

Bodies in Light: Mediating States of Presence

Abstract

Bodies in Light investigates how the convergence of light, body and technology can evoke states of presence through creative practice in the context of both real world and technologically mediated environments. Throughout history the interwoven relationship between body and light has been an ongoing catalyst for discovery, technological innovation and creative expression. Light has been harnessed, measured, manipulated and investigated in order to expand knowledge and create experiences which abstract and re-frame our somatic perspectives. Whether mediated by technology or evolving cultural paradigms, light focuses our attention, frames our narratives and initiates states of presence which enable us to examine and reflect upon our embodied human condition. This chapter discusses the various approaches and strategies artists use to elicit states of presence through the convergence of light, body and technology in response to specific artworks and immersive projection environments.

Keywords/Index

Presence, light, body, embodiment, projection, convergence, perception, experience, observation, mediation, immersion, technology, performance, fulldome, telepresence.

Introduction

Bodies in light. Our fundamental state of being. An innately knowable, interwoven relationship and a primary catalyst for scientific, philosophical and artistic investigation. The discoveries, creativity and expression emerging from this relationship are intrinsically bound to our technological development. From the early flint tools used to create firelight that projected the shadowy figures onto the walls of Plato's Cave, to the interactions between pixel and performer on the contemporary stage; the exploration of body and light in technologically mediated environments has enabled us to examine, understand and reflect upon the human condition by abstracting and re-framing our embodied perspective. Technology has

been used to harness, manipulate and focus light to frame our narratives and evoke states of presence throughout the history of human storytelling. This chapter investigates how the convergence of light, body and technology can mediate states of presence, drawing from my own artistic research and work in immersive projection environments.

Presence is elicited when overlapping modes of presentation and perception come together within a mediated space to construct an experience (Power, 2008: 206), in which an illusion of non-mediation occurs. This illusion is initiated when the environment presented via the medium enables a paradigm shift and the perceived separation between light and body is dissolved through a convergence of highly considered conceptual, spatial and temporal design, refined technical processes, and real-time interactions between light and bodies.

Presence has become a primary focus for many contemporary artists and designers seeking to create experiences that build upon the fundamental human relationship with light and initiate moments of grace, in which the role of technology is eclipsed. (International Society for Presence Theory (ISPR), 2016). The concept of presence will be examined by drawing on my own practice-based artistic research which investigates the relationship between light, body and technology across moving image, performance, projection and fine art. Analysis and review of selected films, performances, installations and artworks emerging from my practice will demonstrate how the integration of light, body and technology can be mediated to initiate states of presence across a range of environments. It will explore the relationship between light, locus of attention and perceptual responses in the initiated states of presence. And it will draw upon existing research to determine how states of presence can generate moments of grace, immersion and heightened experiences in response to specific artworks.

Presence

Presence is a multi-dimensional concept (ISPR, 2016) which crosses disciplinary boundaries and currently defies a unified scholarly definition. In general terms, presence is defined as the state or fact of existing, occurring, or being present (Oxford Dictionaries, 2015). However, within academic contexts the complexity of presence is underpinned by multiple traditions within philosophy, semiotics, and

cognitive and computer sciences. In seeking to clarify a definition, the International Society for Presence Research identifies two main categories - first and second order presence. 'First order' presence includes all human experience of the physical world, mediated by the senses and complex perceptual processes.

This experience is the "normal" or "natural" way we perceive the physical world and provides a subjective sensation of being present in our environment and in which technology plays no role (ISPR, 2016).

'Second order' presence or 'telepresence' is defined as 'a psychological state or subjective perception' (ISPR, 2016) mediated by technology, in which 'one is forced to perceive two separate environments simultaneously: the physical environment in which one is actually present, and the environment presented via the medium. 'Telepresence is the extent to which one feels present in the mediated environment, rather than in the immediate physical environment' (Steuer, 1993: 6). First order presence is implicit within all second order experiences but Steuer (1992) suggests the experience of presence in the unmediated world is commonly taken for granted and as a result remains unconscious. The majority of contemporary research into presence adopts this view and focuses on second order experiences within virtual reality and other digitally-mediated environments, which furnish a user with the perception of being present in 'an external space beyond the limits of the sensory organs' (Loomis, 1992: 113). This prevailing perspective considers presence as a by-product of technological mediation and closely reflects dominant technological and cultural paradigms. This view is derived from the rationalist tradition and is opposed to the proposition that knowledge is acquired through experience (Zahorik and Jenison, 1998: 79). The alternative perspective is an ecological approach in which knowledge is bound to our normal, everyday interaction with the physical environment and has its foundation in the philosophy of Martin Heidegger and the environmental psychology of James J. Gibson (Zahorik and Jenison, 1998: 79).

A key proponent of the ecological approach, psychologist Giuseppe Riva, says that presence should 'not discriminate between the real and the virtual, but between the

internal and the external because, in principle and as far as the organism is concerned, a virtual experience is the same as a real one. They both evoke presence through the perception of a world surrounding the organism' (Riva, 2004: 417). The ecological perspective thus considers the experience of presence a natural embodied response to environmental stimuli, and proposes that first and second order presence are equally mediated 'by both physical (our body, technological devices, etc.) and conceptual tools which belong to a given culture' (Riva, 2003: 12). According to Riva as presence is an evolved psychological mechanism, it should exist independently of a given medium, and in particular, it cannot be considered as a simple response to media (2004: 415).

It follows that states of presence emerging from the convergence of light, body and technology are independent of any specific media and can occur equally in the real world, in virtual worlds, and in the hybrid immersive spaces between the two. Taking an ecological approach, grounded in embodied experience, enables investigation across both real and virtual experiences of presence. As such, it provides an apposite critical foundation for the following discussion about the convergence of bodies and light in the context of both real world and technologically mediated environments.

Light and Body

Presence is inseparably entwined with our embodied experience of light. Electromagnetic radiation oscillates at varying wavelengths and frequencies in the electromagnetic spectrum. The human eye sees only a small region of this spectrum, detecting wavelengths from 400 to 700 nanometers. Contemporary science describes light as a stream of photons, quantum units of energy that have no mass and no electric charge. The amount of energy a photon has determines its behaviour; lower energy photons behave more like waves and higher energy photons more like particles. This phenomenon, known as the wave-particle duality reflects the commonly accepted model of light.

Physicist and philosopher Arthur Zajonc proposes an alternative view suggesting that whilst we may try to split light into fundamental atomic pieces, it will remain whole to the end 'for with light', he says, 'the most fundamental feature is not to be found in smallness, but rather in wholeness, in its incorrigible capacity to be one and many,

particle and wave, a single thing with the universe inside' (Grandy, 2009: 58). Our understanding of light, and the visions we have of ourselves and our place in the universe, are concomitant. Light affords an observer the perception of space and time but makes the objective observation of light impossible. 'Light is such that we cannot see it without seeing by it' thus we are never able to 'separate light from our experience of light - the two are coincidental' (Grandy, 2009: 49).

As a consequence of this situated-ness, our explicit understanding of light remains ambiguous. Implicitly however, the relationship between light and the body is deeply knowable. It is a primary condition of being human to exist as a body grounded in light. Light as a whole may defy logical scientific definition, but at a fundamental experiential level it cannot be un-known. We are immersed in a world of light; it is all around us but 'as such we are unable to see it according to its exterior envelope' (Merleau Ponty, 1964: 178). Much like first order presence, this ubiquitous immersive state remains unconscious because 'we have little doubt of the visible three-dimensional world which extends in front of us, we are seldomly aware of our sense of presence in the world. It is not an experience we are used to reflecting upon' (Riva, 2003: 3).

However, both conceptual and technological mediation can make us aware of this 'default' experience (Riva, 2003: 3) through a re-framing and abstraction of our subjective view. It can provide a distance, a new perspective, and at the very least, an illusion or suggestion of objectivity. From the astronaut's view of our blue planet orbiting in space to microscopic images of bio-luminescent organisms or the virtual lights of digital installations, human innovation and technological invention provide endless tools and systems for the re-observation of our world. When convergent with light and the body, technology can provide an altered perspective and the possibility of an expanded view of ourselves through a mediated world beyond our somatic limits.

Practice-led Research

Generating states of presence through the integration of light, body and technology has been a continuous and central motivation in my creative practice and artistic research. Light and body are interchangeably the subject and media within my work, which traverses film and moving image, live performance, immersive projection, and fine art. Often my practice draws on my own embodied experience of the world and of light as

a starting point for the artworks.

My short film *Flux* (1999) draws on personal experience to tell a story about trust, about an accident, and about emerging from grief. The film uses visceral visual metaphors, multi-layered imagery and seamless editing to tell a story about surviving a near-fatal car accident. The imagery is beautiful, fluid and seductive, but there is a brutality to it that makes the film feel uncomfortably close to the bone. Fluctuations in light and colour form the foundation of the film's emotional journey (Figure 1). The audio tells a second story, as a woman's voice leads the audience through an intimate account of the end of a relationship. The two stories are not directly connected but the audience constructs or perceives a single story, which tells of a death, of mourning and recovery.

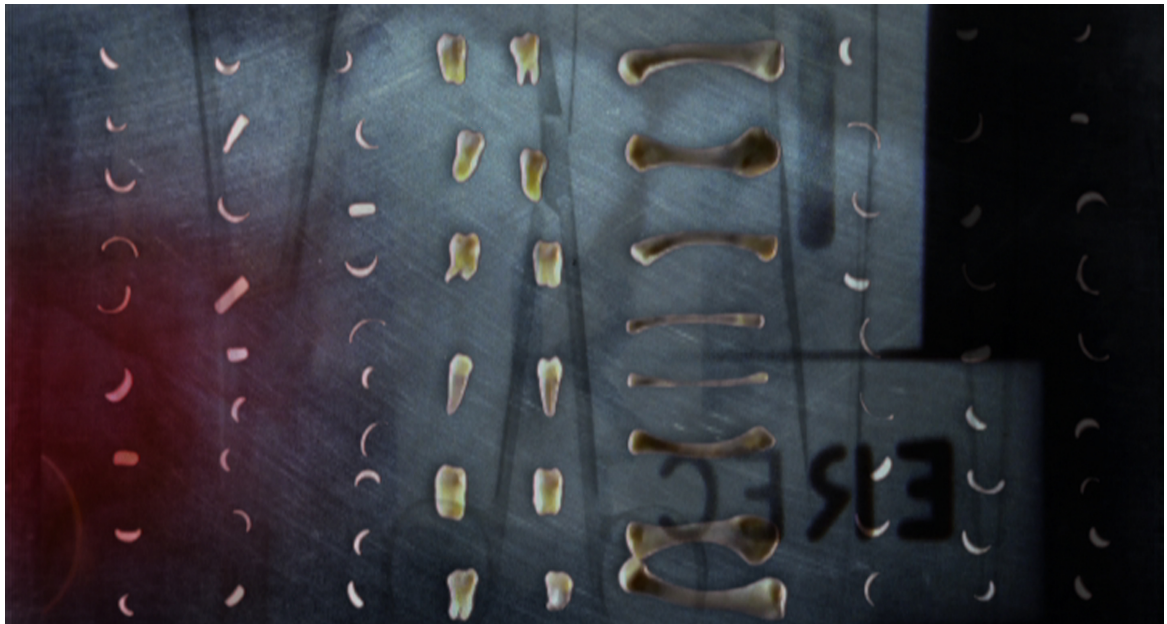


Figure 1. Still image from *Flux* (1999), Written and directed by Michaela French, 16mm Film Digital Post-Production 35mm Film, 9 minutes.

Flux had a profound impact on a number of people who had experienced the death of a loved one shortly before seeing the film. In the cinematic space, light and sound focus the attention, and the visual and aural stories in the film merge with the viewer's personal experience. It is no longer my story on screen, it's theirs; their grief, their body and their loss; and in that moment, presence is initiated. Body, perception, light and technology converge as awareness of the physical space of the cinema falls away, and because it has immediate significance (Riva, 2004: 418) for the viewer, the

mediated world of the film becomes all encompassing. After seeing *Flux* a surprising number of people made contact with me, via email and letters, as they felt it was important I knew how deeply the film had affected them. Each of their messages were very personal, but consistently expressed a sense of a new perspective having emerged as a result of watching the film.

It is clear that the experience of presence occurs when the environment presented via a medium envelops a viewer's perception and initiates the illusion of non-mediation.

However, varying levels of presence can be produced when both the media form and content deliver 'rich, consistent, and captivating sensory stimulation' (Riva, 2003: 3).

Higher states of presence more are likely to occur when the locus of attention is wholly directed toward the mediated environment (Waterworth and Waterworth, 2006: 89). In the example of *Flux*, initially the viewers' attention is directed to the screen via projected light, sound and the framing of cinematic space. As the film plays and the story begins to unfold, the locus of attention is drawn into the narrative, where the perceived 'vividness' (Waterworth and Waterworth, 2006: 84) of imagery, sound, and characterisation determine the initial level of presence. In addition, the potential for optimal levels of presence is significantly increased when the viewer is further engaged by a personal interest in the information or story delivered via the medium. This was demonstrated by the heightened responses particular viewers had to the story told in *Flux*. Their experiences of presence in watching the film moved them enough to allow each viewer a glimpse their 'exterior envelope' (Merleau-Ponty, 1964: 178) which enabled a re-observation of their world.

The experience of higher levels of presence in mediated spaces leads to what Julian Hilton describes as: 'the central theatrical paradox: that a mode of expression so transparently manufactured and artificial is simultaneously the agent of the most intense perception we may ever have of the real' (1987: 1). We construct, narrate and manipulate spaces through the interaction of light and body, creating technologies that allow us to see beyond our embodied limits, in order to observe our reality. Elena del R  o proposes that 'technology springs from the very human condition of embodiment' (Sobchack, 2004: 137), so whilst our tools evolve to reveal ever-expanding views of the world, they continue to reflect our situated-ness. This, in turn, leads to further development of new technologies and the novelty of new ways of seeing.

Projection in Performance

The evolution of technology in digital projection, virtual reality and immersive projection spaces over the last thirty years has seen the emergence of complex creative practices which integrate new technologies as tools, materials and methods to produce previously inconceivable experiences. These practices blur boundaries between theatrical and cinematic space, analogue and digital space, and real and artificial space. The artworks emerging from these practices often focus on the interaction between body, light and technology. Pioneering artist Char Davies, produced early experimental immersive virtual reality artworks *Osmose* (1995) and *Ephémère* (1998) in which breathing and bodily movement enabled navigation and elicited extremely high states of presence. Davies collided physical and virtual worlds and provided gallery audiences with the possibility of being profoundly moved by a mediated digital experience. Choreographer Merce Cunningham's collaboration with digital artists Paul Kaiser and Shelley Eshkar produced *Biped* (1999), bringing the body and technology into dialogue in early examples of video projection and motion tracking in contemporary dance. And Klaus Obermaier explored the limitations of perception though in his striking interactions between the body and digital technology. In his performance works *Vivisector* (2002) and *Apparition* (2004), the body appeared transformed through real-time motion tracking and digital projection mapping within theatrical spaces. Whilst visually spectacular, it was apparent that some of these early hybrid projection works were less able to generate high presence because the role of technology in the experience could not be overlooked.

In designing digital projections for *Melt* (2002), a 20-minute contemporary dance duet for two women by Melbourne choreographer Lucy Guerin, it was a priority for me that technology would not dominate the work. My projection and stage designs had to frame the live performance and capture the audience's attention through vividness and connection to the thematic content of the piece. *Melt* explores the emotional and behavioural characteristics of temperature. Moving from freezing to boiling, the work builds slowly from a harsh, crisp frostiness, through passion to furious anger. Two female dancers perform intricate choreography in white costumes in front of a suspended matte black frame. Their bodies become screens and digital projection illuminates the space in ways beyond the scope of traditional theatre lights. The work is bold and precise, punctuated by interactions between specific body parts and

projected light elements - a snowflake of light landing on the palm of a hand, exposed white teeth glowing in a small bright square of light, a thin line of light caressing the contours of the dancer's back.

The projected images aimed to reflect and extend the emotional unfolding of the choreography, whilst bringing a deliberate and purposeful focus to the stage.

Animated colour gradients, fluid multi-layered moving textures, visual transitions from cold to hot, and the ability to frame and define specific forms and movement on stage resulted in tightly woven interactions. Bodies, light and technology entwined becoming a single entity, and the boundaries between performers, choreography, projection, and theatre blended into a seamless unified experience. Watching the performance the audience were not concerned with technology, rather their attention was transfixed by two living, breathing, bodies moving in sync with a precisely designed field of light, which revealed an emotional narrative the audience recognised and knew well. The stage was set for moments of grace, heightened experiences and high levels of presence, for as Cormac Power suggests 'presence in theatre, far from being suffocated by the introduction of "linear media" may actually be highlighted through the juxtaposition of performers and technology' (2008: 164).

Melt was a pivotal piece of work for me; cinematic image made way for lighting design, filmmaking techniques merged with bodies in physical space and the boundaries of my creative practice expanded. The work re-confirmed the vital importance of the media content, particularly visual and thematic storytelling, when seeking to engage an audience in technologically mediated spaces. (Riva, 2003: 3) It also demonstrated that light, 'owing to its ecological action ... and deeply articulated nature' (Grandy, 2009: 107) can be a medium for communication when states of presence enable a re-framing of our subjective view.

Immersive Projection Space

In cinematic and theatrical spaces, the experience of presence narrows the attention to a specifically framed point of focus. However, in fulldome projection spaces presence expands the view, abolishing any sense of a frame to create a fully immersive experience that results in the 'sensation of being surrounded by a completely other reality ... that takes over all of our attention, our whole perceptual apparatus' (Murray, 1997: 98-99).

My initial experience in designing for fulldome space was in the Melbourne Planetarium in 2000, at the exact time that analogue and digital boundaries had merged. Fulldome digital video projection was in its very early development, and after completing projects in Australia, I joined a team of artists invited to explore this new immersive medium and produce artworks for the planetarium at the New Mexico Museum of Natural History and Science in Albuquerque, US. My ongoing research and creative practice in fulldome projection space has recently lead to the establishment of the Fulldome Research Group at the Royal College of Art in London. In partnership with the Information Experience Design Programme at RCA and the Peter Harrison Planetarium, Greenwich, the Fulldome Research Group investigates the creative, artistic and communicative possibilities of immersive fulldome projection spaces through practice-based research.

Fulldome projection space takes mind, body and imagination on a journey that pushes the exterior envelope; expanding perception and leaving one seeing the world in a new light. In fulldome space, the physical body is placed at the centre of the experience and presence is derived from a fully expanded, frameless locus of attention, combined with ‘optokinetic stimuli’ (Brandt, Dichgans and Koenig, 1973: 476), which influence the sensory receptors to impact spatial orientation, motion perception and proprioception. No longer an external observer, the viewer is immersed in a specifically designed field of light, and the body comes along for the ride.

Developing content for this immersive projection environment requires many of the same considerations as designing for cinema and the real time space of theatre, in the sense that the construction of narrative and the framing of physical and mediated space will ensure audience engagement in the dome. However, optimal levels of presence can be achieved by taking additional factors into account. Designing imagery appropriate for the dark adaptation curve over the first ten minutes of a fulldome work assist in bringing the locus of attention into the mediated projection space. Activating perceptual cues to influence both central and peripheral vision receptors expand the field of attention to the full 360° perimeter. Audio cues should also be used to embed a perceptual comprehension of the hemispherical space. If this spatial relationship is established early in the experience, it is then possible to manipulate the space using visual and aural cues to choreograph the audience in synchronised physical movement. This motion strengthens the connection between the audience and the content

presented via the medium, and elicits even higher levels of presence when the experience is amplified through social entrainment (Schnall, Hedge and Weaver, 2012). Proximity and movement in the mediated projected image and sound design also contribute to states of presence, particularly when visual transitions move between universal and personal scales. The relationship between the infinite and the individual is at the core of the immersive fulldome experience. It is a complex space in which light, body and technology naturally converge. It encourages the audience to reflect upon their situated-ness as bodies immersed in the world, and in doing so generates experiences of heightened awareness and elicits optimal levels of presence.

First Order Presence

Observing the relationship between light and the body through a technologically mediated and immersive view allows us to reflect upon individual experiences of the infinite. However, it is possible to make equivalent observations in a non-mediated, real world context; as Riva reminds us: ‘the feeling of ‘being there’, or presence, is not intrinsically bound to any specific type of technology - it is a product of the mind’ (2003: 3). My artistic research in fulldome space is complemented by an equally immersive creative practice in the real world. Once again, drawing on my embodied experience and using light as the subject matter, *Daylight Observations* (2015-16) place my body at the centre of a durational process which involves the observation of changes in light in the real world. Beginning in pre-dawn darkness, these observations take place in specific locations over the period of a single day. The colour, tone and intensity of visible light is recorded every ten minutes through digital sensors, time-lapse photography and by eye, observing a precisely framed position at the horizon, until darkness falls at the end of the day.

This extraordinarily simple process initiates deep states of presence, which on occasion reach a ‘literally ecstatic state’ (Waterworth and Waterworth, 2006: 88) when the perceived separation between light and body dissolves and the intimate merges with the infinite: I am a single individual body sitting on the planet, watching it spin around the sun, but through the process of looking, this everyday occurrence becomes astounding. I no longer see the sun rise but instead see the earth spinning away on its orbit. Diurnal duration reflects planetary tilt and beginnings and endings of days begin to merge into a single universal continuum.

The images emerging from these observations (Figure 2), presented as large scale prints in a gallery context, are initially read as bands of abstracted colour swatches. But again, the process of looking reveals more; movement from dark to light to dark and the changes in colour intensity build to an understanding of a day. Each timeline reflects a single rotation of the earth on its axis. A comparison of these images over a year, reveals the tilting orbit of the earth's annual rotation around the sun, and implies the progression of a larger planetary system. At the perceived centre of this system, resides all the complexity and situated-ness of each individual embodied experience of light.



Figure 2. *Daylight Observation: Thursday 21st January 2016, Hoddesdon England, 124° East, 51°45' 49"N 0°1'5"W*. Michaela French 2016.

In responding to these artworks on 26th January 2016, N. Shepherd reflected: 'they feel deeply familiar even though I don't know exactly what I'm looking at'. Others expressed satisfaction in the simplicity of the images which belie their underlying complexity, and some simply took a moment to reflect upon their own embodied experience of the world, as mediated through mine.

Conclusion

It has been shown in the examples of practice discussed above that it is possible to design experiences which evoke states of presence through the convergence of light, body and technology if the illusion of non-mediation occurs. And whilst, in contemporary research and practice, technology provides the dominant platform through which presence is experienced and investigated, it is equally possible, if less common, to initiate experiences of presence in real world or first order contexts. Presence is a phenomenal experience, independent of any technological mediation; it depends upon specific perceptual cues which alter our way of seeing, and in doing so

re-frame what we see.

Light is a common factor in both first and second order presence. It is the primary influence in framing and focusing the locus of attention, and a key trigger for other physiological responses which lead to optimal levels of presence. I would argue then, that light is perhaps equally as functional a form of mediation as the technologies that deliver it and the conceptual cultural tools that define it. Current research does not normally consider the role of light in initiating states of presence. However, in evaluating the complex creative practices in which light and body converge through the lens of presence theory, my research seeks to articulate methods, approaches and strategies through which light may be used to evoke presence across a range of environments. By explicitly identifying these factors within creative process, it becomes possible to test, consider, and reflect (Friedman, 2003: 520) upon the contribution such practice-based research can make to the theoretical understanding of presence.

My practice-based research aims to elicit experiences of presence through the mediation of light in both the real world and in a range of immersive projection environments. In cinematic space, the mediation of light delineates the frame through which narrative unfolds; in theatrical space, light illuminates bodies, redefines physical space and frames live performance in real time; in fulldome projection spaces, mediated light becomes immersive, reflecting the limitations of embodied experience whilst offering the possibility of infinity; and in the real world, light is our all-encompassing un-mediated source of both illumination and life. In each one of these spaces, varying levels of presence are possible as multiple sensory receptors are progressively activated.

Whether mediated by technology or specific cultural perspectives, the primary reason for evoking states of presence is ‘to see ourselves transfigured in our implication in both the natural and technological worlds, to experience ourselves as light.’ (Cubitt, 2014: 274). Throughout the long history of mediating spaces in our attempts to elicit presence, light has been harnessed, measured, manipulated and investigated. It illuminates our stories and carries the data which define our technologically driven age. But despite the best efforts of the most renowned minds from the entirety of human history, light as a whole remains satisfyingly enigmatic. It is precisely this ambiguity which makes the elemental relationship between light and body so

fascinating, for it is in attempting fully understand light, that we are also able to observe ourselves.

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