Astronauts and avatars: Exploring consciousness through the art and science of embodiment

Astronauts and avatars: Exploring consciousness through the art and science of embodiment, Symposium Report

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In 2015 I chaired a special conference symposium at *Towards a Science of Consciousness Conference* hosted by the University of Helsinki. The conference, now named *The Science of Consciousness*, began in 1994 at the Centre of Consciousness Studies at the University of Arizona in Tucson. This long-standing interdisciplinary conference is the largest of its kind and considers 'all aspects of the nature of conscious awareness, feelings and existence'. Having originally been invited to speak at the 2012 Conference in Arizona I was keen to convene a discussion around consciousness, arts practiceand the experience of zero gravity and weightlessness.

In the end four speakers agreed to speak at the symposium, two artists: UK-based visual artist Dr Louise K. Wilson and dancer and philosopher Professor Susan Kozel based in Sweden; Space Doctor, Professor Thais Russomano, and founder of PUCRS, a microgravity research centre in Brazil, and Finnish filmmaker Dr Pia Tikka, who engages with neuroscience and enactive media. What follows is a general description of the issues that the symposium was engaged in, the individual abstracts and biography of the speakers, and excerpts from an interview with Susan Kozel for the symposium.

General description

In 2005 Sian Ede wrote 'a new aesthetic phenomenology is emerging via advances in digital technology which might lead us to muse how far the paradoxically named "virtual" brings us closer to lived experience' (Ede 2005: 111). How do artists and scientists approach the question of how the body relates to consciousness in the context of new technologies? Neuroscientists Emily Cross and Luca Ticini suggest that 'art, like everything else we do, is generated from electrical impulses passed between the synapses of the brain, expressed through the body, and eventually appreciated through the senses' (Cross and Ticini 2011: 11), whilst Ede writes that 'we so sensuously inhabit our bodies that it is hard to see them as systems of knowledge, even in the purified arena of the laboratory or operating table' (Ede 2005: 133). This symposia's aim was to examine the relationship between the body and consciousness and seek out the conditions in which, through the creative processes of new media arts practice and through scientific exploration in the fields of neuroaesthetics and neurophenomenology, this relationship can be further understood and articulated.

It is often in the investigations of artists that we can find reflections on the subjectiverelationship between the body and consciousness. In the 1990s the new spaces of technology in virtual reality explored in the work of artist Char Davies, and even in the outer space explorationof dancer and choreographer Kitsou Dubois, highlighted the question of what we mean by the virtual, the weightlessor even the immaterial body. Curator Annick Bureaud commented how weightlessness relates to cyberspace in that there are no privileged directions or hierarchies and yet 'weightlessness is inscribed in the limits of the self and the human body' (Bureaud 2009: 4). Professor of Philosophy Mikhail Ryklin, reflecting on his experience of zero gravity, writes, 'even a temporary stay in states of weightlessness and double gravity changes one's relation to the body and its terrestrial possibilities' (Ryklin in Triscott and Frenais 2005: 15). Reflecting on her own experience of weightlessness Dubois wrote ‘it was necessary […] to concentrate on internal bodily space and the relation this holds with the surrounding space as well as on the imaginary that emerges directly from this new body-space-time’ (Dubois in Kozel 2007: 110). Visual artist Louise K. Wilson notes, however, that what is ‘seldom mentioned is the actuality of being in a plane that is performing these diving maneovres’ (2005). In 1997 dancer and philosopher Susan Kozel developed a performance experiment, *Ghosts and Astronauts*, drawing from her previous research, the work of Maurice Merleau-Ponty, and from reflections on Dubois's own records. In this ‘performers in [two] location[s] were projected into the other for a physical exploration of intimacy, weightlessness and altered materiality’ (Kozel 2007: 104). Kozel commented that ‘it is uncanny to me how Dubois's experiences in microgravity converge with my experiences of telepresence in gravity’ (2007: 109). Susan Broadhurst devotes a whole chapter in her book, *Digital Practices* (2007), to the topic of neuroaesthetics, commenting that ‘as scientific research progresses bringing increased knowledge of how visual imagery is constructed […] that ultimately leads to a questioning of the very nature of our consciousness, identity and being’ (2007: 47–48). Yet Cross and Ticini cite Anjan Chatterjee in his caution that future studies in this domain should make clear what neuroscientific data add to the study of aesthetics that behavioural experiments alone cannot achieve (2011: 14).

Following an introduction to the topic, each speaker presented for twenty minutes, followed by a 30-minute panel discussion. The four speakers were asked to address the following themes and questions:

1. How do artists and scientists approach the relationship between the body, space and consciousness? What paradigms should be consideredfor the following decades of the twenty-first century?

2. How do artists and scientists approach the relationship between embodiment and technology? How do art and science interpret the workings of consciousness in theconditions of the space of technology?

3. What is the value of art/science methods – science/art methods? What does art teach us that science cannot? What does science teach us that art cannot?

4. What future research directions should be considered for understanding consciousness in relation to embodiment, gravity and virtuality?

Speakers' abstracts

1. Susan Kozel, professor of New Media, University of Malmo, Sweden.

Gravity and its sisters

In 1997 *Ghosts and Astronauts*, a dance experiment using basic telematics, linked dancers in two theatres in London. The piece was developed from hours of improvisation around the theme of weightlessness. The studio where we improvised was neither an anti-gravity chamber nor a sophisticated laboratory, but by using music with pronounced spaces between the notes (Morton Feldman's *Piano and String Quartet*, 1985) and somatic improvisation instructions adapted from Kitsou Dubois's observations of movement in zerogravity, we transformed our physical states prior even to introducing the technological components. The altered states lingered long after re-entry into normal patterns of life. The reflective memory experiment that makes up the contribution to the symposium in 2015 revisits this performance from

1997 through the lens of somatic materialism, an articulation of somatic practices as a response to the philosophical discourse of speculative materialism (Kozel 2013). Somatic materialism opens the possibility for a phenomenological approach to affect and expands the reflective capacity for exploration of liminal corporeal and perceptual states.

Another artistic experiment with gravity was the showing of video imagery of dancers moving slowly, weightlessly, in the Reactor Hall of the Royal Technical University in Stockholm (part of the Close Encounters symposium at the Dance and Circus University [DOCH] in Stockholm, 2007). The Reactor Hall is twenty metres underground, and is a research and performance space converted from a mid twentieth-century scientific laboratory for testing nuclear reactors. The physical environment presses down on those in the hall; the weight of history, science and earth exists in a sort of frisson (if no longer fission) with immanent corporeal spaces.

Neuroaesthetics tends to gravitate towards the authority of, or critiques and expands, medical imaging technologies (Munster 2013). In contrast, artistic and phenomenological experiments in somatics rely on powerful internal imagery, coinciding, at times, with distinctive external spaces. Affect and somatics overlap and diverge. The title of this talk, ‘Gravity and its Sisters’, is meant to refer to ‘Shame and its Sisters’ the collection of Sylvan Tompkins writing on affect edited by Eve Kosofsky Sedgwick and Adam Frank (1995). What are the sisters of gravity? Dropping, falling, rising, floating, sinking, spiralling: affective states, states of consciousness, improvisational and meditative practices, zones where knowledge and experience are constructed. In artistic experiments with gravity, corporeal states are even more tightly entwined with states of consciousness and external material environments.

On the inspiration for the original project in 1997:

> *Ghosts & Astronauts* was a philosophical and a physical experimentation. I wanted to enter into a dialogue or a critique with Paul Virilio in his deeply held concern for the loss of the body in telematic and virtual space. The second inspiration for *Ghost and Astronauts* was Kitsou Dubois and her choreographic experimentation in zero gravity with the French aerospace agency. You may know she was hired by them in the 90s to help to train astronauts to habituate themselves to movement and functioning in weightlessness. I read an interview from a French conference (that was published in the proceedings) and on the basis of her observations I visited her studio in Paris. (Kozel 2015)

Figure 1: Anne Holst performing in *Ghost and Astronauts* (1997), © Susan Kozel. Photo: Dee Reynolds (Dancers: Ruth Gibson, Anne Holst, Susan Kozel).

On 'Affect':

> [w]e also can create a parallel with the qualities that come from weightlessness because weightlessness is a physical state of being but it's also highly affective. It can tinge the qualities of our memories, it can actually

> create a sense of inner buoyancy, or rootlessness, lack of connection, of great possibility, or of despair even. So I have some sisters of gravity like dropping, falling, rising, floating, sinking, spiralling. Some of these are tied directly to Kitsou Dubois's instructions but it's really significant that they are filtered through my recollection of the *Ghosts & Astronauts* process, and I will say that I remember more the devising process than the actual performance. The performance for me has faded in significance, but the physical experimentation, if anything, has become more powerful. (Kozel 2015)

Interview excerpt

Professor Susan Kozel's contribution to the symposium was a pre-recorded interview between herself and Denise Doyle that visually and conceptually engaged in the discussions that were due in the symposium. It lives on in archival format as part of the YouTube channel of the Medea Research Lab for Collaborative Media, Design and Public Engagement of Malmö University (Sweden).

https://www.youtube.com/watch?v=KVGwZ8z0vTE&t=2s

This interview is an instance of the performance of memory and relates to current research in the performance of memory, part of the Living Archives Research Project (http://livingarchives.mah.se). It is accompanied by other reflections on the body in the alternate gravity that is memory (Kozel 2017).

(2) Louise K. Wilson, visual artist and fine art lecturer, University of Leeds, UK.

Aerial stories (revised): A return to a consideration of the flying laboratory

On the Arts Catalyst (parabolic) MIR flight 001 in September 2001, I was temporarily categorized as ‘untrained naïve subject’ while taking part in a movement experiment, and, as such, was the counterpart to a trained naïve subject, Morag Wightman (aerial artist). The scientist who assigned us our roles – Dr Anthony Bull (then bioengineering researcher at Imperial College) – had devised a preliminary study of different movement control techniques in microgravity conditions. Of lasting personal impact, however, was the erroneous first parabola where I accidentally lost physical bearings. Aside from this role as a test subject, I gathered material (at Star City, Russia) from some of the fellow flight participants – a few of whom were musicians. Prior to, during and post-flight I conducted (and audio recorded) interviews. Largely anecdotal, these primarily touched on the relationship between felt haptic sensation and autobiography.

My interest had been prompted by a fascination with the medical study of motion sickness – the body’s fault line (as I saw it) that often asserts itself when experiencing different gravitational states and propelled motion. Any idea that the loss of gravity creates something analogous to ‘floating’ (a word employed to promote commercial zero g flight) did not correlate with the sheer brute force that we experienced. In addition, for some, the brain’s delicate chemistry had been modified by chemical intervention (Scop-dex, a mixture of Scopolamine and Dexedrine) to both dull (anti-nausea medication) and to heighten (stimulant to combat drowsiness) awareness. What was surprising subsequently was the affective response to double gravity and to the shared experience of loss of gravity flashbacks.

This presentation would build on these ‘findings’ to address some parallels with the musicians’ analogies with the visceral effects of (low) frequencies (as produced by a bass sound system). These original interviews with the zero g participants – andrecollections of my own responses – would be compared with more recent ones with the same people – with a view to examining both the felt and the remembered responses to such momentous gravitational states, and the idea of gravitational frequency.

3. Prof. Thais Russomano, Ph.D. in space physiology, Head MicroG-Pucrs, Brazil, and senior lecturer KCL, UK.

Space, design and the astronaut

Astronaut crew travelling inside a spacecraft, living on a Moon base or inhabiting a Mars colony or completing daily work tasks whilst wearing a spacesuit are all activities that need to be performed in as safe and comfortable a manner as possible. These aspects, however, are dependent on how the living facilities, extra-terrestrial habitats and astronaut clothing for use inside and outside a space vehicle are designed. This presentation aims to motivate the debate on creative ideas and plans in the area of Space & Design since the environment of space differs considerably from that found on Earth. The partial decrease or total absence of the gravitational force of Earth that is experienced by astronauts during a space mission must inevitably have an impact on the way in which space vehicles, systems and devices are designed and used. This article intends to present the daily life of how astronauts eat, sleep, exercise and work during a space mission and discuss the architectural and engineering requirements for the development, construction and validation of Moon bases and

Mars habitats. It will further consider space tourism, an emerging area that will become a reality in the near future and will lead to the development over the coming decades of new technologies for the establishment of hotels in orbit around the Earth and space gymnasiums for sports and leisure activities. The article will be divided into two parts: it will first introduce important aspects related to manned space flight and its relevance for space exploration; it will then discuss and propose better and more advanced ways to design space living environments, habitats and space suits and clothing.

4. Dr PiaTikka, Aalto University, Helsinki, Finland

Intersubjectively shared (un)consciousness enacted on cinema screen

This presentation discusses two ideas from the point of view of neurocinematics. On the one hand, the idea of embodiment and the situated physicality of the body on the cinema screen is considered. On the other, the antithesis of this idea is introduced in terms of virtual realities that conflict with the experiential embodiment. These reflections will lean on empirical explorations of cinematic narratives by a means of functional magnetic resonance imaging (fMRI). The idea of embodied mind dates back to William James, Edmund Husserl and Maurice Merleau-Ponty, among others. Gradually it has also been accepted within the field of neurosciences, together with the idea of *enactive cognition* introduced by Francisco Varela and colleagues (1991) and that of *embodied simulation* by Vittorio Gallese (2005). While the first refers to the inseparable situatedness of a subject within the surrounding world, the latter refers to the unconscious neural body-brain-world interaction dynamics (Tikka 2008). My practical case studies will allow discussing how different viewers' brains seem to respond to the embodied presence of the human characters on the screen and to the virtual realities conflicting with the familiar experiential world. I will also discuss empirical findings that compare brain responses to the human characters on the one hand and human-like virtual agents on the other. In relation to this distinction, I will present my ongoing studies with an enactive avatar and the use of a live actress and her avatar side by side in a feature film. Unavoidably, I also need to touch the widely studied issue of *uncanny valley* (originally coined by Mori 1970), that is, the experience of weirdness when confronted with a virtual agent that is too close to human-likeness, but not quite enough (Cheetham et al. 2011). Finally, I will present my approach to *narrative co-presence*, the intersubjectively shared experience of presence emerging in interaction of the viewer and the enactive avatar on the screen.

Biographies of speakers

Susan Kozel is a professor with the School of Art and Culture, Malmö University (Sweden), and director of the interdisciplinary research project Living Archives, funded by the Swedish Research Council. Her research is artistic and philosophical, with a grounding in dance and phenomenology. Notable publications include *Closer: Performance, Technologies and Phenomenology* (2007, MIT Press), plus recent book chapters 'Process phenomenologies' in *Modes of Embodiment* (eds Nedelkopolou et al., Routledge 2015), 'Devices of existence' in *Improvisation and Social Aesthetics* (eds Born et al. forthcoming Duke 2016) and 'Dancing with twitter' in *Digital Storytelling and Mobile Media* (ed. Farman, Routledge, 2013). Current artistic research collaborations include 'AffeXity' and 'Performing Encryption' exploring affect using mobile devices in urban contexts (http://livingarchives.mah.se).

Louise K. Wilson is a visual artist, writer, lecturer in art and design at the University of Leeds, UK. Her published writing includes an interview with Paul Virilio (in the online journal *CTheory*, 1994), artist pages for *Zero Gravity: A Cultural User's Guide* (Cornerhouse Books, 2005) and book chapters for *A Fearsome Heritage: Diverse Legacies of the Cold War* (Left Coast Press, 2007) and *Contemporary Archaeologies: Excavating Now* (Oxford: Peter Lang, 2009). Recent chapters are in *Approaching the Bunker: Affect, Materiality and Meaning-Making in Cold War Ruins* (in the Place, Memory, Affect series, Rowman and Littlefield, 2017) and *Beyond Text? Critical Practices and Sensory Anthropology* (Manchester University Press, 2015).

Thais Russomano, MD, M.Sc. (aerospace medicine, Wright State University, US), Ph.D. (space physiology, King's College London, UK),founded and coordinates the Microgravity Centre–PUCRS, Brazil, internationally recognized for its space life sciences and eHealth research. She is a full professor at PUCRS and visiting senior lecturer at King's College London. Thais holds international patents, has authored numerous articles and books, and acts as consultant and advisor for space projects. She is an elected member of aerospace academies and associations and involved in space projects as co-founder, corporate director and chief medical officer of the US–based International Space Medicine Consortium Inc.(ISMC).

PiaTikka, Ph.D., filmmaker-researcher, is director of Crucible Studio at the Media Lab, Aalto University, Finland. She has directed feature films *Daughters of Yemanjá* (Brazil–Finland 1996) and *Sand Bride* (Finland 1998), a participatory film-game *The Third Woman* and worked in international productions. Herbiosensor-based Enactive Cinema *Obsession* (2005) received the Möbius Prix Nordic interactive storytelling award. She is the author of the book *Enactive Cinema: Simulatorium Eisensteinense* (2008), and publishes widely in the fields of art and science. Previously a key member in the Aalto University's research projects 'Enactive Media' (2009–11) and 'aivoAALTO' (2009–14), currently, her NeuroCine team applies neuroimaging methods to study the embodied basis of creative imagination, storytelling and enactive media.

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