Hekateris Dance

Charlotte Gould
University of Brighton
United Kingdom
C.Gould@brighton.ac.uk

Abstract

Hekateris Dance is an Augmented Reality installation, converging past and present, to envisage a distant future, threatened by the extinction of many species on the Earth which has been impacted by climate change. Hekateris Dance acts as a provocation to imagine what we are becoming in a posthuman world beyond anthropocentrism where, as Rosi Braidotti asserts, we are in a state of becoming through the convergence of technology and organic matter in a "zoe/geo/techno assemblage". This aligns with Donna Haraway's proposition that we need to work in collaboration with other non-human beings to survive on a damaged planet. On entering the gallery, the visitor scans a QR code revealing a life-sized three-dimensional hybrid being which is transported into the exhibition space using Augmented Reality (AR) and is viewable through a mobile phone. The avatar invites participation in the ritual of dance, using contemporary movements but in homage to the ancient Greek dance of the Hekateris, as a celebration of the natural world. This practice-based research project explores how AR can be utilised through playful interaction and storytelling as a discursive tool to prompt audiences to take action in order to be part of the change in achieving net zero.

Keywords

Augmented Reality, Speculative, Narrative, Convergence, Posthuman, Geology, Sustainability, Interaction, Agency.

Introduction

Hekateris Dance is an Augmented Reality (AR) installation, where three-dimensional AR avatars, are augmented into the environment in 360°, prompting visitors to join their life affirming dance. The AR artwork speculates on a world beyond anthropocentrism where humans are no longer the primary species. This is a practice-based research project, which asks if we can prompt audiences through storytelling and playful interaction using AR, to consider the agency that participants have over global warming. The artwork acts as a discursive tool to question preconceptions, to consider the small actions that visitors can take to reduce climate change. The AR artwork was presented as part of "Drawing the Future" at the University of Brighton in November 2023. Hekateris Dance imagines the evolution of beings in the future, part human, part animal, part machine. These chimeras are transported into the present as the audience scans a QR code and are visible through a mobile phone (see figure 1). This speculation on evolution aligns with Rosi Braidotti's proposition that as posthumans we are in a state of becoming through the merging of technology and organic matter which she calls the "zoe/geo/techno assemblage" [1]. Hekateris Dance speculates on the convergence that may take place, through evolution. Braidotti proposes that we are evolving through a process which is "neither linear nor one-directional but is rather a multi-faceted experimentation with what we are capable of becoming" [2]. This glimpse of a possible future and the notion of the transformation of humans and nonhumans through evolution resonates with Tim Ingold's proposition in his book "Life of Lines" that "things are continually coming into being through processes of growth and movement" [3]. Ingold invites us to see ourselves as of the world, "We do not live inside our bodies, but - in breathing and eating - continually and alternately gather the world into ourselves and release ourselves into the world" [4]. From this perspective, we are all interconnected, we are part of the world and life is cyclical. This chimes with Donna Haraway's assertion that we need to find more harmonious ways to live with other beings on earth, both human and non-human. Living creatures survive through symbiosis, to flourish, to digest, and procreate [5].

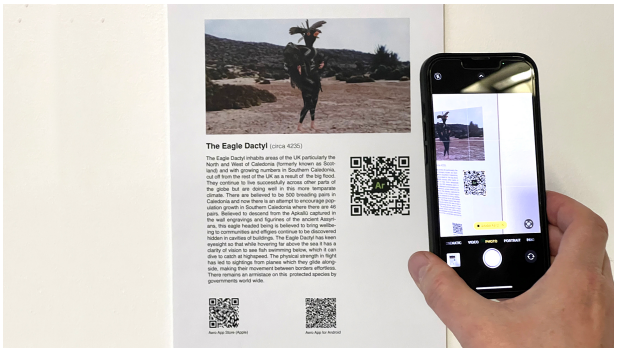

Figure 1. Eagle Avatar, QR Code Scan, 2023. © Charlotte Gould

Hekateris Dance looks to the past to imagine the future. Images and information on the ten avatars and their habitat are presented on information boards as fictional stories. Each of the avatars has a unique QR code and information is available on how to download the Adobe Aero application on to the handheld device. The QR code can be scanned revealing an avatar character in the exhibition space. The visitor is prompted to place the avatar on a floor surface and the dancing avatar springs to life, visible through the screen. The avatars are life-sized and can be seen from all sides, so

the visitor can move around the creature viewing at 360° from back to front, (see figure 2).

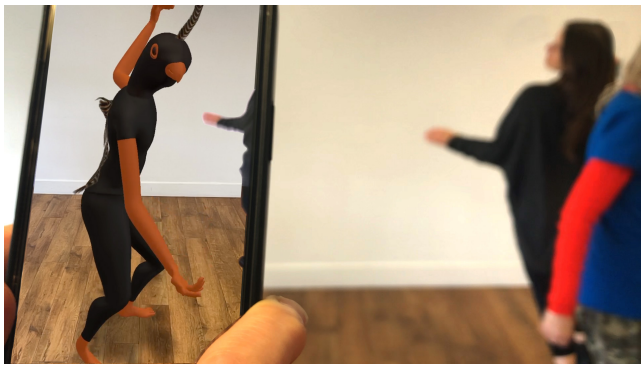

Figure 2. Eagle Dactyl Avatar Dancing, 2023. © Charlotte Gould

Audiences can appreciate the past, consider the present impacts on the environment, and imagine the future. The use of speculative fiction to activate the audience into considering other species and the impacts of human actions on all our futures raises visitors' awareness and empathy. The audience can interact with the AR avatars and engage through discussion with the narratives to look to the future through playful interaction, engendering a positive action focused approach. Visitors can decide which of the characters they want to connect with, considering if they were an animal what would they be, and what are the character traits that they most admire. Stories include information about animals and birds unique and specialized traits such as the albatross with magnetic navigation to migrate and their ability to sleep on the wing for two months at a time and the bat who can sonically 'see" in the dark.

The name of the artwork borrows from ancient Greek mythology, the Hekateris is a dance of fast-moving hands, performed by the ten dactyls, both male and female, representing the ten fingers. The name heka and teris means marvellous hundred and as a group, the dactyls were considered such as they had one hundred fingers between them. Descendants of the first humans, their offspring were satyrs, (fertility spirits of the countryside and wilds) and nymphs (female spirits of the natural world and protectors of forests, mountains, meadows, rivers, springs, and seas). They were associated with creativity, the skill of hands, metal working, mathematics, the alphabet, and the environment [6]. The layering of augmented beings from the future, into the present with reference to the past resonates with Anthropologist W.E.H. Stanner's translation of the term the "Everywhen" as a convergence of past, present and future, where time is cyclical [7]. Also known as the dreaming, this was a complex historical interpretation which did not distinguish between human, animal, and object. Stanner sought to capture the concept of the indigenous first nation Australian interpretation of the Everywhen, where he identified three elements to the stories, the great marvels which included the ecology, human and non-humankind, (emerging from one source that was neither human nor animal), and institutions and culture [8]. Stanner noted that through the dreaming, there was no attempt to control nature but instead to be at 'one' with nature [9], aligning with the ethos of the artwork.

Stories of non-Humankind through time

Ancient mythologies drew heavily on the relationship of animals and humans, documented by Katherine Rundell in her book "The Golden Mole", where Navajo folklore identified bats as the first creatures on earth along with insects" [10], in Papuan mythology the tuna is the father of the sun [11] and in Hawaiian folklore the crow is a guardian of the soul [12]. Ancient peoples shared stories by word of mouth including the first nation Australian tales of how the Kangaroo got its black nose and the porcupine its quills [13]. Narrative and mythology have been used for millennia to help us make sense of the world and our stories reflect fundamental belief systems. In the current posthuman era, science fiction narratives imagine future worlds. In their study on attitudes to artificial life, Belk et al defined clear distinctions between approaches to Artificial Life (AL) in stories between the East and West. They determine that the Judeo-Christian West show prejudice towards animism whereas in Japan, Shintoism and Buddhists believe that all objects possess 'kami' or spirit. Christianity identified animals as having no soul and therefore assigned them as servants to man. The binary distinction between animals and humans in the West is further influenced by the Cartesian division of the mind and body, where animals were believed to have only a body and not a soul. In contrast, Buddhists do not recognize the concept of the soul and animal life is instead revered [14]. This extends to attitudes to other nonhuman beings and in his comparative study on the approach to robots between the West and Japan, Frederick Kaplan also defined the rejection of the Cartesian mind body distinction as a defining difference. Kaplan found that in Buddhism and Shintoism the body is more closely linked to objects and environments, making the Japanese more accepting of artificial life. This resonates in their mythologies and in science fiction where robots are often helpful and trustworthy, whereas in the West there is a common theme of the fear of man playing God through attempts to control nature [15].

Hekateris Dance seeks to focus beyond the human, and instead value the planet and all its inhabitants living and otherwise and invites audiences to look at the world from an alternative perspective. Time is relative and passes differently for all objects on earth. Both living and dead matter are in movement, be it so slowly that we do not perceive it, such as mountains and tectonic plates which shift over billions of years. Species such as the Greenland whale can live for up to 600 years, with a slow metabolism they swim at a speed of between 2.75 to 3.5kph [16]. At the other end of the scale the jumping spider with their pneumatic legs can leap 40 times their own body length [17]. Hekateris Dance draws together the past, present and future, aiming to encourage audiences to value other animals through storytelling. The approach taken to the narratives was inspired by Rundell's writing which celebrates the treasures of the

natural world as well as ancient mythologies and current stories in the media to fuse fiction with science and mythology. David Burrows and Simon O'Sullivan propose that the past and present can inform our understanding of possible futures which may counter preconceptions, offering new solutions.

> "A future facing mythopoesis might in fact involve the use of past myths, albeit in new and novel combinations…past myths may present a certain amount of resistance to the dominant culture, although it would be crucial to demarcate those that have been incorporated." [18]

The information provided through speculative imaginings prompted discussion at the "Drawing the Future" presentation at the University of Brighton. The audience were engaged in the AR artworks, and they fed back that the augmented reality artworks offered a fun interactive playful approach to considering the impacts of climate change to prompt action, as an alternative to being presented with a dystopian vision which can lead to anxiety. Participants said that they were interested in the mythologies used to inspire the future speculative narrative as well as the information provided on the animal characteristics and habitats, and this prompted their selection of the AR avatar. Another visitor said that the speculative narratives gave them the opportunity to imagine an alternative future. Audiences reflected on the small actions they could take to reduce climate change, which collectively amounts to larger actions. One visitor commented that public pressure can activate corporations to take responsibility for sustainability and thereby contribute to change.

Figure 3. Hekateris Dance, Interaction, 2023. © Charlotte Gould

This artwork prompts participants to rethink their approach to sustainability, to protect and respect the planet and to live in harmony with nature. Through playful interaction and fun audiences can consider ways to make a difference to the future of the planet (see figure 3). Haraway emphases the importance of positive action so that we can live in harmony with other creatures to survive on a damaged planet [19]. Sustainability of our ecology requires respect for all things on earth living and otherwise, as well as acknowledging the unique contribution that each species makes. David Archer writes in his book "The Great Thaw", that humans are not "bio-logically 'special'…we are descended from monkeys, and they from even humbler origins" [20]. Our time on earth is also relatively short, "Geological evidence tells us that the world is much older than we are, and there's no evidence that it was created especially for us... This is all very humbling" [21]. Dipesh Chakrabarty argues that humans came late in the history of the planet not as hosts but as guests, so we are responsible for taking an ethical approach to mitigating the impacts of global warming [22]. The population has grown exponentially over the centuries following industrialisation and globalisation. Emily Elhacham et al identify that we have reached a tipping point where anthropogenic (human made) mass, is now equal to and within six years will outweigh the global biomass [23]. Vaclav Smil identified the impacts that human actions have had on other species, reducing the phytomass (terrestrial plant matter) by 45% in the last 2,000 years. The number of humans surpassed the number of wild land animals in the second half of the 19th Century and by 1900 there were 30 percent more humans, by 2000 wild animals constituted 10% of the global anthropomass. Conversely the density of domesticated animals increased significantly, to outweigh the biomass of all soil invertebrates with only soil bacteria surpassing this [24]. Changes in climate have occurred through millennia, where in the ancient world populations could move freely towards more clement weather conditions. Chakrabarty argues that the huge growth of populations following industrialisation have led to human controlled restrictions on migration, to prevent mass movement across borders and boundaries [25].

Catherine Yusuf proposes that colonialism and the resulting globalisation have contributed to the identification of territories and borders as well as to the vast inequalities of wealth across the planet. She argues that indigenous peoples were diminished to a form of geology as property and were brutalised by the colonizers. Yusuf identifies colonialism as the beginning of the Anthropocene starting in 1452 when Black Africans were transported as slaves to the Portuguese Island of Madeira to work on the plantations. Colonisation led to significantly diminished indigenous populations across the planet. "The invasion of Europeans in the Americas resulted in a massive genocide of the indigenous population, leading to a decline from 54 million people in the Americas in 1492 to approximately 6 million in 1650, a result of murder, enslavement, famine, and disease" [26]. This led to a huge replacement of population and the merging of flora and fauna, and non-human animals impacting on the ecology of the Americas. Colonialism resulted in vast inequalities of power and violent oppression of indigenous peoples. "The white man was held up as the primary ontology, the rational thinker and rightful owner of all matter human and otherwise and blackness was confined to the other, dehumanising to justify horrific violence" [27]. Whole peoples were displaced from their ancestors. "Colonialism enacted multiple forms of geologic disruption as well as the more obvious forms of extractive dispossessions" [28]. Following the atrocities enacted through colonialism, globalization and world conflicts have contributed to continued displacement of beings. Through the retelling of ancient world mythologies, we can resist to speculate on possible new futures.

Speculation on becoming: Avatar Identity

Hekateris Dance speculates on a future world where a convergence of human and non-human beings has taken place, taking inspiration from the natural world as well as mythologies from the past. Particular attention was paid to ensure diversity in the representation of the avatars and to avoid racial or gender stereotypes. Edward Said warned of the danger of orientalising, romanticising, or appropriating the 'other' [29] as an impact of the imbalance of power through colonialism. For this reason, embodiment and the politics of identity was a key consideration in the design of the avatars. Adrianne Shaw argues that representing diversity within a globalized world can become a complex site for negotiation [30]. The term avatar derives from Hindu, as a perfect representation of a deity on Earth. De Wildt et al argue that Silicon Valley tech designers appropriated Indian culture in their use of the term, through their interest in mysticism [31]. Researchers interested in identity politics have highlighted the significance of avatar design in games and film. A study by Dmitri Williams et al of 150 video games found that the avatars were predominantly white and male [32]. In this way whiteness is presented as the normalized group to the audience. Nezer AlSayyad warns that where blackness is represented in cinema, it is often used to symbolize disempowerment and otherness [33]. Adrianne Shaw proposes that there is a risk through representation in tokenism and stereotyping [34]. She argues that it is important to "recognize nuanced individuals" as well as "recognising entire groups in ways that we value without essentialising the differences between groups" [35]. Shaw contends that counter-stereotype representation is important, but it will not on its own overcome inequality, and a pluralist approach only reaffirms inequalities, further marginalizing groups by homogenizing people of one gender or race. Instead, Shaw argues that representation should be approached through hybridity, intersectionality, and coalition politics [36]. For this reason, the avatars were designed to be inclusive as hybrid beings, avoiding the use of archetypes through race, gender, and age. The artwork offers opportunity to bring diverse communities together to engage with the avatars offering a plurality of voices and experience through interaction. Patrick Allen found in his research on urban screens that the presence of the visitor's body within the frame offers agency [37]. Participants in Hekateris Dance can see each other on their mobile phone, they have un-restricted movement, and can improvise and engage freely within the space to enact agency. Using Kristine Stiles and Edward A. Shanken's definition of agency, as an opportunity to have a meaningful effect on the artwork [38], audiences have agency to direct their own experience and to make creative choices. Through their playful interaction and dance with the avatars as well as with other visitors, they can complete the artwork.

Storytelling through Augmented Reality

The term Augmented Reality was coined by Boeing Aero Space researchers Tom Caudell and David Mizell, in 1992 [39]. Vladimir Geroimenko defines AR as a "device lead experience" where "dynamic content" is layered on to the camera view of the physical environment [40]. Patrick Lichty proposes five categories of augmentation, fiducial, planar, locative/GPS, environmental and embodied/wearable. The first two are similar in that they fix content to a point or plan. The second category refers to content that can be fixed in location through geo-tagging from databases or online maps for contextual site-specific content or to generate overlays in a fixed position which is selected by the mobile device user. This creates content in the environment. The final example is wearable and fixed to the user. AR has been used as a form of cultural production for image recognition, spatial location, and embodied interaction. AR can provide a performative media space where the physical body is required to move and interact with the content "there is a becoming in action…an activation of the space [41]. Through the layering of data and visual media, AR offers new sites for experiencing public space, and new opportunities for artists to engage with audiences.

Through AR audiences can experience physical interaction as an embodied, presence in the environment. The augmented space offers another layer of communication, where we can explore memory, histories, culture, learn, access information, experience, and play. Lev Manovich examined the potential and ethics of AR for the use of artists and commerce specifically in Prada Stores, using the digital overlay offered by AR. He proposed that,

> "…architects along with artists can take the next logical step to consider the 'invisible' space of electronic data flows as substance rather than just as void – something that needs structure, a politics, and a poetics" [42].

In this way AR offers new opportunities to engage with narrative. Scott Rettberg proposes that the ubiquity of mobile devices transforms the way that we can engage with storytelling in the environment changing the way we interact with the internet in physical space, by layering "narrative and poetic experience on the world around us" [43]. AR provides ubiquitous storytelling to be experienced within our environment and architecture, and everyday life, and artists can explore the new potential for interaction with audiences in public spaces. This is made possible through the convergence of the tangible and digital as spaces for storytelling and community building. Sean Morey and John Tinnell propose that AR offers 'hybrid spaces' created by mobile interfaces [44]. They write of new opportunities in AR for publishing and design to trigger dialogue, "AR assembles a multidisciplinary cast of contributors with the aim to reflect on current practices, propose new concepts and initiate critical conversations pertinent to AR's cultural development" [45]. This provides opportunities for AR artworks to prompt discourse within communities and place, facilitating "collectively engaged scripted space" to "reaffirm and revitalize the urban space" for "social encounter communication and debate" [46]. Through AR communities can participate in interactive narrative and place making. Morey and Tinnell argue that this "requires us to invent new forms of digital civic participation" while also creating "new ways of developing

cultural interfaces in scripted spaces" [47]. This builds on a tradition of artists who engage with public audiences in space and place, advocated by Lucy Lippard whereby through engaging with artworks in public space, communities can develop new stories and memories of place [48]. AR offers opportunity for artists to engage audiences in discourse to prompt change, in relation to how we engage in our environment, to reflect on how we live together for a sustainable future. It offers artist autonomy to work beyond the white cube and museums and galleries have also commissioned projects including 'London Street Museum' [49] and 'MOMA NYC Augmented Reality Exhibition' [50], for audience interaction. The former layered archival photographs within the street environment as memories mapped onto a contemporary view of the same location and the latter placed AR artworks to be explored within the gallery. The convergence of media via the internet with the physical world using mobile phones offers ubiquitous computing opportunities for new forms of narrative and immersion in the environment. AR converges time, in real and virtual space, for information, narrative, and interaction so that enjoyment and fun can prompt discussion on serious issues such as climate change.

Hekateris Dance invites audiences to dance with the Avatars as a call to action both through playful interaction as well as through dialogue in response to the narrative. Participants can engage in speculative imagining to consider the impact of their actions on the future inhabitants of the planet. Audiences enjoyed dancing with the avatars and fed back that the project was enjoyable and fun whilst provoking intrigue, imaginings, and discourse on the hybrid life forms. The documentation of the artwork is a method which acts as a record to evidence the audience reaction and participants can be seen laughing and joyful. One participant responded that this was an effective way of engaging with the issues, as they were aware of the actions that they could take to help to reduce climate change, but they needed to form new habits. Visitors commented that participation through play prompted positive action and a sense of agency when considering actions to reverse climate change, avoiding anxiety and despair which can be overwhelming and lead to inaction. One participant commented that the memory of the AR experience provided a unique way to observe the situation through their imagination and to reflect on it, which would help them to consider the changes that they could make.

Conclusion

Hekateris Dance invites audiences to speculate on humans and non-humans in the distant future, and how we may evolve to survive on a damaged planet using augmented reality. On scanning a QR code, the life-sized three-dimensional dancing avatars are transported into the space, using augmented reality. Through playful interaction the audience can enjoy dancing with the avatars visible through a handheld device. The information boards provide nuanced information about the animal characteristics, and this prompted discussion on how humans are negatively impacting on the environment and changes that could be made to reduce this. The audience responded that they really enjoyed the playful experience, which made it fun and memorable, and this could help induce new habits and behaviours. Augmented reality offers opportunity for new types of storytelling, and interactivity for audiences in tangible and digital spaces. The artwork follows a tradition of speculative fictioning, prompting audiences to reflect on how we may live more sustainably, to positively impact on our future, bringing about a change in how we live and engage in the environment. The use of stories brings a human focus, making the issue of climate change more relatable. The prompting of discussion helps people consider how they can put changes into action in a tangible way. Soraya Murray describes games as providing "the 'dreamlife' of culture" [51]. Through playful Augmented Reality (AR) artworks, we can dream of a future to change the present and to be part of the transformation, for a sustainable future.

References

[1] Braidotti, Rosi, *Posthuman Knowledge* (Cambridge, Medford: Polity Press, 2019), 44.
[2] Braidotti, Rosi, *Posthuman Knowledge*, 44.
[3] Ingold, Tim, *Life of Lines*, (Oxon, New York: Routledge, 2015), 14.
[4] Ingold, Tim, *Life of Lines*, 42.
[5] Haraway Donna, *Staying with the Trouble* (Durham and London: Duke University Press, 2016).
[6] Atsma, Aaron, "Theoi" Greek Mythology website, accessed 5 Nov 2023, https://www.theoi.com
[7] Stanner, William, Edward, Hanley *White Man Got No Dreaming* (Canberra: National Library of Australia, 1979), 23.
[8] Stanner, William, Edward, Hanley *White Man Got No Dreaming*, 31.
[9] Stanner, William, Edward, Hanley *White Man Got No Dreaming*, 32.
[10] Rundell, Katherine, *The Golden Mole and Other Living Treasure* (London, Faber and Faber, 2022), 157.
[11] Rundell, Katherine, *The Golden Mole and Other Living Treasure*, 164.
[12] Rundell, Katherine, *The Golden Mole and Other Living Treasure*, 81.
[13] Stanner, William, Edward, Hanley, *White Man Got No Dreaming*, 28.
[14] Belk, Russell, Humayun, Mariam, Gopaldas, Ahir, "Artificial Life", *Journal of Micromarketing*, Sage, Vol. 40, No 2 (2020): 221-236.
[15] Kaplan, Frederick, "Who is Afraid of the Humanoid, Investigating Cultural Differences in the Acceptance of Robots", *International Journal of Humanoid Robotics*, World Scientific, (2004): 465-480.
[16] Rundell, Katherine, *The Golden Mole and Other Living Treasure*, 16.
[17] Rundell, Katherine, *The Golden Mole and Other Living Treasure*, 146.

[18] Burrows, David, O'Sullivan, Simon, *Fictioning,* (Edinburgh: Edinburgh University Press Ltd, 2019), 20.
[19] Haraway Donna, *Staying with the Trouble*
[20] Archer, David, *The Long Thaw, how humans are changing the next 100,000 years*, (Princetown, Oxford: Princetown University Press, 2016), 2.
[21] Archer David, *The Long Thaw, how humans are changing the next 100,000 years*, 2.
[22] Chakrabarty Dipesh, *The Climate of History in a Planetary Age, Chicago*, London. University of Chicago Press, 2021), 66.
[23] Elhacham, E., Ben-Uri, L., Grozovski, J. *et al.* "Global human-made mass exceeds all living biomass". *Nature* 588, 442–444 (2020).
[24] Smil, Vaclav, "Harvesting the Biosphere: The Human Impact", Population and Development Review, 12, Volume 37, Issue 4 (2011).
[25] Chakrabarty Dipesh, *The Climate of History in a Planetary Age*, (Chicago, London: University of Chicago Press, 2021), 60.
[26] Yusuf, Catherine, *A Billion Black Anthropocene or None*, (Minneapolis: University of Minnesota Press, 2018), 31.
[27] Yusuf, Catherine, *A Billion Black Anthropocene or None*, 31.
[28] Yusuf, Catherine, *A Billion Black Anthropocene or None*, 35.
[29] Said, W. Edward, "Orientalism Reconsidered", *Cultural Critique*, Autumn, No 1, 89-107, University of Minnesota Press, (1985).
[30] Shaw, Adrienne, *Gaming at the Edge: Sexuality and Gender at the Margins of Gaming Culture*, (Minneapolis: University of Minnesota Press 2015).
[31] Wildt, Lars de, Apperley, Thomas, Clements, Justin, Fordyce Robbie, Mukherjee Souvik, "Re-Orientating the Video Game Avatar" *Games and Culture* Vol. 15 No. 8, (2020) 962-981.
[32] Williams, Dimitri, Martins, Nicole, Conslava, Mia, Ivory, James, "The Virtual Census: Representation of Gender, Race and Age in Video Games", *New Media and Society*, Sage, Vol.11, No. 5, (2009).
[33] AlSayyad, Nezar, *Cinematic Urbanism: A history of the modern from reel to real,* (New York: Routledge 2006), 190.
[34] Shaw, Adrienne, *Gaming at the Edge: Sexuality and Gender at the Margins of Gaming Culture*, 167.
[35] Shaw, Adrienne, *Gaming at the Edge: Sexuality and Gender at the Margins of Gaming Culture*, 148
[36] Shaw, Adrienne, *Gaming at the Edge: Sexuality and Gender at the Margins of Gaming Culture*, 6.
[37] Allen, Patrick, "Framing Locality and the Body in Augmented Public Space, in Augmented Urban Spaces, Articulating the Physical and Electronic City, eds Aurigi Alessandro, De Cindio, Fiorella, (Hampshire, Burlington, Ashgate Publishing limited, 2008) 38.
[38] Stiles Kristine, and Shanken, Edward, in *Context Provider: Conditions of Meaning in Media Arts*, ed Lovejoy, Margot, Paul, Christiane, Vesna, Victoria (Bristol: Chicago, Intellect Books, 2011) 36.
[39] Lichty, Patrick in *Augmented Reality Art: From an Emerging technology to a Novel Creative Medium*, Geroimenko, Vladimir, ed. (Springer International Publishing AG, Cham, 2014) Available from: Pro Quest Ebook Central. (5 November 2023), 101.
[40] Geroimenko, Vladimir, ed. *Augmented Reality Art: From an Emerging technology to a Novel Creative Medium*, Springer International Publishing AG, Cham, (2014) Available from: Pro Quest Ebook Central. (5 November 2023), 82.
[41] Lichty, Patrick in *Augmented Reality Art: From an Emerging technology to a Novel Creative Medium*, Geroimenko, Vladimir, ed, 111.
[42] Manovich, Lev, The poetics of Augmented Space, *Visual Communication,* London, England, (2006) 237.
[43] Rettberg, Scott, *Electronic Literature*, (Cambridge: Polity, 2011), 184.
[44] Morey, Sean, Tinnell, John, (Eds.) *Augmented Reality: Innovative Perspectives across Art, Industry, and Academia*, (Anderson, South Carolina: Parlour Press, 2017), 14.
[45] Morey, Sean, Tinnell, John, (Eds.) *Augmented Reality: Innovative Perspectives across Art, Industry, and Academia*, 9.
[46] Morey, Sean, Tinnell, John, (Eds.) *Augmented Reality: Innovative Perspectives across Art, Industry, and Academia*, 16.
[47] Morey, Sean, Tinnell, John, (Eds.) *Augmented Reality: Innovative Perspectives across Art, Industry, and Academia*, 17.
[48] Lucy Lippard, *The Lure of the Local: Senses of Place in a Multicentered Society*, (New York, New Press, London, 1998).
[49] London Street Museum https://www.youtube.com/watch?v=qSfATEZiUYo accessed 6 Nov 2023.
[50] MOMA NYC Augmented Reality Exhibition, https://www.youtube.com/watch?v=b9T2LVM7ynM accessed 6 Nov 2023.
[51] Murray, Soraya, *On Video Games: The Visual Politics of Race, Gender, and Space*, (I.B. Tauris & Company Limited, 2017), 3.

Bibliography

Allen, Patrick, "Framing Locality and the Body in Augmented Public Space", in *Augmented Urban Spaces*, *Articulating the Physical and Electronic City,* eds Aurigi Alessandro, De Cindio, Fiorella, (Hampshire, Burlington, Ashgate Publishing limited, 2008).
AlSayyad, Nezar, *Cinematic Urbanism: A history of the modern from reel to real* (New York, Routledge 2006).
Atsma, Aaron, 2000-2017, "Theoi Greek Mythology" website, accessed 5 Nov 2023, https://www.theoi.com
Archer David, *The Long Thaw, how humans are changing the next 100,000 years*, (Princeton, Oxford: Princeton University Press, 2016).
Belk, Russell, Humayun, Mariam, Gopaldas, Ahir, 2020, "Artificial Life", *Journal of Micromarketing*, Vol. 40(2): 221-236, Sage.
Braidotti, Rosi, *Posthuman Knowledge* (Cambridge, Medford: Polity Press, 2019).
Burrows, David, O'Sullivan, Simon, *Fictioning,* (Edinburgh: Edinburgh University Press Ltd, 2019).
Chakrabarty Dipesh, *The Climate of History in a Planetary Age*, (Chicago, London: University of Chicago Press, 2021).
Elhacham, E., Ben-Uri, L., Grozovski, J. et al. "Global human-made mass exceeds all living biomass", *Nature* 588, 442–444 (2020). https://doi.org/10.1038/s41586-020-3010-5 accessed 30 October 2023
Geroimenko, Vladimir, (ed.) *Augmented Reality Art: From an Emerging technology to a Novel Creative Medium*, Springer International Publishing AG, Cham, (2014) Available from: Pro Quest Ebook Central. (5 November 2023).
Gould, Charlotte, *Hekateris Dance*, AR Installation, 2023.

Haraway Donna, *Staying with the Trouble,* (Duke University Press Durham and London 2016).
Ingold, Tim, *Life of Lines*, (Oxon, New York: Routledge 2015).
Kaplan, Frederick, "Who is Afraid of the Humanoid" *International Journal of Humanoid Robotics*, 465-480, World Scientific, (2004).
Lichty, Patrick in Geroimenko, Vladimir, (ed.) *Augmented Reality Art: From an Emerging technology to a Novel Creative Medium*, Springer International Publishing AG, Cham, (2014) Available from: Pro Quest Ebook Central. (5 November 2023).
Lucy Lippard, *The Lure of the Local: Senses of Place in a Multi-centered Society*, (New York, New Press, London, 1998).
Manovich, Lev, "The poetics of Augmented Space", *Visual Communication,* London, England, (2006) 237.
Murray, Soraya, *On Video Games: The Visual Politics of Race, Gender, and Space*, (I.B. Tauris & Company Limited, 2017).
Morey, Sean, Tinnell, John, (Eds.) *Augmented Reality: Innovative Perspectives across Art, Industry, and Academia*, Anderson, South Carolina, Parlour Press, 2017).
Rettberg, Scott, *Electronic Literature*, (Cambridge: Polity, 2011).
Rundell, Katherine, *The Golden Mole and Other Living Treasure*, (London: Faber and Faber, 2022).
Said, W. Edward, "Orientalism Reconsidered", *Cultural Critique*, Autumn, No 1, 89-107, (University of Minnesota Press, 1985).
Shaw, Adrienne, *Gaming at the Edge: Sexuality and Gender at the Margins of Gaming Culture*, (University of Minnesota Press 2015).
Smil, Vaclav, "Harvesting the Biosphere: The Human Impact", *Population and Development Review*, 12, Vol. 37, Issue 4 (2011).
Stanner, William, Edward, Hanley *White man Got No Dreaming*, (National Library of Australia, Canberra 1979).
Stiles Kristine, and Shanken, Edward, in *Context Provider: Conditions of Meaning in Media Arts*, (eds.) Lovejoy, Margot, Paul, Christianne, Vestna, Victoria (Bristol, Chicago, Intellect Books, 2011).
Wildt, Lars de, Apperley, Thomas, Clements, Justin, Fordyce Robbie, Mukherjee Souvik, *Games and Culture* vol 15 (8) (2020.
Williams, Dimitri, Martins, Nicole, Conslava, Mia, Ivory, James, "The Virtual Census: Representation of Gender, Race, and Age in Video Games", *New Media and Society*, Sage, Vol.11, No. 5, 2009).
Yusuf, Catherine, *A Billion Black Anthropocene or None*, (Minneapolis: University of Minnesota Press, 2018).

Author Biography

Charlotte Gould is a senior academic in the School of Art and Media at the University of Brighton. She has taught all levels of Visual Communication and supervises PhD students. Through her practice she explores the potential for interactive installations in digitally mediated public spaces, promoting public participation through shared experience. She has developed Extended Reality artworks to prompt play and interaction across social and cultural boundaries as well as interactive nonlinear narratives and speculative fiction, which explore how we can communicate the threat of ecological crisis, raising public awareness to trigger change in behaviours. Through interactive installations she tests the boundaries of open systems, to offer opportunity for diverse audiences to co-create artworks, impacting on the way we engage in the urban environment and public space and contributing to a collective memory of place in a global context.