells’ capacity to challenge a clear ontological separation of living subject and dead object, and the transitional process by which animal subject becomes meat object. This was presented in the installation via documentary microscopy video, still image, and accompanying text, alongside videos and photographic images that explored the issue using more abstracted, metaphoric languages.

Using a very different, highly speculative approach to the ambiguity of the life-death boundary, the persistence of lucid consciousness in humans during states of ‘clinical death’ was explored. The phenomenon is increasingly reported, as new and emerging resuscitation technologies make it possible to resuscitate patients previously regarded as beyond medical reach. For *The End is a Distant Memory* Pynor interviewed individuals who report experiences of lucid consciousness during states of clinical death, commonly termed Near-Death Experiences (NDEs), later collaborating closely with NDE survivor Rohan Thomas as performer and informant. Videos presented in *The End is a Distant Memory* depict moving humans and objects, references extracted from Thomas’ experiences that comprise an abstracted, metaphoric language to explore this terrain of the unknowable.

Ethical complexities arising from the reality of death as a duration process, rather than an event that takes place in a moment of time, form the broader context of *The End is a Distant Memory*. These complexities have particular relevance to contemporary medical practices that rely on precise determination of death, for example for the purposes of organ retrieval from cadaveric donors for organ transplantation.[2]

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**References and Notes**


2. Supplementary materials can be accessed at http://...

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**Topic: Bio-Science**

**Uncertain creation; sympoietic system for art and science.**

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Sympoiesis, the boundaryless system coined by Beth Dempster from the Greek words for collective and production, is in synergy with the creative potential for art and science collaboration.[1] A sympoietic system is non-hierarchical and creates the capacity for risk taking without compromising individual perspectives. This paper will focus upon empirical experience and outcomes emerging from the artist’s residency at the Department of Medical Biotechnology, Flinders University, I embarked upon in 2006. The residency is novel due to its longevity, since it is without formal funding and is self-directed. Such an endeavor, however, is not possible without various tropes of contribution from the arts and sciences; creating opportunities for interaction, developing critical thinking and political discourse.

Results of the residency are inclusive of local and international participation and presentation of; exhibitions, formal and Do It Yourself workshops, symposia, artist’s talks, lab meetings, community outreach and other residencies. Adding value through sympoiesis; the creation of new knowledge via open collaboration, and syntechnesis; working with tools and materials in novel ways. Furthermore, the significance of informal dialogue between artists and scientists is difficult to measure but should not be underestimated. Much work and novel understanding toward theory, concepts, models and methodologies are precipitated by such conversations. Artists and scientists might ask different questions but together they can collapse boundaries to extend understanding, create future scenarios, solve problems, and engage new audiences and stakeholders whilst being simultaneously comfortable and uncomfortable, thus embracing uncertainty as a way to move forward.[2]

References and notes


2. The full paper version of this text and supplementary materials can be accessed at http://...
Project Immortality Beta: A critical examination of the quest for eternal life through regenerative medicine and artificial intelligence.

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Immortality Beta describes a series of artworks and speculative prototypes, developed in a creative partnership between the School of Creative Arts and Media at the University of Tasmania and the Centre for Regenerative Medicine at the Queensland University of Technology. The artworks are a response to the promise of immortality through engineered life extension and the way utopian technological attitudes often re-inscribe the concepts of eternal life and resurrection onto contemporary computing and life technologies. In particular, the project examines the idea of ‘the body as spare part’ and the worldview that humans will eventually replace the body with technological and bio-technological substitutes including bio-printed organs and manufactured bodies with a downloadable consciousness. Through an examination of transhumanist discourse and contemporary cultural representations of artificial intelligence and life extension technologies, the authors signal some of the problematic philosophical perspectives inherited from the Enlightenment that reinforce substance dualism and continue to influence the public perceptions on the value of preserving and extending human life.

The article provides an overview of the development of the Immortality Beta project with discussion of iterative and collaborative processes between the artists and scientists involved. Two works from the series are discussed in detail. The first work, ‘Ghost Writer’ consists of a custom-built writing machine and linked screen-based avatar comprised of 3D scans of the artist Dr Svenja Kratz’s face. The machine uses a programmed neural network to produce an evolving body of text in Kratz’s handwriting. The original narrative is composed of selected fragments from seminal philosophical publications as well as stream of consciousness text musing on immortality and the nature of identity and consciousness. Over time, the writing machine reworks the script to develop a new narrative. The second major work, titled ‘Monument to Immortality’, is a large-scale sculpture with a biaxial bioreactor that contains a range of custom 3D printed scaffolds in the shape of different body parts seeded with human cells. The monument also includes video works and a series of glowing sigils that incorporate alchemical symbols, as well as historical and contemporary icons that reference the long-standing human desire for eternal life.
The discussion of these works is complemented by a contextual overview of current propositions for technological immortality including storing consciousness through chemical brain preservation or digital connectome mapping, as well as the development of virtual avatars that use data archives and artificial intelligence algorithms to create an ongoing digital legacy. By contrasting techno-hype and speculation with current technological limitations and insights from life science, the authors reflect on a number of propositions – Can a mind exist without a body? Is technology the new Philosopher’s Stone? – that form the conceptual backbone of these creative works. The authors concluding argument is that interdisciplinary collaborations facilitate a mechanism of ‘assumptive intervention’ by offering more ambiguous presentations of technologies to create an open and affective space for critical reflection.[1]

References and notes
1. Supplementary materials can be accessed at http://...