

TABLE OF CONTENTS

∴	1
Séance in the Fulldome.	1

Séance in the Fulldome.

Séance in the Fulldome.

Mike Phillips 2025.

Chrono-Synclastic Infundibulum...

Contrary to popular cultural belief, Space is not the final frontier (The Man Trap 1966). This text explores the real final frontier, where everyone will go, boldly, gently or otherwise, and questions whether we can ever come back, and what apparatus might be necessary to make the transition. This piece explores relationships between the development of broadcast, networked, and immersive technologies that have engaged with the paranormal and examines the interface – the thin membrane – that separates the living and the dead and touches on a brief history of a specific set of technologies that have attempted to penetrate it. Ultimately, it considers how these processes could

be made manifest in immersive environments when enhanced by algorithms and audience interaction.

It focuses on the potential of the fulldome as an immersive architecture for contemporary hauntings. The fulldome, formerly known as the Planetarium, uses spherical perspective to provide an immersive, performative, and polysensory experiences (Phillips 2012). Rooted in the cosmological language of space, it is now a transdisciplinary instrument for the manifestation of (im)material and imaginary worlds, a “chrono-synclastic infundibulum”, a place ‘where all the different kinds of truths fit together.’ (Vonnegut 1962: 7). Its celestial architecture blends the mythic with the spiritual, and the astronomical with the heresy of the astrological.

Between 2012 and 2025 I managed the [Immersive Vision Theatre](#) (IVT) at the University of Plymouth and lead a team of researchers and developers building its immersive future whilst remembering its provocatively heretical past. Built in 1967 it was named the William Day Planetarium after the Principal Lecturer who galvanised its construction and delivered an astronomy programme to students and communities across the region. Originally equipped with an optical-mechanical constellation projection system, the Zeiss-Kleinplanetarium Nr. 1 (ZKP1) Star Ball, capable of projecting 5000 stars onto the horizontal 9-meter plaster dome, the building underwent a digital conversion in 2006 with a 25-degree tilt, a single fisheye projector and surround sound system, and renamed the IVT. Recent technological refurbishment (2023) has added a dual fisheye projection system, enhanced spatial audio and more computational power for

visualisations, rendering and data processing. It is now hard to find a planetarium that hasn't been digitised with Zeiss Star Balls providing a decorative curio, an antique scientific instrument from another age. With over 4000 fulldomes worldwide, the vast majority are still predominantly servicing STEM subjects, mostly astronomy but the variety of audience focused science communication and infotainment productions is growing.

With this rise in popularity, it would be easy to forget that the fulldome has emerged from an architectural, painterly, theatrical, philosophical and spiritual milieu that blended colonial, religious and scientific narratives through awe inspiring experiences of scale and wonder. Lambert maps out this evolution from the Gottorp Globe (1664), the Gesamtkunstwerk ambitions of Philipp Otto Runge's Tageszeiten (circa 1803), to Wyld's Great Globe (1851), recognising that there is something about the fulldome that "...as well as being a representation of 'outer' space it can also be seen as an analogue for one's interior space too." (Lambert 2012).

The [Fulldome Database](http://www.fddb.org) (www.fddb.org) provides a comprehensive international list of contemporary venues, content and producers, and examples of some of these places and works where a shift has taken place towards a more interactive and performance model.

The conversion to a highly flexible digital Audio/Visual system allowed the scale and scope of the planetarium to shift perspective, it was no longer just a space for stars, but a place where all material things and scientific concepts could be

visualised and sonified at macro, meso and micro scales, from the atomic forces that bind us, the invisible weather patterns that surround us, to the Dark matter that eludes us. When operating at these transcalar dimensions, from the biggest to the smallest things imaginable, it is easy to assume that this all happens along a single axis, from the Cosmic Microwave Background (CMB) radiation all the way down the nano, and beyond to the quantum. An experience not unlike the “Woooooow!” Powers of Ten (Eames 1977) couch gag from the Simpsons (Simpsons 2004). The short parody from the family couch, across the Universe towards the nano and molecular level before emerging from Homer Simpsons head. When the cultural dimension is added the frontiers and boundaries between disciplines start to leak and things – forgotten or hidden memories – start to ooze through.

Uneasy Dreams...

The fulldome has been undergoing a disciplinary metamorphosis, it awoke one morning from uneasy astronomical dreams and found itself transformed from a planetarium into an ‘omniarium’ – no longer just planets, but all things, in a shared virtual reality for interdisciplinary exchange and cultural production. As recognised by McConville, it can no longer be defined by a lazy and uncomfortable comparison to cinema, “Throughout the mid 20th century, numerous scientists, mystics, artists, engineers, and propagandists engaged the dome as a way to explode the frame of the rectilinear confines of traditional cinema.” (McConville 2007: 83). The fulldome transcends the flat rectangular screen,

extending it to infinity, both in terms of its cosmological heritage and the natural immersive qualities of a hemispherical screen that wraps all the way around, engulfing the viewers' peripheral vision. As an example of the potential of this new spherical perspective, the EU Culture funded European Mobile Dome Labs project (2013–15) (EMDL 2013) generated three performances, Liminal Spaces, Dream Collider, and [Murmuration](#), performed at the 'Satosphere' at [Société des arts technologiques](#) (SAT) in Montreal. The works were a synthesis of research undertaken by an international interdisciplinary team exploring the rapidly evolving field of fulldome, developing a new dramaturgy for interactive fulldome environments as well as technological innovations to enhance audience participation, utilising networked navigation devices, Artificial Intelligence, scanning and real-time data (Magnetic Resonance Imaging, Lidar, Atomic Force Microscopy) and 3D spatialised audio. (Murmuration 2015). The fulldome is now a performative space, not just a space for the consumption of information, but a space that provokes audience interaction and participation, a home for projection mapping, live coding, VJing, gaming, interactive works, live performance, and, as explored below, the perfect place to hold a séance.



[Figure 1. Murmuration (2015). Société des arts technologiques (SAT). European Mobile Dome Lab. Photo Johnny Ranger.]

There is no doubt that the fulldome is haunted by its disciplinary past, if only because it has been channelling a scientific method which so efficiently erases its past to create its future narrative. The things that were once possibilities are surgically erased in a narratology written by the fittest survivor. For science, there is no service station with adjoining café for Sapphire and Steel (to ponder anachronism and inertia as they stare out of the window and drift off into infinite space), as described by Mark Fisher. Science would appear to embrace the opposite of the “slow cancellation of the future has been accompanied by a deflation of expectations” (Fischer 2014: 6); it cancels alternate pasts and promises great expectations. The IVT, in its William Day Planetarium

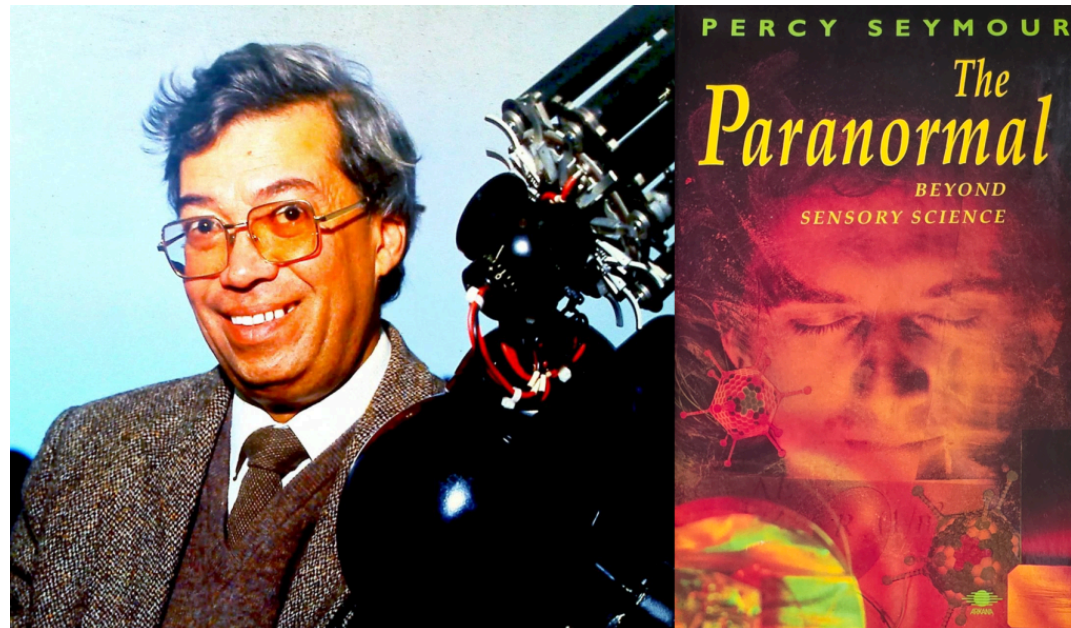
mode, has played a small part in upsetting the scientific hegemony and cultivating the kind of heresy that is explored below. Its mission back in 1967 involved significant public engagement and education around cosmological narratives and navigating by the stars, tales told in the dark under an artificial sky, a Zeiss Star Ball performance with deep roots in the mythological interwoven with scientific and technological knowledge. It was also part of a wave of planetarium developments linked to the USA and USSR Space Race at the end of the 1950s through to the mid-1970s (McConville 2007: 73). It is also not a coincidence that it was born the year before the launch of the Leonardo Journal (Leonardo 2024), also an offspring of the Space Race, a symptom of the disciplinary permeability that was evolving around the use of technology for artistic and cultural production. Created by Frank Malina (Kazakou 2020: 47)), a rocket scientist at the Jet Propulsion Laboratory and known as a member of the notorious Caltech Suicide Squad (Winter 2017), the [Leonardo Journal](#), Leonardo Music Journal (Leonardo-music-journal 2024) and ISAST, the International Society for the Arts, Sciences and Technology has been a bed rock for new media art practice and art science collaboration. The growth in planetaria and the advent of transdisciplinary organisations, such as Leonardo, mark an evolution in ways the world could be seen, captured and represented –an evolution that aligns synergetically with post-World War 1 Avant-Garde art movements.

“ *vision in motion is a synonym for simultaneity and space-time; a means to comprehend the new dimension.*

(Moholy-Nagy 1947: 12)

László Moholy-Nagy design manifesto, published a year after his death, synthesises the Bauhaus' pre-World War 2 mission into a design education agenda that provides a framework that pre-empted the science engagement of the planetarium and the transdisciplinarity of Leonardo. Manifesting the invisible forces that were haunting the cultural milieu at the turn of the century, post Hertz and pre Quantum, can be seen as a preoccupation of artists such as [Naum Gabo](#), as articulated through his Realistic Manifesto (Gabo et al 1920), Kazimir Malevich fascination with the cosmos (Shatskikh 2014) and of course Cubism's entanglement with simultaneity.

Beyond Sensory Science...



These disciplinary relationships are not always comfortable ones, as my predecessor, the second director of The William Day Planetarium discovered. Previously a Senior Lecturer at the Royal Observatory and a Fellow of the Royal Astronomical Society, Dr Percy Seymour ran the Planetarium at the University of Plymouth from 1978 to his retirement in around 2004. He authored several books which were seen as heresy by many in the astronomy community. Publications such as *The Scientific Basis of Astrology: Tuning the Music of the Planets* (Seymour 1992) and *The Birth of Christ: Exploding the Myth* (Seymour 1996), ironically published by Virgin Publishing, and his appearance on the *Strictly Supernatural* TV Series episode on Séances (1997) narrated by Christopher Lee, attracted a level of notoriety, with which Seymour seemed genuinely surprised. Some of these objections were recorded in an article in *The Guardian* from 2004.

“Seymour’s suggestion that the stars and planets rule over us has largely been received with the shortest of shrifts. “All I can say is that I have yet to meet another scientist that agrees with his views,” says Jacqueline Mitton of the Royal Astronomical Society. “It’s right up there with stuff like crop circles being made by extra-terrestrials,” says Robert Massey, astronomer at the Royal Observatory in Greenwich, where Seymour worked as a planetarium lecturer in the early 70s.” (Sample 2004).

The jacket blurb on his book, *The Paranormal: Beyond Sensory Science* (1992), articulates a hypothesis drawn from a rich mix of concepts, such as Rupert Sheldrake's Morphic Resonance and his own World-Line-Web Memory theory. It states that the book is "an attempt to explain the interconnectedness of subatomic phenomena which open the door to an explanation of some aspects of the paranormal, including the human aura, apparitions, telepathy, clairvoyance, and our ability to look into the future." His discussion around the potential for the existence of ghosts and apparitions draws on his World-Line-Web Memory theory, which sounds remarkably like wormhole (or Einstein-Rosen bridge) explanations in films such as *Déjà Vu* (2006), *Interstellar* (2014), *Event Horizon* (1997), and *Stranger Things* (2016). These involve a folded piece of paper with a pencil pushed through between two points. Seymour sees this as a dynamic 3-dimensional web of connections moving through time, not unlike the visualisations of planets orbiting the sun, but seen as a spiral as they move through an expanding universe. In this model, the blurriness of ghostly apparitions can be accounted for by a signal-to-noise ratio based on the connections in this dynamic between people and places. The discussion is not a million light years away from the thinking of other scientists, admittedly from a slightly earlier period where the paranormal was something to be explained, if not believed. A thread linking Seymour's theory and those held by late Victorian-era spiritualists is an awareness that technology may unlock a door to let ghosts in. The emergence of photography as a mechanism for capturing ghostly figures and emerging ectoplasm came just in time to shift the acoustic haunting experiences into the visual manifestation of ghostly

beings. The séance had a tradition of knockings, trances, and subtle movements of curtains and objects, but ghosts were always heard and never seen. Seymour, and the psychical researchers who are the focus of this article, were tapping into other forces beyond the visible spectrum of photography, a new landscape of electromagnetic radiation, the stuff of radio and television.

In the late 1880s, Heinrich Hertz lifted the veil on a world saturated in electromagnetic radiation. The Hertzian landscape became the playground for technological innovation that utilised this invisible spectrum to see invisible things and transmit sound and images over great distances, just like magic. The subsequent entanglement between the physical and, apparently, metaphysical domains galvanized a confluence of disciplines. It is difficult to disentangle the relationship scientists and engineers have had (and still have) with the paranormal. The distinctions between belief, ideology, theology, and methodology should be clear, but when played out through human behaviour, it is easy to see how enthusiasm, awe, and the phantasmagorical blur and fold in on themselves. And hindsight is a wonderful thing, for whilst “any sufficiently advanced technology is indistinguishable from magic” (Clarke 1968: 255), any magic without a sufficiently advanced technology to distinguish it is probably the paranormal. One could think of Isaac Newton’s dalliance with alchemy and astrology as a naïve rehearsal for modern chemistry and astronomy, and not scientific heresy. The birth of the modern planetarium coincided with the discovery of this Hertzian dimension, a place of radio waves and magnetic forces that, with

a little instrumentalization, promised access to the dead. The telecommunications technologies and infrastructure that we now use to talk to algorithmic entities that know our deepest desires better than we do ourselves were born from paranormal cravings.

In a letter to his future wife, Mabel Gardiner Hubbard, Alexander Graham Bell discussed his sceptical, but enthusiastic interest in Spiritualism; “In our utter ignorance of all that passes after death – it would of course be folly to assert positively that the spirits of those we have loved may not still be in existence.” (Bell 1875). Thomas Edison, the inventor and businessman, took a more proactive approach.” I have been thinking for some time of a machine or apparatus which could be operated by personalities which have passed on to another existence or sphere.” (Lescarbours 1920). This apparatus would be some kind of ‘valve’, although it became known as a ‘spirit phone’ or ‘necrophone’, which would be given to psychic investigators to amplify conversations and manifestations. There are rumours (Express 2017) that John Logie Baird, credited with inventing the television, attended spiritualist meetings and “saw no reason, for example, why television could not be used to explore the subject of spiritualism” (McArthur et al 1986: 269), and whilst this may have been a popular entertainment at the time, there is a strong gravitational if not magnetic force binding those who were entangled with Hertzian waves.

The Medium is the Message and other Ectoplasmic Extensions...

My entanglement with the paranormal started innocently enough in 1986, whilst a postgraduate fine art student, trying to develop interactive spaces and technologies that might capture, record and playback various human behaviour in an installation – as is often the case in Art Schools. I reached out to Professor Robert Morris, the recently appointed Koestler Chair of Parapsychology at the University of Edinburgh. The chair had been established by the author and journalist Arthur Koestler, who established the KIB Society with two friends as a vehicle for supporting research into Parapsychology. After his death by suicide in 1983, the KIB Society was renamed The Koestler Foundation, and his estate was used to fund parapsychological research. The university website declares “The Koestler Parapsychology Unit takes a broad approach to parapsychology, conducting research into the psi hypothesis, pseudo-psi (‘what’s not psychic but looks like it’), beliefs about the paranormal and the history of accounts and studies of anomalous phenomena.” (ed.ac.uk 2024). Morris very generously wrote in response with a description of the phenomena I was attempting to construct: the concept of psychometrics as the ability for people, objects and places to record events and then for these events to be played back by sensitive people through the objects or within the space they were recorded.

Attempts to develop and utilise this mechanism has played out over the years through many projects, and not least those that are played out in fulldome environments discussed below, but it also is symbiotic with broad themes in new media art practice. Psychometrics would appear to compliment Ascott’s concept of cyberception.

“ If, as many would hold, the project of art in the twentieth-century has been to make the invisible visible, it is our growing faculty of cyberception that is providing us with X-ray vision and the optics of outer space. And when, for example, the space probe Cassini reaches the dense nitrogen atmosphere of Saturn’s satellite Titan, it will be our eyes and minds that are there, our cyberception that will be testing and measuring its unknown surface. ”

(Ascott 2003: 320)

The transcalar shift from the edge of the known universe to the atomic level was tested in the Immersive Vision Theatre as a production pathway for visualising Atomic Force Microscopy (AFM) data. AFM imaging uses a probe to measure the atomic forces on a material, somewhat reminiscent of a record player stylus tracking over a vinyl album, generating a high-resolution height map or topography. The data is captured and used to visualise the sample within a spherical fulldome environment effectively giving the viewer a nano level perspective, and the ability to wander around an atomic landscape. Once captured this data can be processed and further information generated. Examples of this process were used to construct several installations, including an exhibition a work titled spæktø/spectre (Phillips 2012), which suggested that the Schauraum in the Quartier21 (Electric Avenue) of the Museums Quartier in Vienna was a psychometric

architecture. AFM data taken from a grain of dust from the space was used to generate recordings of its pre-war inhabitants. The space had been occupied by Professor Gustav Adolf Schwaiger, the technical director of the Österreichischer Rundfunk (ORF), Austrian National Broadcast Corporation, in collaboration with the infamous spiritual medium, Rudi Schneider from the late 1930s to the early 1940s. According to Mulacz's History of Parapsychology in Austria, 'Schwaiger in his research focussed on investigating that "substance" and its effects applied then state-of-the-art apparatus, such as remote observation by a TV set' (Mulacz 2000). Unfortunately, Schwaiger's radio and television technologies that he developed to capture ghosts and ectoplasm were destroyed in the war.



[Figure 3. spēktə/spectr (2024) Spherical Perspective version..
Image Mike Phillips]

In trying to track down Schwaiger's Hertzian technologies and their design, a manuscript reporting on séance sitting with Rudi Schneider was uncovered at The Society for Psychical Research Archive held at the University of Cambridge Library. This SPR Archive was acquired in 1990, and is an extraordinary collection of documents, photographs, diagrams and accounts of paranormal activity, and the people engaged in performing and researching it. The Society for Psychical Research (SPR), founded in London in 1882, became an international network of researchers across Europe and the USA, and a prestigious membership which included John Ruskin, Aldous Huxley, Sigmund Freud and Conan Doyle (although he resigned in protest at the SPR's more rigorous scientific investigations). The SPR was also home to a surprising number of aristocrats and, considering the period in history, an unsurprising number of now Dead White Men, the DWM's that still haunt our contemporary culture and science. The organisation established research methodologies for investigating the paranormal and explored key topics, such as apparitions, materialisations, hauntings and mediums and séances. Their mission to expose fraudulent psychic activity is tempered by an openness to the possibility of the paranormal, as many of the SPR researchers' accounts recorded authentic psychic activity. The SPR is still a very active international organisation maintaining a rich archival website (www.spr.ac.uk), magazine, journal and runs regular events.

A Séance with Rudi-Olga...

Christian Victor Charles Herbert, later to become the 6th Earl of Powis, was a salaried SPR research officer deployed to investigate paranormal phenomena and reports of sittings (séances) dating c.1935–1937 with accounts, descriptions, diagrams and photographs (Herbert 1935). One account included in the manuscript is of a series of sittings held at Weyer in Austria between September and October 1935 which Schwaiger attended with one of his instruments. It would appear that this was the start of Schwaiger's entanglement with Schneider, which then led to further experiments held in the flat in Vienna above the Schauraum Quartier²¹, which held the captured atomic remains of their paranormal activities. The account includes several photographs and diagrams of the apparatus, and these have provided design and functional insights into the virtual reconstructions discussed later in this article.

Rudi Schneider, the medium, willingly underwent scientific investigation by SPR researchers. As a result, his activities were well documented and ultimately deemed fraudulent (Gregory 1977) but his showmanship seems remarkable in the face of the relentless experiments to disprove his psychic skills. He came from a family of 9 children, some of whom also developed planchette skills and trance phenomena, in particular, his brother Willy, whose spirit controller was a woman called Olga Lintner, who later adopted Rudi as her mouthpiece. In Herbert's account, he highlights the suggestion that Olga was the spirit of the infamous Lola Montez AKA Eliza Rosanna Gilbert, Countess of Landsfeld. By all accounts, a wild-spirited Irish woman who wreaked merry havoc as a notorious dancer before becoming the mistress of King

Ludwig I of Bavaria and a powerful political influencer. After Ludwig's abdication, she fled across Europe before being accused of bigamy in London and fleeing to the USA and Australia, to relaunch her career as a performer, only to die of syphilis at the age of 39. It would seem that Olga's spirit identity remains a mystery, but she appears to have been a commanding entity when controlling and speaking through Schneider.

According to Herbert the séance room was equipped with a curtained cabinet provided by Schneider which he claimed was a 'reservoir' for the psychic force or invisible substance that would be manifest within the séance. The room would be in darkness of lit by a red lamp fitted with a rheostat to vary the brightness. A small table containing objects would be placed below the lamp and objects were also placed inside the cabinet. Before the lights were turned out, Schneider would sit his back to the cabinet's curtains and opposite a 'principal controller', an SPR researcher or member of the séance tasked with holding his two wrists and gripping his legs between their knees. The other sitters formed a semi-circle, holding hands to maintain a controlled environment. Schneider would convulse violently, begin quick, shallow, hissing breaths, and enter a deep trance, occasionally whispering with the "intelligence" that claimed to be the spirit of Olga Lintner. Herbert's refers to this composite being as "Rudi-Olga" when in this possessed state. The sittings held in Weyer ran over several days, with different participants, each session lasting at least three hours. More often than not nothing of a paranormal nature was recorded or witnessed, even after Rudi-Olga had been in a trance for several hours.

Herbert's research was particularly interested in the interference with a beam of infra-red radiation, the early apparatus developed by Schwaiger, the application of a force to objects situated at a distance from the subject, and the manipulation of objects at a distance from the subject. The infra-red beam was used to detect manifestations and ghostly apparitions as Schneider could materialise organs and body parts.

“ *It would seem that we are dealing with a force or invisible substance which can pass through fine gauze, which in a later stage of its development, can condense into a temporary replica of a human hand* ”

(Herbert 1937).

In subsequent communication Herbert expressed his conviction that Schneider was not faking things, and this is also reinforced by Schwaiger's continued engagement with the medium, for several years, and his commitment to develop technologies that could capture the apparitions.

As a template and modus operandi for fulldome immersive experiences these accounts of séances and descriptions of various apparatus provide several key elements: the temporal nature of the events; the medium, controllers and participants, and the interactions between them; the use of objects or props to aid communication with and manifest the dead and Schweiger's

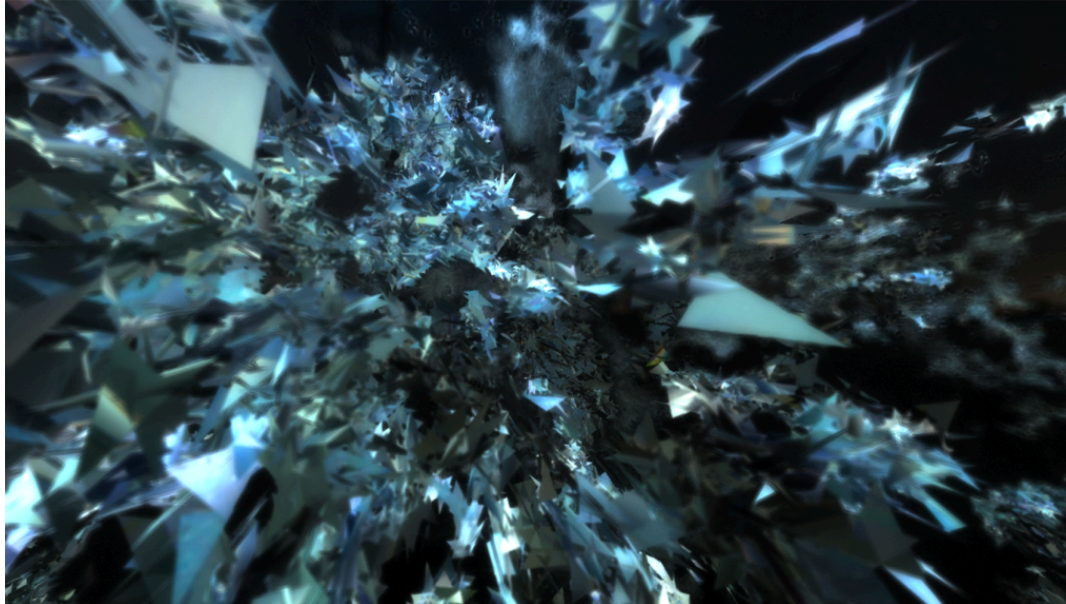
apparatus to measure and detect them; the “intelligence” that is Olga, the ghost in the room.

Space-Time Continuum and Other Models...

The temporality of the fulldome has always been constrained by its cinematic mode of consumption. Traditionally, planetaria have a ‘press play’ model for the delivery of content, the audience sits down and gets immersed in a pre-recorded projection for a period usually shorter than a traditional movie. This is usually because science infotainment budgets are more constrained than Hollywood movies, but also because that amount of static immersion can be overwhelming for a long period of time. Live events using astronomical simulation software tools, such as [ZEISS UNIVIEW](#) and [OpenSpace](#), defy the spacetime laws of physics by allowing the audience to fly around a strangely frozen Known Universe faster than the speed of light. The metaphorical time of the fulldome can be measured in light years, about 40 billion to the CMB, and yet the media consumption model is measured in minutes. There are an increasing number of venues that are breaking this temporal/spatial conundrum, the original and gold standard is the Society for Arts and Technology [SAT] in Montreal (discover-the-sat 2024) with its flat-floored 260-degree 18-meter Satosphère the space becomes an immersive venue which can cater for ‘movie’ mode but facilitates a diverse mix of performance and interactive works. These include the European Mobile Lab projects discussed above but also Fragments described below and illustrated in Figure 3, and the intense rolling

programme of research and development undertaken at SAT. Also, its slightly smaller sibling, the [Real Ideas Market Hall](#) (Real Immersive 2024), developed in Plymouth, along a similar model, provides extended periods of performance and occupation. Likewise, [CULTVR](#) (cultvr 2024) in Cardiff offers a non-planetarium model for immersive experiences. International fulldome festivals also offer a celebration of fulldome temporality, such as the [Fulldome Festival](#) (fulldome-festival 2024) in Jena, Germany at the Zeiss Planetarium, [Fulldome UK](#) (fulldome 2024) (a roaming event at the IVT, [ThinkTank](#) (thinktank 2024), [National Space Centre](#) (spacecentre 2024), Real Ideas and CULTVR), [Dome Fest West](#) (domefestwest 2024) in Boulder, Colorado at the Fiske Planetarium, and the [Dome Under Festival](#) (dome-under-festival 2024) at Melbourne Planetarium, to name but a few.

Notable examples of real-time performance fulldome experiences would include Fragments (2014) by RFID, a UK-based collective of artists – William Young, Benjamin Gannaway and Jake Williams – commissioned by SAT. The live performance created by a Kinect2 sensor point cloud and incorporating 3d scenes and recorded footage using the VVVV software and binaural field recordings manipulated in a custom DJ setup in Ableton Live and Ambisonics in MaxMSP.



[Figure 4. Fragments (screengrab) (2014). Image RFID.]

The live performance created by Harry Yeff aka Reeps100 and Bertie Sampson, using Notch and TouchDesigner, performed at Fulldome UK (2021) Figure 4, and the live version of The Voyage of the Arka Kinari at Fulldome UK (2022) by Nova Ruth Setyaningtyas and Grey Filastine and 4Pi Productions, and the fulldome performance work of Kondition Pluriel by Marie-Claude Poulin and Martin Kusch, which integrates and installations in fulldome spaces. These works incorporate live audio performances synchronised with dynamic projections within the fulldome. Fulldome's offer unique spatial audio configurations within a spherical projection environment, SAT has 93 speakers for instance, the Real Immersive dome has 19.1 and the IVT has 10.1, all though tis plaster dome creates a eccentric whispering gallery effect which creates its own opportunities for sonic experimentation. Fragments, Reeps100 and Bertie Sampson and

The Voyage of the Arka Kinari were all time limited performances, whilst the work of Kondition Pluriel incorporates choreography, performers and physical and digital props occupy physical and virtual space fulldome. Each of these offers a new model for the immersive fulldome experience which overlap with the temporal and performers /participant interaction protocols of the séance.



[Figure 5. Harry Yeff aka Reeps100 and Bertie Sampson (2021)]
[{{figure5}}]

At the time of writing the Internet of Domes Project (IoD) has identified a layer of interactive and performative technologies within the Fulldome content stack, and aims to provide new opportunities for developers, artists, and performers wishing to engage with real-time, data-driven content in immersive environments. It offers a new psychometric framework of algorithmic networked devices which may make the Fulldome séance a tangible experience. Schweiger's apparatus and objects that facilitate interaction and communication are being reconstructed based on Herbert's diagrams and examples can be

seen in figure 6. These virtual devices communicate with physical Internet of Things style controllers come planchette, allowing audience members to participate in the immersive projected They incorporate biological sensors to facilitate the physical qualities of the medium, such as the respiration patterns of Schneider, and accelerometers and gyroscopes to allow real-time interaction with the projected apparitions and ectoplasm – chromatic aberrations and geometric distortions – to navigate the spherical space.

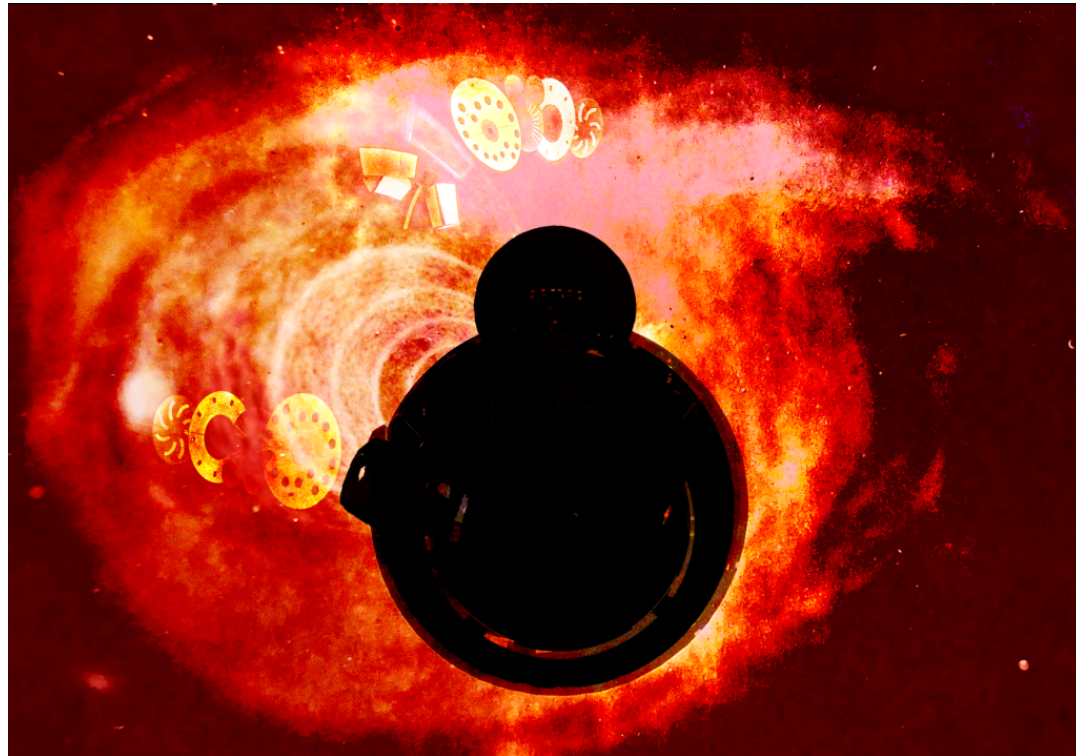


[Figure 6. Kondition Pluriel (2015). Image Sebastian Roy.]

Full dome Half-Life...

And as for Olga, the ghostly “intelligence” that speaks to us from beyond the grave. If there is a hauntology of science, it will be the ghosts that lurk in the unethical application of medical knowledge gained through torture and war, the racist nomenclatures that prowl horticulture and the eugenic memes that still seep through from Francis Galton’s measurements and Intelligence Quotient tests. Algorithmically it can be found in contemporary unethical practices of the data sciences, the data ghosts that inhabit the biased and racist data sets used to train Artificial Intelligence models, the scraping of facial recognition and behavioural data sets that feed on our desires. They steal our visual culture, and even our choreography and signature dance moves for game engine emotes (Hanagami 2023). Zuboff declares that “We are the sources of surveillance capitalism’s crucial surplus: the objects of a technologically advanced and increasingly inescapable raw-material-extraction operation.” (Zuboff 2019: 10). Ectoplasm is such a raw material, a substance somewhere between life and death, that is being mined from the open-cast landscapes of our memories, our deepest desires, our collective behaviours and the vaults of the dead. The fulldome is a place where all these truths come together, the forgotten, erased and alternative past seeps into a spherical perspective to generate new possible futures, accelerated by the predictive algorithms that feed of our aggregated behaviour, a confluence of these disciplinary practices, orthodoxies and possibilities, maybe the fulldome is café where Fisher, Sapphire, Steel, Seymour, Schwaiger, Schneider and Lintner meet for their séance. Ghosts are persistent in their attempts to reach out to us through ectoplasmic interactions, psychoactive concoctions, rituals, talismans, and Hertzian

instruments, and now through a new portal of Artificial Intelligence fed on our data and desire. Olga Lintner has found a new apparatus through which to communicate.



[Figure 7. Schweiger's Apparatus and Ectoplasm]

End Times...



[Figure 8. Ectoplasm in the Fulldome (2024). Image Mike Phillips]

Media technologies have always provided an interface between the living and the dead, whether through the sepia photographic portrait of a lost loved one, the falling in and out of the membrane of the television screen (*Poltergeist* 1982), the faint voices in radio static, or the emergence of Grief tech with its ghostly chatbot algorithms, Deep Nostalgia™ animations of the deceased, and digitally enhanced gravestones. There will soon be more ghosts on Facebook than living people (Öhman 2019) with Meta's algorithms populating their feeds with recommendations and memories. Philip K. Dick's predicted future of death enhanced by the technologically empowered state of the 'half-life', described in *Ubik* (Dick 1969: 4), has never been so close, and it is shaped like a fulldome.

Ascott, Roy (2003). The Architecture of Cyberception. Telematic Embrace. Visionary Theories of Art, Technology, and Consciousness/ Edward A. Shanken ed. University of California Press.

Bell, Alexander (1875). Letter from Alexander Graham Bell to Mabel Hubbard Bell, September 26.
<http://hdl.loc.gov/loc.mss/magbell.03400114>, accessed 08 July 2024.

CULTVR <https://www.cultvr.cymru/>, accessed 10 July 2024

Clarke, Arthur C. (19 January 1968). "Clarke's Third Law on UFO's". Science. 159 (3812): 255.

Déjà Vu (2006), [Film]. Directed by Tony Scott. Touchstone Pictures.

Dick, Philip (2006 [1969]) Ubik. London: Gollanz.

Dome Fest West <https://www.domefestwest.com/>, accessed December 2024

Dome Under festival
<https://museumsvictoria.com.au/scienceworks/whats-on/dome-under-festival/>, accessed December 2024

European Mobile Dome Lab (2013) www.emdl.eu, accessed 12 November 2024

Event Horizon (1997), [Film]. Directed by Paul W. S. Anderson.
Paramount Pictures

Nicoll, Vivienne (2017). John Logie Baird believed he was advised by Thomas Edison from beyond the grave.
<https://www.express.co.uk/news/uk/823617/John-Logie-Baird-messages-Edison-grave-ghosts-UFO-paranormal>, 2 July, accessed 01 December 2024

Fisher, Mark (2014) Ghosts of My Life: Writings on Depression, Hauntology and Lost Futures. Zero Books.

Fragments (2014) [Live Performance]. RFID (Young, Will, Gannaway, Ben, Williams, Jake). Society for Arts and Technology.

Fulldome Festival <https://fulldome-festival.de/>, accessed December 2024

Fulldome UK: <https://www.fulldome.org.uk/>, accessed 10 July 2024

Gabo, Naum and Pevsner, Antoine (1920)
<https://www.arthistoryproject.com/artists/naum-gabo/realistic-manifesto/>, accessed December 2024

Gregory, Anita (1977) Anatomy of a fraud: Harry price and the medium rudi
schneider, *Annals of Science*, 34:5, 449-549

Hanagami v. Epic Games, Inc., No. 22-55890 (9th Cir. Nov. 1, 2023).
District Court for the Central District of California, No. 2:22-cv-

02063. <https://casetext.com/case/hanagami-v-epic-games-inc>, accessed on the 19 July 2024.

Herbert, Christian (1935). T/S Sittings with Rudi Schneider, held at Weyer (September and October 1935); with photographs and diagrams of Schwaiger apparatus, 1935 Reference Code: GBR/0012/MS SPR/52/6/1. The Society for Psychical Research Archive, University of Cambridge library.

Herbert, Christian (1937). The Mediumship of Rudi Schneider. Reference Code: GBR/0012/MS SPR/52/6/1. The Society for Psychical Research Archive, University of Cambridge library.

Interstellar (2014), [Film]. Directed by Christopher Nolan. Paramount Pictures

Kazakou, Christiana (2020) 'Leonardo: A 'mind space' in transit', Ubiquity Journal of Pervasive Media 8(20): 47-57

Kondition Pluriel. <https://konditionpluriel.org/> accessed 15 of July 2024.

Lambert, Nick (2012): Domes and creativity: a historical exploration, Digital Creativity, 23:1, 5-29

Leonardo Journal <https://leonardo.info/leonardo>, accessed December 2024

Leonardo Music Journal <https://leonardo.info/leonardo-music-journal>, accessed December 2024

Lescarbourea, Austin (1920). Edison's Views on Life and Death. An Interview with the Famous Inventor Regarding His Attempt to Communicate with the Next World. Scientific America, 30 October. Volume CXXIII, Number 18.

The Koestler Parapsychology Unit, The University of Edinburgh.
<https://www.ed.ac.uk/ppls/psychology/prospective/postgraduate/research-programmes/research-interests/parapsychology>
accessed 15 June 2024

McArthur, Tom. and Peter Waddell (1986) The Secret Life of John Logie Baird, London: Hutchinson.

McConville, David 2007. Cosmological cinema: pedagogy, propaganda, and perturbation in early dome theaters. *Technoetic Arts: A Journal of Speculative Research*, 5 (2), 69–85.

Moholy-Nagy, László (1947) *Vision in Motion*. Paul Theobald, Chicago.

Mulacz, P. History of Parapsychology In Austria. Notes for a History of Parapsychological Developments in Austria. Paper presented at The Parapsychological Association (PA) the 43rd Annual Convention held from 17th to 20th of August, 2000 in Freiburg i. Br., Germany, hosted by the 'Institut für Grenzgebiete der Psychologie und Psychohygiene' (IGPP).
<http://parapsychologie.info/history.htm#paper>, accessed 20 July 2024.

Murmuration (2015) www.i-dat.org/murmuration, accessed 11 November 2024

National Space Centre <https://www.spacecentre.co.uk/>, accessed December 2024

Öhman, Carl and Watson, David (2019). Are the dead taking over Facebook? A Big Data approach to the future of death online. *Big Data & Society*, 6(1). <https://doi.org/10.1177/2053951719842540>

Phillips, Mike (2012), ‘spæktə/spectre’, Schaurraum, Quartier21 (Electric Avenue), Museums Quartier, Museumsplatz 1/5, 1070 Wien, Austria, 27 January–18 March.

Phillips, Mike (2012): There is no dome?, *Digital Creativity*, 23:1, 48–57

Poltergeist (1982) [Film]. Directed by Tobe Hooper. Metro-Goldwyn-Mayer

Powers of Ten. Charles and Ray Eames. IBM. 1977.
<https://www.eamesoffice.com/the-work/powers-of-ten/>, accessed on the 20 June 2024.

Real Ideas <https://real-immersive.realideas.org/>, accessed December 2024

Sample, Ian. Written in the stars, *The Guardian*, 18 May 2004
<https://www.theguardian.com/education/2004/may/18/research.highereducation>, accessed on the 01 July 2024.

Schinckus Christopher (2016) From Cubist Simultaneity to Quantum Complementarity.

<https://pmc.ncbi.nlm.nih.gov/articles/PMC5674126/>, accessed December 2024

Séance (1997) Strictly Supernatural. Episode 2. The Learning Channel (TLC).

Seymour, Percy (2003) The Paranormal: Beyond Sensory Science, Penguin Group, 1992. Reprinted as The Third Level of Reality: A Unified Theory of the Paranormal. London: Paraview Special Editions.

Société des arts technologiques <https://sat.qc.ca/en/discover-the-sat/>, accessed December 2024.

Shatskikh, Aleksandra (2014) <https://www.tate.org.uk/tate-etc/issue-31-summer-2014/cosmos-and-canvas>, accessed December 2024

'The Flea and the Acrobat' (2016) Stranger Things, Series 1, episode 5. Available at: Netflix (Accessed 23 July 2024).

'The Man Trap' (1966) Star Trek, Series 1, episode 1. NBC, 8 September.

The Petrol Station (1982) Sapphire and Steel. Episode 34. Adventure Six – Part 4. ATV/Central

The Society for Psychological Research Archive, University of Cambridge library.

<https://www.lib.cam.ac.uk/collections/departments/archives-modern-and-medieval-manuscripts-and-university-archives-0>
accessed on 20 July 2024

The Voyage of the Arka Kinari (2022) [Live Performance]. Directed by Najera, Janire and Wright, Matt. 4Pi Productions.

The Ziff Who Came to Dinner (2004) The Simpsons: Season 15, Episode 14.

ThinkTank <https://www.birminghammuseums.org.uk/thinktank>,
accessed December 2024

Vonnegut, Kurt (1962), The Sirens of Titan, London: Victor Gollancz.

Winter, Frank (2017) <https://www.smithsonianmag.com/air-space-magazine/how-suicide-squad-became-one-worlds-first-rocket-companies-180962548/> , accessed December 2024

Zuboff, Shoshana (2019) The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power, New York: PublicAffairs.

[CC BY-SA 4.0](#) mike-phillips.net – unless
otherwise stated.

mike.phillips.net@gmail.com
+447971993023

[Instagram](#)
[LinkedIn](#)