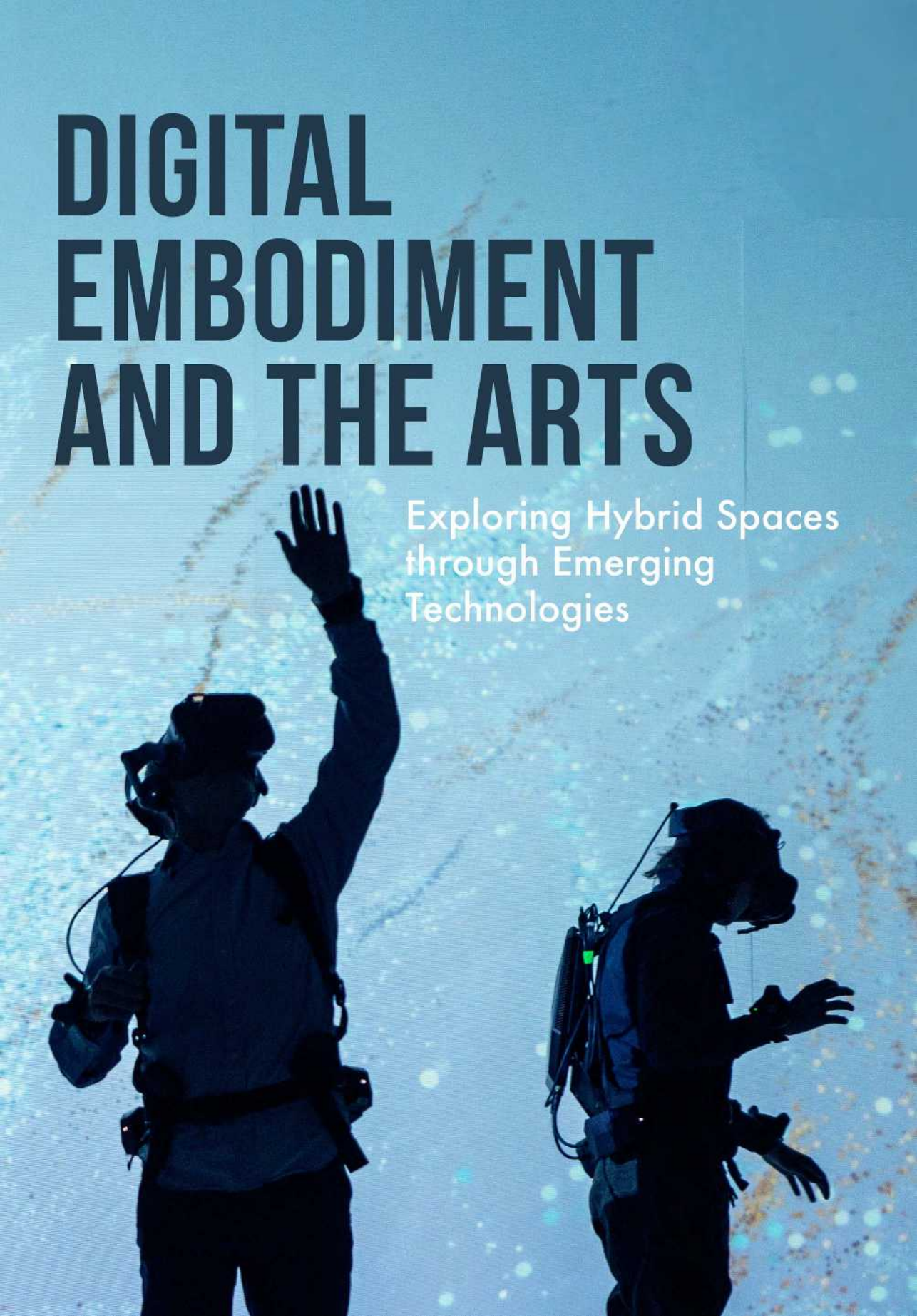
DIGITAL EMBODIMENT AND THE ARTS

Exploring Hybrid Spaces through Emerging Technologies



Digital Embodiment and the Arts

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Exploring Hybrid Spaces through Emerging Technologies

Denise Doyle

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This is a peer-reviewed publication.

I dedicate this book to my daughter, India Rose, a creative, musical, and vibrant soul. I hold on to the deeply contented feeling of what it is to watch you grow …

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Foreword

Jacquelyn Ford Morie

The questions posed by Denise Doyle within *Digital Embodiment and the Arts: Exploring Hybrid Spaces through Emerging Technologies* are profound in nature. They transcend the current state of art in technology and presage how we are evolving as human beings in a new age, with new affordances shaped by the technologies we have developed over the last century. These transformative technologies have not only altered our way of life but have laid the foundation for a new human paradigm.

We are indeed being blown backwards into this new paradigm. We cannot see what is coming in our missing rear-view mirror. But each section of this book provides some tantalizing hints about this unfolding future.

New immersive technologies offer us other kinds of spaces — places heretofore unimagined — to explore and eventually integrate into our lived reality. The current moment points to a merging of our bodies, minds, and imagination within these boundless new realities.

We are no longer confined to a singular grand crusade lasting our life's span but have at our reach countless micro journeys and meaningful pilgrimages, many described within these pages. Today our experiences are legion.

And who are we, if not the sum of our experiences? The doors of perception and possibilities are thrown open by what technology affords us at this moment in the way of innumerable habitable (yet) liminal spaces we traverse breathlessly.

These journeys are creating new neural pathways, modifying existing ones, and doing so at an unrelenting pace. We cannot help to be affected by these expanding inputs and their impacts. Our brains are wired to change, albeit what was once imagined to be a slow process has supercharged itself—like Moore's Law, exponentially — over the last century.

And as we traverse the possibilities breathlessly, drinking it all in, the mind/body duality is debunked. We comprise riches we are only beginning to realize. Our body holds untapped potentials — brains in our gut, microbiomes, synesthesia, and as many as 55 identified senses. The interplay of these sense imaginaries presents an explosion of possibilities, heralding a new bodily order.

The virtual liberates us from so many shackles, limitations, and earthly constraints, allowing us to fly, dive into clouds, inhabit other bodies, genders, and mindsets. This century's technologies have also expanded us into the realms of space. Like the virtual, space beckons expanded forms of embodiment by removing gravity, that earth-bound condition that has ever impinged on the freedoms of our physicality.

Just as someone congenitally blind cannot imagine a pure blue sky, our imagination has been locked by the limitations we have endured as slow-to-evolve, earthbound creatures. Technology advances have expanded our experiential understanding, unlocking novel modalities from living as a dragon to dancing on planets with different dynamics, to seeing through another's eyes. New states of consciousness emerge from these experiences, slowly, one shock of awe or small scintilla of understanding at a time.

While we may not meticulously measure the impacts, every single stretch of our imagination alters and evolves us as we grasp the complexities revealed by virtual playgrounds or the mysteries of space. Four distinct kinds of cognition — embodied, embedded, extended, and enactive — have emerged, with the potential for more as our experiences multiply. Complexity is the norm, and each discovery expands us beyond our primal nature.

As these pages reveal, technologies liberate us from the shackles of our original human condition, and yet, we have only glimpsed a tiny glimmer of a vast inconceivable glow. The potential is for abundant possibilities, ones that morph and magnify, meld and emerge in the temporal dance of what it means to exist as living beings.

And key to this abundance is the role of artists, in concert with their colleagues the inventors, technologists, and scientists of practicality. Artists dive into the clouds of possibilities and weave them like candy floss into new imaginalities through a dynamic equilibrium of habitation and creation.

Even robots, humanity's recent creations, become part of these transformative thought processes. Through them embodiment transcends the virtual, manifesting another form of physicality — a body we inhabit that may not be of flesh and blood or pixel and rendering, but of metal and matter and the soul we infuse into it.

I am reminded of Jaron Lanier's desire to be a lobster in the unencumbered space of the virtual — hopping into that body and testing our extra appendages, locomotion, and sensory delights. Today we are there and beyond. And at this nexus, we can, and must ask, in all sincerity: What does it mean to live, not as humans have lived throughout times past, but as humans now poised on the edge of a new world of abundant possibilities. The question is better phrased as: What does it mean to live now, and who might we eventually become after feasting at this table of abundance?

Digital Embodiment and the Arts by Denise Doyle not only explores these questions raised by our emerging technologies but more importantly points us to a future where these become our birthright.

Los Angeles
January 2024

Introduction

This book is more than fifteen years in the making, although its origins go back much further than that, most likely pointing to a darkened almost empty local cinema more than 30 years ago in 1991. I had convinced two of my loyal friends to attend the screening of a new film entitled *Prospero's Books* directed by artist and filmmaker Peter Greenaway. I sat there mesmerised by its innovative use of mixed media techniques and overlays of multiple moving and still images and animations, all rendered on a Quantel Paintbox System, although the only other audience member in the cinema that evening already left halfway through the film. There was no denying it was hard going at times, but the magic coming from that screen has never left me. I remember staring at those books coming alive before my very eyes, with frogs and other animals seen one moment as an illustration on the pages and the next moment morphing into animation and scuttling offscreen. This was a form of thinking and a use of mixed media that was beyond my own imagination.

Fast forward another decade or so and it was during the timing of undertaking my Ph.D. at SMARTlab Digital Media Institute[1] with Professor Lizbeth Goodman that had a deep impact on my understanding and perceptions of the world of digital media, not least because of the incredible minds and energies that I had the good fortune to meet there. I began my Ph.D. in the summer of 2006 and quickly realised I was in exactly the right place at exactly the right time – it was a kind of serendipity to have found myself there. Here, I laid the foundations of my approaches, methodologies, interests, and sensitivities towards the arts and new technologies that have been sustained since then. There has been just enough time to see the returning circles of interest in virtual worlds, virtual reality (VR), participatory practices, online technological-mediated collaborations, and many other related themes. Who would have thought that the 'Metaverse' would be talked about almost as though it had never existed until the second decade of the twenty-first century – of course, it had already had two returns of the circle, once in the mid-1990s (although not consistently related to online accessible and connected worlds) and again from the mid part of the first decade of the twenty-first century. Luckily, I have been around just about long enough to have seen these things first hand.

It took me until I met the philosopher, academic, and dancer Professor Susan Kozel at SMARTlab[2] to understand the significance of the body in my understanding of the world. Taking part in some of her workshops and listening to her talks allowed me to realise that I had always understood the world through my body. Additionally, the set-up of the Ph.D. tri-annual seminar exchanges often drew upon a range of performance techniques with the body being held central to the intellectual, academic, and artistic understanding that was being developed there. This was a liberation for me. I always learnt through my body but this was the first time I had permission to do so, and even encouraged to do so, and most importantly acknowledged that for myself.

But why a book on digital embodiment and its relationship to hybridity and the arts? It seems that certainly in the last decade, there has been a growing realisation that our desire for the digital experience in all its forms is very much here to stay (at least while there is still power left to keep the technology going or an alternative source of energy is found to feed our collective digital appetites) and most certainly embedded in our everyday lives in the western world and beyond. Again, over the last decade, there comes another realisation, that technology is contributing to a kind of hybridisation of experience, with online and offline, the virtual and physical, and more recently newly accepted forms of hybrid working – being virtually present amongst those who are physically 'there'. In addition, this explosion of digital culture and experience has most certainly given artists and creative practitioners new ways of exploring the hybridisation of creative practices with access to technological tools only previously dreamt of. Over the last few years, and in this context, I have attempted to pull together a number of threads around digital embodiment and its centrality to the digital experience. The results have laid the foundations and structure of the book itself. Organising the book into three sections has been a useful way in which to frame my thinking about digital embodiment in relation to artistic practice. Each section, **EMBODIMENT AND SPACE**, **BODY**, and **TECHNOLOGY**, looks for the hybrid, the combined, and with it the new spaces, the new bodies, and the new technological experiences that are enabled through these artistic investigations. Another thread that is woven through the book is the subject of my original Ph.D. research, that of the relationship between technology and the imagination. Three of the chapters are drawn from existing published research: Chapter 2 is based on research on the virtual and the imagination published in 2012 and presented at *Towards a Science of Consciousness 2012* in Tucson, Arizona, USA; Chapter 3 is based on research undertaken exploring the relationship between bodily experiences in zero-gravity space and virtual space and published in the *International Journal of Performance Arts and Digital Media* (Routledge) in 2015, and Chapter 4 loosely draws upon a book chapter entitled 'Avatar lives' published in the edited volume *Creating Second*

Lives (Routledge) in 2011. The rest of the chapters are new. Below I outline the aims of each section followed by an introduction to each chapter.

Section 1: EMBODIMENT AND SPACE explores the whole notion of embodied experience through a study of space and virtuality, imagination, and technology. The first chapter focuses on ways of exploring digital embodiment through various artistic and scientific fields of research, and the second chapter considers digital embodiment from an ontological point of view and draws heavily on phenomenological thought and the philosophy of technology. **Chapter 1: Digital Embodiment, Hybridity, and the Arts** sets out the relationship between the three primary themes of the book and outlines how they are interrelated and connected. It charts the connections between the study of digital embodiment in arts and sciences over the past two or three decades and it seems that new articulations are formed each time the theme is taken up by artists, computer scientists, phenomenologists, or even philosophers where what it means to be 'digitally embodied' is challenging notions of reality itself. The chapter further explores the notion of hybridity in the context of new technologies and presents the ways in which the arts are key to developing new research methodologies in order to understand the impact and potential of immersive experience and the technologies that enable it to occur. The chapter argues for, what I am terming, a post-hybrid approach which is exemplified in the work of the BeAnotherLab Art Collective whose work in Empathy VR attempts to bring the worlds of art and science together to enable others to 'walk in someone else's shoes'. Their work further features in other chapters of the book. In **Chapter 2: Imagination, Space, and Immersive Technologies**, I examine the role the imagination plays in the complex relationship of our physical bodies and our virtual bodies and indeed in our acceptance of immersion in virtual space be it through full immersion technologies in VR or by proxy through a virtual body and the sense of presence it invokes. The chapter interrogates early theorists engaged in phenomenological thought in order to create a deeper ontological understanding of the phenomenal experience of immersion and digital embodiment in the twenty-first century. The relationship between materiality and the imagination and how this connects to our experience of virtual space is explored and the chapter ends with a whimsical discussion of the geographies of virtual space and how this may be constructed through a complex interweaving of time and space itself.

Section 2: BODY lays the ground for a more explicit understanding of the role the body has in our engagement with digital technologies. In this section, I focus on three distinct bodies: the gravitational body, the virtual body, and finally the hybrid body. It may appear a little strange to begin the section with a chapter on the gravitational body in a book about the arts and digital embodiment. However, as with any discussions about embodied experience per se, the hidden

force of gravity upon our bodies, whether in physical reality or immersive reality, is always there. Sitting right now writing this introduction, I can feel the gravity on my body if I hold my arm up and release muscle tension, and I remind myself of the (extremely improbable) possibility of floating upwards if gravity suddenly 'switched off' in Earth's atmosphere. It is an incomprehensible force, yet when artists and creative practitioners move to explore gravity and its counterpart (zero gravity), it quickly becomes a creative and imaginative force to reflect upon. Based on previous research and recontextualised to weave in the impacts of gravity on the body in light of the digital, **Chapter 3: The Gravitational Body** charts the relatively short history of creative engagement in zero gravity and the endeavours of arts organisations around the world to enable the exploration of zero gravity first hand. This includes in particular the UK-based The Arts Catalyst and the series of zero-gravity flights they charted in the first decade of the twenty-first century. Here, the focus is on projects and reflections that consider the body and the impact of gravity upon it. It is curious how humanity is constantly looking for other places and spaces to inhabit (consider the current research on not only reaching Mars but also the possibility of inhabiting Mars). In considering the body in an extreme space such as that of zero gravity, the chapter is closely followed by an examination of another form of bodily experience in that of the virtual avatar body.

Chapter 4: The Virtual Body considers the body as a virtual representation in virtual space and reflects upon the often, visceral experiences that occur when our minds inhabit the virtual. It picks up from Chapter 2 in terms of the theoretical examinations of the body and the virtual and explores a range of artist and creative-led projects that utilise the virtual body to examine ways in which virtual space is experienced. The chapter includes some early projects that I undertook as my own avatar Wanderingfictions Story in *Second Life* (Linden Lab, 2003). It is timely to re-examine this work following a lull in interest in virtual worlds a decade ago (from 2011 onwards) but with an identifiable resurgence of interest in the last two to three years (most certainly fuelled by the worldwide pandemic and its implications in terms of the lockdown and the inevitable restrictions to our physical movements outside of our homes). Many of us found solace and freedom again in virtual worlds and online spaces. With a 10-year-old daughter at home, I increasingly observed how digitally embodied experience is now more fully embedded in young people's waking lives than ever before. With a resurgence in interest in virtual worlds, embodied experience in virtual space through an avatar body has become even more pertinent since I began writing this book in 2019. Finally, **Chapter 5: The Hybrid Body** explores the notion of the hybrid body and engages with the work of Donna Haraway and her astounding chapter in 'A Cyborg Manifesto' written more than 30 years ago and startlingly relevant today. In the years following Haraway's manifesto, artists have been privileged to have access to and sometimes

created many virtual and immersive technologies that have been explored and utilised in many ways. The concept of the post-human and the bio-cultural body are explored through hybrid practitioners as varied in their approach as Stelarc and Björk. The chapter points towards a naturally hybridising future where the idea of keeping our bodies separated from technology seems almost impossible now. A further focus of this chapter is on gender and identity in the context of the hybrid and I include a discussion on a range of artworks including *Becoming Dragon* (2009) by Micha Cardenas.

Section 3: TECHNOLOGY focuses on the new technologies that support the digitally embodied experience and is split into three chronological chapters in terms of technological developments and the artistic experimentations that often push the technologies themselves. Whilst in some ways all of the three technologies discussed, Virtual Reality, Virtual Worlds, and (to an extent) Augmented, Mixed, and Extended Realities, were all present at the start of those major technological developments from the late 1980s and early 1990s onwards they have followed slightly different trajectories and in turn have emerged as distinct technologies in terms of our understanding of their nature and the human experience that is captured within them. It is therefore pertinent to consider each contribution that each technology has made and is making, to the digitally embodied experience. **Chapter 6: Virtual Reality** is focused on full immersion in virtual space, where the developments of VR can be seen to have arrived in two waves – the first in the 1990s and the second wave emerging since 2015 (or a little earlier) that has been instigated through a mix of factors including the lower costs of VR headsets and therefore allowing greater accessibility for researchers and artists and an increased interest from the general public. The chapter chronicles the practice-based research of the creative practitioners during the two waves and examines what the initial focus was of the pioneers who were literally creating the technology (VR) at the same time as researching its very nature, being likened to that of a musician trying to build a piano in order to write a symphony. The burgeoning interest in VR in gaming and in the arts is examined with the potential of the technology developing and being applied in many new fields beyond gaming such as health and training scenarios.

Whilst virtual worlds emerged at a similar time to VR in the late 1980s, they can also be seen to be following two waves of interest but at slightly different times and for perhaps slightly different reasons. In **Chapter 7: Artistic Practice in Virtual Worlds**, I examine that, whilst most of the elements of virtual worlds were present from 2005 onwards when the virtual worlds could be accessed online,[3] interest in standalone online worlds such as *Second Life* waned from 2011 onwards but have seen another resurgence in the last three years through social gaming sites (and most certainly as part of the impact of the global pandemic).[4] This chapter's focus, in particular, is on the embrace of artists of virtual worlds as spaces for creative

practice and in the first wave where significant activity and research was undertaken to understand the nature of the virtual space (usually online, connected, and persistent) and the relationship of the body representations to that space, most often through the avatar body. Finally in **Chapter 8: Augmented, Mixed, and Extended Realities**, I outline the specific characteristics of augmented realities, mixed realities, and extended realities (although many art projects also utilise the full immersion of VR), where the projects that are primarily engaged in full body immersion are reserved for discussion in Chapter 6. Again, it can be said that the use and exploration of mixed realities were present in the arts from the start with the use of telematic spaces in the early 1990s providing explicit engagement with the relationship between physical and virtual space. However, it is only in recent years that a range of differing 'realities' in terms of new technologies can be increasingly defined. The chapter discusses a range of winners from the Lumen Prize[5] projects set up in 2012 to celebrate the global best practices of artists engaged in new technologies.

As I write this introduction, I recently presented at the *Extended Senses and Embodying Technology 2022* conference, a collaboration between the University of Greenwich and the University of the Creative Arts in the United Kingdom, where many artists, philosophers, and academics were further articulating the potential for extending sense-based experiences of being embodied in technology. As with any book about new technologies, it can only ever provide a snapshot of a particular time and place and collections of experiences. In this ever-changing landscape, I hope this book serves as a mirror in time and provides a set of phenomenological and artistic insights into digital embodiment with the addition of the different offerings of a scientific lens, and no doubt those who follow will stretch our understanding that little bit further of the impact of our technological world on what it means to be human or rather post-human.

NOTES

1. The Institute, having recently moved from Central Saint Martin's College of Art and Design to the University of East London when I undertook my Ph.D., now resides at University College Dublin in Ireland.
2. Kozel held the position of Senior Research Fellow while I was studying my Ph.D. there.
3. The virtual worlds of the 1990s should be rather considered virtual environments or closed worlds, not accessible via the internet.
4. The COVID-19 pandemic emerged from China in the latter days of 2019 and became widely spread by the Spring of 2020, impacting on the daily lives of the majority of the globe until the creation of a range of COVID-19 vaccines around the world.
5. The Lumen Prize, founded by Carla Rappaort, will be introduced in Chapter 6, and further discussed in Chapter 8.

SECTION I

EMBODIMENT AND SPACE

1

Digital Embodiment and the Arts

The tension of holding incompatible things together because both or all are necessary and true.

(Haraway 1991: 149)

Introduction

I begin with two precepts, firstly, that the body has always been contested in a number of ways, and secondly that we, as human beings, have almost surpassed ourselves in our desire for and the lure of new technologies. Having witnessed, and to an extent being part of, some of the debates about the body in relation to technology through the later part of the twentieth century and into the twenty-first century, it seems clear that now due to both the complexity and the hybrid nature of our technology-mediated experiences our bodies remain at the very heart of this discussion, particularly when it comes to immersive technologies. Whether or not we 'see' a visual representation of ourselves in an immersive experience, whether we see ourselves as a hybridised body, or even if there is no physical or visual representation of ourselves, we inevitably experience new technological spaces through the physical response of our bodies.

The ontological framing of the book is firmly embedded in embodied experience. As noted elsewhere, I have always understood the world through my body and therefore I must always begin there, even if we are talking about the constructed spaces of digital embodiment. In my early research, I turned to a phenomenological account of the world in order to begin to grasp the implications of the digital world, and now twenty years later, it continues to offer a reckonable approach that continues to improve and shed further light on our understanding of this particular set of experiences. So too is the interdisciplinary and multi-disciplinary work being undertaken through the fields of cognitive neuroscience and psychology, and it is deepening our understanding of what happens to the brain when it negotiates virtual and mixed reality spaces, and in turn how the brain

might understand itself in relation to a physical body, a virtual body, or a body that is anywhere in between.

The chapter introduces the 'concept of hybridity' inspired by Donna Haraway and Arthur Kroker as re-combinatory re-creations drawing from multiple forms, bodies, and spaces that often conflate the digital/mineral, the machine/organism, the mixed/extended, the virtual/physical, and to quote from Kroker, 'our multiple […] our proliferating identities will always follow paths into the future figured by the contingent, the complex and the hybrid' (Kroker 2012: 144). This concept will be expanded upon in the chapters that follow as its relationship to the ongoing developments of new technologies, particularly in the development of immersive technologies. New technologies have introduced an entirely new set of experiences for human beings, and it will take time for us to properly estimate their ongoing impact in the coming years and decades. In turn, this book will argue that hybrid experiences are becoming so embedded in our physical, mental, and to an extent, our emotional experiences through new technologies that there is a very real possibility that we really did become cyborgs some time ago, although many of us are yet to fully realise it, and the many implications for humanity if this is so. There are certainly those who embrace this concept and see it as an evolutionary and necessary step, and these ideas are explored more deeply in Chapter 5. Whatever the reality, the genie is out of the bottle; mankind has made this bold step into this vast collective 'technological imagination' and now we must grapple with its realities and impacts, potentially for both good and bad. The chapter argues then not for hybridity per se, but rather for a post-hybrid approach in order to grasp the genie and see where it may take us. In the final sections of the chapter, I will introduce the work of BeAnotherLab, a trailblazing artist collective, whose work attempts a deeply interdisciplinary approach to the question of digital embodiment with reference to the exploration of what can be termed empathy virtual reality (VR). Here I argue that, through their organisation as a collective and through the methodologies that they underpin, their research is already embodying a form of post-hybrid thought in their practice.

Digital embodiment

Let's begin with some definitions and differences in our understanding of digital embodiment with some reference to our historical understanding of embodied experience in digitally mediated and virtual (sometimes online) spaces. Having not really engaged in early MUD[1] worlds as others did, the first experiences of 'created' worlds were through words themselves and the power of the user's imagination. In the 1980s and early 1990s, taking a step into a world that was stimulated through reading a set of text-based descriptions and instructions held no real interest for

me. However, it was not until I could 'see' something of that virtual space and beyond a basic visualisation that I became engaged in something that has held my interest for the last 25 years. This fascination, for me, to understand the embodied digital experience has consistently been through primarily artistic means and this is what has engaged me so deeply. However, through the many fields of research that are engaged in digital embodiment and its effects and affect including philosophy, cognitive neuroscience, neurocinematics, neuroaesthetics, the philosophy of technology, phenomenology – the list goes on – each stakes their own claim on the challenges and opportunities that the sense of embodied experience of the digital and virtual realms offers. In the following section, I provide an overview of the theories surrounding embodiment that are of interest to this investigation and how they in turn relate to the digital embodied experience. Much of the theories come from a phenomenological standpoint and of course privileges the body as a site of experience and interpretation.

Privileging the body over the eye

Phenomenology, the science and study of phenomena, has fallen in and out of favour since its initial articulation in the first part of the twentieth century. Edward Casey remarks that 'the phenomenologist's basic attitude is: no matter how something came to be in the first place, what is of crucial concern is the detailed description of the phenomenon *as it now appears*' (Casey 2000: 9, original emphasis). Max van Manen proposes that the phenomenologist is akin to, or not unlike the poet, as the 'phenomenologist directs the gaze toward the regions where meaning originates, wells up, percolates through the porous membranes of past sedimentations' (van Manen 2007: 11; see also van Manen 1997). Merleau-Ponty's philosophical work focused on perception; his sense of sight being an embodied vision as a part of the 'flesh of the world', rather than the Cartesian eye of the disembodied spectator. In *Sense and Non Sense,* he writes:

> My perception is not a sum of visual, tactile, and audible givens. I perceive in a total way with the whole of my being: I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at once.
>
> (Merleau-Ponty 1964: 48)

Finnish architect Juhani Pallasmaa suggests that

> the primacy of the tactile sense has become increasingly evident and the very essence of the lived experience is moulded by hapticity and peripheral unfocused vision.

> Focused vision confronts us with the world whereas peripheral vision envelops us in the flesh of the world.
>
> (Pallasmaa 2005: 10)

Always returning to the body, Pallsamaa's phenomenological description of his experience of the city reflects Merleau-Ponty's position:

> I confront the city with my body; my legs measure the length of the arcade and the width of the square; my gaze unconsciously projects my body onto the façade of the cathedral, where it roams over the mouldings and contours, sensing the size of recesses and projections; my body weight meets the mass of the cathedral door, my hand grasps the door pull as I enter the dark void behind. I experience myself in the city, and the city exists through my embodied experience. The city and my body supplement and define each other. I dwell in the city and the city dwells in me.
>
> (Pallasmaa 2005: 40)

Robert Bosnak, in writing of the dreaming brain, agrees with a current set of 'stories' of neuroscience as expounded by both Mark Solms and J. Allan Hobson that dreaming is related to an experience of space (Bosnak 2007: 36). In fact, a key element of what Bosnak terms the 'embodied imagination' is that there is 'an inversion of the notions of inside and outside [that] changes the very nature of the space' in which we find ourselves (Bosnak 2007: 20). Giving the explanation of how to visualise the experience of multiple embodied emotions, Bosnak explains that if dreaming is considered as a narrative of simultaneous embodied states that unfold along a timeline, then equally, if the timeline 'tilts [...] into a vertical axis, a cross-section of multiple embodied stories [...] making its many story times visible at a glance' (Bosnak 2007: 39). In suggesting that emotions are 'fully embodied states existing throughout the physical body', he further explains that dreaming could be considered to be 'a simultaneous spatial experience of multiple embodied emotions' (Bosnak 2007: 38). He uses the term 'image-presence' to explain the environment, or space, we might find ourselves in when experiencing the embodied imagination. For Bosnak, the process of embodiment precedes any mental or emotional knowing. For him, embodiment is the fundamental archaic way of knowing (Bosnak 2007: 71). This approach to, or view of, embodiment through Bosnak's embodied imagination can be related to the digitally embodied experiences in VR and the mixed reality spaces of the twenty-first century.

According to Mark Hansen (2006a, 2006b), in the first part of the twenty-first century there was a repositioning of the body in relation to technology within new media arts practice. Hansen's claim, along with others at that time (Ihde 2002; Biocca 1997, 2006; Hillis 1999; Pallasmaa 2005), is that the eye no longer

dominates, and it is now the body that mediates our experience 'in the ensuing shift from perception to affectivity' (Hansen 2006b: 13). He argues that, because of new media technologies, there has been a move away from the image based on 'perception' to that of embodied experience. The question, or rather the inevitability, that new technologies are changing us was taken up by Jean-François Lyotard as he suggests that 'technology wasn't invented by us humans. Rather the other way round [...] any material system is technological if it filters information [...] if it memorizes and processes' (Lyotard 1991: 12). In what he terms the 'myth of disembodiment', Steve Dixon, in *Digital Performance* (2007), claims that as bodies embody consciousness, 'to talk of disembodied consciousness is a contradiction in terms' (Dixon 2007: 212). In the context of digital arts practice, Bolter and Gromala note that digital artists in particular:

> insist on the materiality of their work. They will never abandon or disparage the ways of knowing that the senses give us. For them, even the experience of seeing is not disembodied; it is visceral. Seeing is feeling. What fascinates digital artists is the ways in which their embodied existence is redefined in cyberspace. So, they use digital technology to examine the interaction between the physical and the virtual.
>
> (Bolter and Gromala in Dixon 2007: 216)

Of course, beyond the visual arts, embodiment is further explored through the performing arts, mixed reality and virtual practices in theatre (Popat 2016), and through dance and the philosophies of technology outlined in studies such as Susan Kozel's important work *Closer: Performance, Technologies, Phenomenology* (2007).

The art and science of embodiment

Slightly earlier in 2005, Sian Ede wrote 'a new aesthetic phenomenology is emerging via advances in digital technology which might lead us to muse how far the paradoxically named "virtual" [actually] brings us closer to lived experience' (Ede 2005: 111). How do artists and scientists approach the question of how the body relates to consciousness in the context of new technologies? Neuroscientists Emily Cross and Luca Ticini suggest that 'art, like everything else we do, is generated from electrical impulses passed between the synapses of the brain, expressed through the body, and eventually appreciated through the senses' (Cross and Ticini 2012: 11), whilst Ede writes that 'we so sensuously inhabit our bodies that it is hard to see them as systems of knowledge, even in the purified arena of the laboratory or operating table' (Ede 2005: 133). It is often in the investigations of artists that we can find reflections on the subjective relationship between the

body, consciousness, and embodiment. Susan Broadhurst devotes a whole chapter in her book, *Digital Practices* (2007), to the topic of neuroaesthetics, commenting that 'as scientific research progresses bringing increased knowledge of how visual imagery is constructed [...] that ultimately leads to a questioning of the very nature of our consciousness, identity and being' (2007: 47–48). Yet Cross and Ticini cite Anjan Chatterjee in his caution that future studies in this domain should make clear what neuroscientific data add to the study of aesthetics that behavioural experiments alone cannot achieve (2011: 14).

In discussing the sense of telepresence[2] in new media technologies in the early 2000s, artist Toni Dove writes about her experiences of making *Spectropia* (2005), an interactive performance piece using responsive interface technologies. She likens the experience of the user to the experience of swimming: 'this is a different form of attention – a kind of sustained tension which creates a space for reception; vertical eruptions in a horizontal field of time' (Dove 2006: 67). She discusses the effects of the embodied interface and the use of 'flow' rather than the 'cut' as the architecture for the media experience. For Dove, this charged space is a key characteristic of telepresence: 'it is the space through which the body extends itself into the movie or virtual space. It is the invisible experience of the body's agency beyond its apparent physical edge' (Dove 2002: 210). This space, between real space and the virtual space of the screen, is the charged space described by Dove; this is the space where the experience of telepresence is acted out. This is the same charged space that can be experienced when interacting with a virtual character[3] in Luc Courchesne's interactive film installation, *Landscape One* (1997), being invited to go on a journey in a park in Montreal, Canada. These are the similar imaginary and metaphorical spaces that Andrea Zapp describes in her book *Networked Narrative Environments as Imaginary Spaces of Being* (2004). Additionally, the augmented spaces created in *Human Avatars* (2005), an interactive installation also by Zapp, construct a visual dialogue between real and virtual participants on a networked stage, as the visitors in the exhibition space discover a wooden hut that they are invited to enter. A live image of the visitor was projected inside a model version of the hut seen, and the disproportionately large faces were then seen at the windows of the second hut. These three examples of artistic practices that engage with new technologies as spaces of interaction, telepresence, or spaces to engage in the nature of physical versus virtual space point to the contribution artists were making in further exploring and examining new technological applications in the first part of the twenty-first century. In turn, this book is brimming with examples of artistic interventions, which I would argue significantly contributed to human understanding of digitally embodied experience. There are even many examples throughout this book that highlight how and what is actually an entwined connection between the arts and technology, and another with the

arts and science, and yet another with the sciences and technology, and together they develop whole new avenues of research, artistic production, and sometimes broader cultural applications.[4]

Consciousness, cognition, and embodiment

With this dual approach of the arts and the sciences to further understand embodiment and in particular digital embodiment, a question that has occupied researchers and artists alike is what happens to the brain in digitally embodied experience? The Digital Agenda for Europe and the Human Brain Project aims to better understand and improve our knowledge of the brain and its working processes, and through advancing research in the field of neuroscience, a number of studies now show a developing understanding of the level of the plasticity of the brain itself (Greenfield 2014). There have been studies of how the brain reacts in digital space demonstrating significant effects on the emotional, psychological, and perceptual experience and health of the participants (Morie et al. 2011; Cross and Ticini 2012; Wu et al. 2016). Other studies have focused on the experience of the body and the self in digital space (Cleland 2010; Doyle 2011; Veerapen 2011), and on concepts of identity in relation to the digital self (Attrill 2015). Sociologist Jonathan Harth notes that:

> Due to the steady expansion of virtual reality (VR) applications in the entertainment sector and in various fields of science, immersive experiences increasingly emerge as an empirical object of research […]. These virtual experiences concern central areas of selfhood, identity and embodiment.
>
> (Harth et al. 2020: 1)

These advances in neuroscience, body sensor monitoring, multi-sensory perceptual understandings, and how people can be psychologically enhanced by such experiences are opening up new ways of creating meaningful VR and mixed reality experiences.

To return then to the question of how the brain responds to digitally embodied space, there are two initial themes that emerge: first, the question of how, and to what extent, our brains accept the perceptual 'reality' of digital space as though the person inhabits that space and therefore its response to varying degrees of 'digital illusion'. Second, the question of how the brain understands and interprets body ownership in digital space. There are a number of cognitive neuroscience research labs around the world that are focusing on the question of body ownership in virtual space (Petkova and Ehrsson 2008; Spanlang et al. 2014). In particular, the

research work of Mel Slater, co-director of the eventLAB (Experimental Virtual Environments for Neuroscience and Technology) at the University of Barcelona alongside co-director Maria Sanchez-Vives is of interest in this context. Their research in the field of body ownership and illusion involves research in understanding the impact of body ownership on changes in social attitudes such as reducing implicit racial bias (Banakou et al. 2020) or the concept of presence in VR (Slater 2009). In his recent article, Slater argues that VR can generate illusions that are not possible with other media. He explains further that 'here we mean illusions in the sense that people have perceptions that arise from digital sources that are totally different from what is actually being perceived' (Slater et al. 2022: 2). However, working with Sanchez-Vives Slater explains that their interest in working with VR goes beyond that of simply recreating the illusion of space and:

> has focused on using VR to transform the self. This work, inspired by and contributing to the field of body ownership illusions as studied in cognitive neuroscience points to an additional power of VR: Change the self not just the place.
>
> (Slater and Sanchez-Vives 2016: n.pag.)

There are, of course, other ways neuroscientists are utilising media spaces in order to further develop research in understanding how the human brain reacts to mediated space. Finnish filmmaker and researcher Pia Tikka has developed her research in what she terms 'enactive cinema' taking a neuro-cinematic approach to researching how the brain reacts to cinematic stimuli. As Tikka notes, the field of neurocinematics 'refers to neuroimaging experiments that use cinematic stimuli to study human behaviour' (Tikka 2012: 2). In response to the themes of embodiment in the *Astronauts and Avatars* symposium,[5] her discussion focused on two ideas from the point of view of neurocinematics. She explored on the one hand, the idea of embodiment and the situated physicality of the body on the cinema screen, and on the other, the antithesis of this idea 'introduced in terms of virtual realities that conflict with the experiential embodiment. These reflections lean on empirical explorations of cinematic narratives by a means of functional magnetic resonance imaging (fMRI)' (Tikka in Doyle 2017: 78). Tikka explains that, of course, the idea of embodied mind dates back to William James, Edmund Husserl, and Maurice Merleau-Ponty, among others. However, she argues that gradually it has also been accepted within the field of neurosciences, together with the idea of enactive cognition introduced by Francisco Varela and colleagues (1991) and that of embodied simulation by Vittorio Gallese (2005). Tikka explains that while the first refers to the inseparable situatedness of a subject within the surrounding world, the latter refers to the unconscious neural body–brain–world interaction dynamics (Tikka 2008). In 'Nerves of data: The neurological turn in/against networked media'

(2011), Anna Munster has reservations about the 'turn' towards neuroscience as a way of explaining a person's response to media stimuli. She explains:

> If the 'neurological turn' in and against networked media is a nebulous forking pathway, stretching its tendrils across a range of heterogeneous neurosciences, neuroscientists, networked media entities and media theorists, it is nonetheless materially embedded in the techniques and visuals of functional magnetic resonance imaging. Functional Magnetic Resonance Imaging (fMRI), with all its promises and claims to be an *in vivo* lens; a real time mind movie; the soundtrack to the brain's activities.
>
> (Munster 2011: 3)

Arguing for an approach that is more in keeping with the materialities that neuroscience now assigns to the brain, that of plasticity and dynamism, Munster argues that these images need to maintain their dynamism and their connection to the very virtualities that they ascribe to (Munster 2011: 18).

Turning to the field of the cognitive sciences and to more recent theories of '4E Cognition', a term attributed to philosopher and cognitive scientist Shaun Gallagher attempts to bring together, Mathew Henley highlights 'a group of overlapping accounts of the nature of cognition' (2021: 130). Mia Burnett and Shaun Gallagher comment that 4E Cognition itself includes a variety of approaches but is 'typically listed as embodied, embedded, extended and enactive, but sometimes including ecological – and do not form a unified theory' (2020: 158). Henley notes that there is a continued debate as to the precise definition of these terms, but more generally *embodied cognition*, as already described and further discussed in Chapter 2, is understood to be a mental phenomenon that is more closely associated with the whole-body experience as opposed to merely something that occurs in the head or brain. In *embedded cognition*, a mental phenomenon is dependent upon the environment it finds itself in, whereas a theory of *extended cognition* is constituted by a bodily interaction with that environment. As already noted above in the work of Tikka, *enactive cognition* constitutes a co-relationship between the body and the environment in cognitive terms. As Henley notes, 'for enactivists cognition does not simply provide us with information about the world, cognition is the mode by which we transform, and are transformed by, the world' (2021: 130). The concepts and working theories surrounding 4E Cognition will be useful to us in the coming chapters in terms of defining the particularities and the range of immersive, interactive, and embodied experiences that are discussed.

From the field of philosophy, and proponent of the extended mind, David Chalmers has recently focused his attention on the philosophical challenges of virtual worlds in his book *Reality+: Virtual Worlds and the Problems of Philosophy* (2022). Chalmers claims that this study has an approach that he

terms Technophilosophy, a two-way interaction between philosophy and technology, rather than the approach of the Philosophy of Technology. He claims that the Philosophy of Technology asks philosophical questions about technology whereas Technophilosophy goes beyond this to also use technology to help answer traditional philosophical questions (Chalmers 2022: xviii). Taking up the discussion that Slater develops above, he argues that, while Slater has developed the most influential work on how VR affects the human mind through illusions, that of the place illusion and the plausibility illusion, and indeed that of the body ownership illusion, he is in fact wrong about the idea that this about 'illusions' at all (Chalmers 2022: 204–06). Whilst he agrees that Slater is right in asserting that VR creates a 'visceral sense of place, plausibility, and embodiment', Chalmers claims that rather than this being an illusion, it is rather that VR devices should be more appropriately called 'reality machines' as they in fact involve non-illusory perceptions of real VR (Chalmers 2022: 205–06).

Hybridity as a concept: Towards a post-hybrid approach

> *Our multiple bodies [...] our proliferating identities will always follow paths into the future figured by the contingent, the complex and the hybrid.*
>
> (Kroker 2012: 144)

A UK government report that was already produced a decade ago sought to investigate how people's identities were to change over the coming decade. It already concluded then that 'people's identities are, and will continue to be, significantly affected by several drivers of change and in particular the rapid pace of developments in technology' (Future Identities 2013: 1). The report further suggested that rather than the internet inherently changing us, it has been 'instrumental in raising awareness that identities are more multiple, culturally contingent and contextual than has previously been understood' (Future Identities 2013:1). In truth, I argue that it is both. Our identities have always been more multiple than previously understood (and here is the digital light shining), but in turn, we are also Haraway's cyborgs, figured by the hybrid.

Chalmer's techno-philosophical approach can perhaps be termed a hybrid form, that of the inter-mixing of the philosophical with technology and vice versa. It is important at this stage to define or shine a digital light on the term hybrid. It can of course be used both as a noun and as an adjective. As a noun, it is often used to describe a mixture of things, be it a hybrid animal or plant made from two usually very different types or kinds of animal or plant. It can be used to make an improvement to a plant or an animal's characteristics or hybridised in order to create a form of

novelty for instance. It can also signal a combination of two very different approaches such as mixing musical styles for example. The use of the term hybrid has surely increased in the last two decades, the most common use of the term hybrid is that of the form of a car that runs on two forms of energy, and still retaining the qualities related to both of them. An impact of the global pandemic in 2020 and 2021 is an increased acceptance of the creation and operation of hybrid spaces for work, education, and governance for example. The development of the hybrid, and of hybridity itself, must be an inevitable approach in the twenty-first century. The notion of a hybrid is something that is 'both this and that' not necessarily at the same time – but co-existing and simultaneously being available to be called upon. If there has been a call for interdisciplinary and multi-disciplinary practices to solve the complex issues of an increasingly complex world, a further call for hybridity, particularly as part of the fabric of digital technologies as they evolve further, could also make sense. Or should we be looking for something much more intertwined? Should we be looking to a new term about hybridity – should it be something akin to a post-hybrid approach?

A post-hybrid approach to embodied cognition

BeAnotherLab is an interdisciplinary art collective whose main base is in Barcelona, Spain although the nine, strong, art collective is distributed worldwide (currently in Amsterdam, Paris, Zurich, Sao Paulo, and New York) collaborating globally. BeAnotherLab is the recipient of the 2017 STARTS Prize Honorary Mention for its work *Library of Ourselves*, an interdisciplinary and distributed project to create transformative encounters between communities in conflict. Described by the collective as an open book of embodied narratives, the ongoing archive of the *Library of Ourselves* is composed of stories recorded from first-person perspectives of individuals belonging to various communities. Formed almost a decade ago, the nine members of the collective are from wide-ranging backgrounds such as anthropology, digital arts, cognitive science, and conflict resolution.

Philippe Bertrand, a member of the BeAnotherLab collective, notes a number of 'disciplines have investigated the interconnected empathic abilities behind the proverb "to walk a mile in someone else's shoes" to determine how the presence, and absence, of empathy-related phenomena affect prosocial behavior and intergroup relations' (Bertrand et al. 2018: n.pag.). In their early works, the collective often used a short quote by Giacomo Rizzolatti, the neurophysiologist who discovered mirror neurons citing 'how bizarre it would be to conceive of an I without an us' (Rizzolatti and Sinigaglia 2008: n.pag.) as a tag line for their research. In fact, the longer quote describes how the perception of emotions – of experiencing someone else's emotions – activates the same part of our brain as when we experience the same emotions ourselves:

> Emotions, like actions, are immediately shared; the perception of pain or grief, or of disgust experienced by others, activates the same areas of the cerebral cortex that are involved when we experience these emotions ourselves. This shows how strong and deep rooted is the bond that ties us to others, or in other words, how bizarre it would be to conceive of an I without an us.
>
> (Rizzolatti and Sinigaglia 2008: n.pag.)

This encapsulates the aims of BeAnotherLab in terms of their motivation and desire to encourage and enable empathy in others. The underlying conceptual logic of their approach is that through a better understanding of embodied cognition we can enable others to have a greater experience of empathy. However, there appears to be a less of an agreement within the cognitive sciences as to what empathy actually is. Dan Zahavi and John Michael in 'Beyond mirroring: 4E perspectives on empathy' argue that the notion of empathy does not, in fact, have a long history (2018: 589). They explain that the German term '*Einfuhlung*' was introduced into the field of social cognition in the early part of the twentieth century as a way of expressing our basic understanding of others in the context of interpersonal understanding. Zahavi and Michael cite the work of Paul Bloom that empathy relates to a process, whereby we 'come to experience the world as others do, be it through imaginative perspective taking or by some kind of affective matching' (2018: 589). Others would argue that it is neither a point of imagining or indeed and affective response that creates empathy. This discussion warrants further investigation in the context of immersive technologies, particularly in light of the power of VR in placing a viewer in another's point of view.

In discussing the significance of embodied experience in an interview with Marte Roel, a member of the collective explained:[6]

> I am very intrigued by it [embodied experience] as well. That's what I study in the lab. I study embodiment and disembodiment, or alterations of embodiment in clinical populations, but also in the healthy population. I think there is a very ontological question in my understanding of embodiment […].
>
> There's one ontological and one epistemological. The ontological one is this understanding of the body as an almost liquid entity that is boundless, because it's very difficult to define it's boundaries, both objectively and subjectively, and that it's sort of merging with the environment. On the one hand, it speaks of some sort of togetherness, that we are bound necessarily to the environment. So, that's one of the ontological premises of my exploration of embodiment.
>
> Then, I think, epistemologically it's more about para-linguistics and the knowledge value of non-linguistic communication, which can be both seen as the song in language, the prosody, the phrasing, [or] the rhythm of conversation. I think of this voice as a

> limb, coming out and dancing with another person's limb, and merging and melting. I think we [BeAnotherLab] understand the body and communication in this way. We also understand knowledge as beyond formal, logical knowledge and understanding.
>
> (Roel 2020: n.pag.)

Roel studied his MA in Digital Arts before he decided to undertake his Ph.D. in Neuroscience. This fluid crossing between the Arts and Sciences is a striking feature of a number of members of the collective. In fact, every member has at least two areas of specialism that they are comfortable moving between.[7]

Embodiment systems and The Machine to Be Another *(*TMTBA*)*

Following their formation as a collective, the 'embodiment systems' of BeAnotherLab have undergone essentially three stages of development: (i) First, the development of the *Machine Classic*, which facilitates a Body Swap for one person, and the second person is a performer; (ii) second, the development of *TMTBA* as a two-way swap, not a performer but two users. An example where the collective has used this, with much media attention, is in the gender body swap (where a male and a female swap bodies); and (iii) finally, the *Library of Ourselves* (using *TMTBA*) was developed as a form of embodied storytelling. There is a pre-recorded narrative that the user listens to, and the second person is the performer, enhancing the experience through touch and smell. *Library of Ourselves* is a reconfigured form of documentary film-making. Their work with *Library of Ourselves* will be discussed further in Chapter 6.

BeAnotherLab gained an earlier recognition for their *Machine to be Another* – their 'embodiment system' was given an Honorary Mention at the Prix Arts at the Ars Electronica festival in 2014. The collective described it as: 'Designed to address the relation between identity and empathy. The project merges performances with protocols of neuroscience experiments, in order to offer users an immersive experience of seeing themselves in the body of another person' (Bertrand et al. 2014: 1).

Bertrand explains that *The Machine to Be Another* is inspired by embodiment studies and 'allows users to see themselves in the body of real human beings (captured by video) instead of using computer generated images' (Bertrand 2019: n.pag.). In further explaining the motivation of *TMTBA*, Roel reflects that:

> I very much like the allegory of stepping into another person's shoes. Even the name, *The Machine to Be Another* is very evocative. I think it's one of the ways, at least in my personal practice, I explore what I have mentioned before, this boundlessness of the body, this plasticity, this capacity to embody radically different bodies.
>
> (Roel 2020: n.pag.)

Curious about how they shared their knowledge across the collective, I discussed this in my interview with member Norma Deseke, an anthropologist. Deseke explained that both Marte Roel and Phillip Bertrand had decided to do a Ph.D. in neuroscience to further understand what the 'embodiment system' is achieving in scientific terms. She went on to explain that they wanted to learn more about how knowledge production works in the sciences. But, she notes, 'I think it's not easy for either of them, because of the restrictions and limitations that a scientific working environment has' (Deseke 2019: n. pag.). However, Deseke explains that the scientific work does not determine what *TMTBA* is, 'it's just a way of expressing a certain way of producing knowledge in another field […] that's what I also do in anthropology. I take the machine, and I try to explain it through anthropology' (Deseke 2019: n. pag.). In articulating the differences between working in the arts rather than in the sciences, Roel comments that, 'they are more inclusive than the scientific field that I'm working on, which tends to be extremely positivist' (Roel 2020: n.pag.). He continues:

> I do believe in empirical science. It's not that I don't. I think we would fall into arbitrariness if we didn't trust some of the principles of science. But I also find it limiting […]. Some of the things that I'm studying are very related in terms of the techniques that we do with BeAnotherLab, so there is some validation of some of the methods that we use.
>
> (Roel 2020: n.pag.)

BeAnotherLab epitomises what I would argue could be considered beyond an interdisciplinary practice and even beyond what Cherene describes as anti-disciplinary. In fact, it may be a clear example of an emerging form of post-hybrid practice.

Conclusion

This chapter stakes its claim on the significance of embodied experience in relation to the digital and argues that this is the most significant interpretation of its power and impact on, and in, the contemporary world. The ability of so many fields of research studying the effects of digital embodiment attests to the enormity of its potential impact. I argue that we need to understand what the potential of digital embodiment is, and it is through its study through a whole range of fields both in the arts, in the social sciences, and in the sciences that this can happen. Further to this, as Chalmers claims the space created for and of virtual worlds and in turn our experience of digital embodiment enables us to ask, and perhaps sometimes even answer, some of the philosophical questions that new technologies continue to cast its digital light upon.

Taking a phenomenological approach and indeed privileging the body over the eye enables us to interpret the spaces created and highlights the contribution that artists consistently make to the perceptual understandings and potentials within it. Notable too are the scientific studies that engage with embodied experience and the chapter highlights the tensions between the interpretation of the data captured through neuroscientific means and the lived experience of the body that the brain inhabits. However, the cognitive sciences, further supported by techno-philosophy, certainly show promise as ways of interpreting both the phenomenological account of being immersed in virtual space and how our cognitive forces deal with it. In particular, drawing from 4E Cognition as a way of bringing together concepts of enactive, embodied, embedded, and extended cognition will be useful in interpreting mixed reality spaces that is further discussed in 'Chapter 8: Augmented, Mixed, and Extended Realities'.

The chapter puts forward the idea of moving beyond a traditional view of interdisciplinary practices – what could be termed hybrid practices across different and sometimes surprising fields research and rather develop an understanding of post-hybrid practices that find new disciplines within the spaces between the fields. The research undertaken by BeAnotherLab exemplifies the potential of this post-hybrid approach to the complex research needs of the study of embodied technologies (although in truth their interest does not lie in technology per se) and the power of the collective. Collectives invariably set out a different value system and the values that the members of the collective have are acutely shared. Their use of technology is absolutely a tool, and the more recent boom in VR has only served to aid them in the development of their projects rather than direct them. Their ability to fluidly work across the arts and the sciences has developed their work and their understanding of embodied cognition in a unique way.

In the following chapter the focus moves to a deeper theoretical exploration of the relationship between virtual space, the imagination, and the digitally embodied experience. In particular it interrogates how both the concept and experience of time and of virtuality itself supports our experience of immersive technologies.

NOTES

1. MUDs: Multi-user-dungeons are shared textual environments where users can move between rooms, interact with each other, and manipulate virtual objects, all of which are described in text form.
2. Marvin Minsky is generally attributed to first using the term 'telepresence' in *OMNI* magazine in June 1980.
3. I was fortunate to experience this piece at Ars Electronica 2000 in Linz, Austria. It was my first experience and later my understanding of a particular form of telepresence that I take up in the next section on enactive cognition.

4. Many examples of interactive concepts have been developed by artists and then rolled out into the mainstream such as the Wii in 2006.
5. I first met Pia when she came to my University to give a talk and I subsequently asked her to speak at a symposium in Helsinki in 2015. The *Astronauts and Avatars* symposium is discussed further in 'Chapter 3: The Gravitational Body'.
6. Marte Roel completed a Ph.D. in neuroscience at the University of Zurich in Switzerland.
7. This was borne out through my interviews with eight of the nine members of the collective.

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2

Imagination, Space, and Immersive Technologies

We can think of the virtual as the shadows within the body of what it might mean for the very materiality of our bodies to be a weave of flesh and shadow, tangible and intangible.

(Kozel 2007: 138)

Introduction[1]

The chapter investigates the relationship between imagination and digital embodiment in the context of immersive technologies. What are the appropriate conditions and context for the study of the imagination, and the study of imaginative states that are, as Edward Casey notes, 'remarkably easy to enter into' (Casey 2000: 6) and how can this enable us to further understand digitally embodied experiences? In commenting on the imagination Edward Casey notes that 'imagining is easy enough to enact as experience, but it is extremely difficult to capture in midair for the purposes of scrutiny and examination' (Casey 2000: 4), and further, 'it's very ephemerality renders it resistant to conceptual specification of a precise sort' (Casey 2000: 7). The imagination and consciousness share this same quality of the intangible, and yet each state is fundamental to human existence. In the previous chapter, we saw how various fields approach the study of embodiment, and here, in order to give a broader understanding of the different elements that contribute to our experience of digital embodiment, the focus is on a reading of the imaginary through contemporary writings of the virtual with particular reference to our experience of technology-mediated spaces and other forms of immersive technologies. The aim is to identify further the workings of the imagination in relation to consciousness, and in particular its relationship to the mediated experience of virtual worlds and game environments and other forms of digital embodiment. Already seen as 'a veritable *deus ex machina*; a ghostly presence that

sidles into critical debate yet rarely comes to the for' (MacCallum-Stewart and Doyle 2010: 101, original emphasis), imagination may form the crux of our understanding of consciousness experienced in the transitional spaces created between the physical world and virtual worlds and other hybrid spaces. The chapter proposes that there are new dimensions of experience emerging and a complex and multiple imaginary operating when interacting with virtual worlds, avatar-mediated spaces, and other immersive environments.

Through an examination of the relationship between the virtual[2] and the imagination, the chapter describes and locates where and what our imaginary is when moving within and between physical, virtual, and hybrid spaces. The discussion includes two sets of authors: firstly, those who have written on the virtual, and secondly, those authors who have written within the field of phenomenology and who have taken up the question of the imagination. The philosopher Gaston Bachelard's writings on the material and dynamic imagination are discussed, along with his theories of the literary imagination and those of dreams and reverie (Bachelard 1969, 2005). The chapter also explores Jean-Paul Sartre's theory of the imagination as presented in *The Imaginary* (2004) and considers the work of philosopher and phenomenologist Maurice Merleau-Ponty who is not regarded as a theorist of the imagination or of the virtual per se, but whose writings in *The Visible and Invisible* (1968) are important in linking the two concepts together.

A question that directs this discussion is to what extent the virtual has changed our framing of the imaginary. How does our experience of space in virtual worlds and virtual immersive environments impact our experience of the imaginary and the imagination? Does the coupling of the two terms, the virtual and the imaginary, shed light on new relationships and experiences of both space and time and lead us to a greater understanding of consciousness and digitally embodied experience itself? In turn, to what extent can virtual and immersive space create a sense of place and what relationship does this have to our deepened sense of embodiment in that space?

On the virtual and imaginary

Casey commented in his book *Imagining: A Phenomenological Study* (2000) that, at the time of its first publication in 1976, a 'concerted phenomenological study of the imagination had yet to be done' (Casey 2000: xi). In fact, even since Casey first wrote his book, a substantial study of the virtual and the imaginary together has yet to occur. There have been some passing associations, such as philosopher Brian Massumi's link to the imagination as a 'mode of thought' that is most suitable to the virtual (Massumi 2002: 134), or that of Pierre Levy, describing the imagination as one of the three vectors of the virtual (Levy 1998: 28).

As a starting point for the dialogue on the virtual and the imaginary, they are placed in direct relation to each other (with the two terms on an equal footing). This pairing throws up some initial thoughts on what pulls or pushes them together, what attracts them, and conversely what pulls them apart. When paired together, as relatives, or at least as an associated grouping, three shared characteristics or impulses are revealed. Firstly, both terms are often associated with an 'elsewhere' or to a place or space not immediately associated with the real. Secondly, each appears to be multi-faceted, whose meaning changes quite dramatically when seen as an act or as a description, when a verb (imagine), a noun (virtuality, imaginary), or equally as an adjective (virtual, imaginary). Finally, each term can be as elusive and fleeting as the other. When identifying what would differentiate them, one can make the distinction in what may be the very impulse that stirs or moves them. In fact, other than the imagination being more closely aligned with creativity, or a creative impulse, (which does not necessarily incorporate or include notions of virtuality), one may quickly flounder in attempts to keep them separated, rather than falling back on the liminal qualities that they both share. Yet each term cannot necessarily be exchanged as freely as an initial analysis may suggest. Perhaps then, it is in the very language of describing these states or movements of consciousness within us that is where the problem lies.

On the virtual and time

Much debate has surrounded ideas of the virtual in light of the move to a world increasingly full of the digital. Authors such as Massumi (2002, 2014), Gilles Deleuze (1991), Elizabeth Grosz (2001), Pierre Levy (1998), and Susan Kozel (2006, 2007) have each written about the virtual. Grosz suggests that the coupling of the digital and the virtual is misleading although she also notes that 'the computer and the worlds it generates reveal[s] that the world in which we live, the real world, has always been a space of virtuality' (Grosz 2001: 78). Massumi goes further by suggesting that in equating the virtual with the digital, there is nothing more 'destructive for the thinking and the imagining of the virtual' itself (Massumi 2002: 137). In contrast to Grosz and Massumi's positions outlined above, there is one point where this coupling of the virtual and the digital is brought back together.

The unhinging of the virtual

What do we mean by the term virtual and when did we even begin to talk about it? Writing in 1992, Massumi described it as, 'the *unsaid* of the statement, the unthought of thought' (Massumi 2002: 46, original emphasis). For Grosz, it is 'an

augmentation, a supplementation, and a transformation of the real' (Grosz 2001: 90); for Levy, it is 'a fecund and powerful mode of being' (Levy 1998: 16); and Kozel thinks of the virtual as the 'shadows within the body' itself (Kozel 2007: 138). Grosz identifies her goal in *Architecture from the Outside* (2001), to rethink concepts such as the physical and the corporeal, as well as the real and the material 'in light of the unhinging that concepts like the virtual and the conceptual propose' (Grosz 2001: 86). In fact, the virtual that she describes is:

> Not a geometric, spatial, or technological concept, nor is it structured by phantasmatic or imaginary projections alone; rather it is the domain of latency or potentiality, given that the boundaries between the virtual and the real or the physical are unsustainable.
>
> (Grosz 2001: 86)

Grosz suggests that there is a collapsing or an 'unhinging' of the boundaries of the virtual, between what we have previously claimed to be the dichotomies of real and virtual, or physical and virtual. Kozel goes further and claims the virtual itself 'can be seen as a challenge to our standard notions of the material and the immaterial' (Kozel 2006: 137).

On Bergson, duration, and the virtual

Most readings of the virtual can be traced back to the work of the philosopher and writer Henri Bergson, who wrote in the early part of the twentieth century on memory, duration, and the virtual itself. Most readings of Bergson, a century later are, compellingly, framed by the writings of Gilles Deleuze. In fact, it is hard at times not to see through this Deleuzian lens, given that Deleuze himself writes so invitingly on the Bergsonian virtual. Grosz herself acknowledges that Bergson 'is in effect a theorist of virtuality, of the openness of the future to what befalls it' (Grosz 2001: 12). In examining the work of Bergson, and in particular in his book, *Matter and Memory* (1991), he discusses ideas of how memory works in relation to perception in which he describes 'the plane of action and that of pure memory' (Bergson 1991: 161). He explains that between the two points, that is if S represents the point of our immediate perception, and that of AB, entirely the place of pure memory, then SAB represents 'the totality of the recollections accumulated in my memory' (Bergson 1991: 152). In explaining what happens with the data that is being collected at point S, and the planes of memory within the whole of SAB, Bergson writes that what is happening consists of 'a double current that goes from one to the other – always ready to either crystallize into uttered words or to evaporate into memories' (Bergson 1991: 162).

Grosz claims that the only access we have to the past 'is through a leap into virtuality […] we move from one set of memories to another through a leap into a virtual time' (Grosz 2001: 123). Deleuze writes of Bergson's idea of duration that

> the past and the present do not denote two successive movements, but two elements that co-exist: one is the present, which does not cease to pass, and the other is the past, which does not cease to be but through which all presents pass.
>
> (Deleuze in Grosz 2001: 122)

In *Bergsonism* (1991), Deleuze writes that while the SAB cone represents 'this complete state of co-existence', each of these sections in the diagram 'is itself *virtual*, belonging to the being in itself of the past' (Deleuze 1991: 60, original emphasis). Grosz calls this simultaneity or 'the co-existence of the past in the present, the anticipation of the present as the actualization of the past […] in other words, the co-existence of two kinds of time, one frozen and virtual, the other dynamic and actual' (Grosz 2001: 26). Artist and theorist Sher Doruff, in *The Translocal Event and the Polyrhythmic Diagram* (2006), stays close to Bergson when outlining the 'distinguishing virtualities' and when she explains that the virtual 'is real, but not yet actualised. Abstract, yet real. […] It is temporally qualified rather than spatially quantified' (Doruff 2006: 78). The virtual, in this instance, has some kind of temporal base, although how the virtual is understood framed within a spatial context will be taken up later.

The virtual, the real, the actual, and the possible

Grosz suggests that 'the virtual poses no threat to the real because it is (actually) a mode of production and enhancement of the real' (Grosz 2001: 90). According to Deleuze, 'the virtual possesses complete reality, in its virtuality' (Deleuze in Levy 1998: 15). Dancer and philosopher Kozel suggests that 'the virtual is never a completely separate world; it is evident in the most mundane acts of perception' (Kozel 2006: 138). However, making distinctions between a range of words is important here: between the real, the actual, and the possible. When Grosz attempts to describe virtual reality, something that she already considers to be an oxymoron, her attempts highlight the difficulties in our language now faced with these ontological issues of 'a real not quite real, not an "actual real", a "really real" but a real whose reality is at best virtual. An equivocation in and of the real. An apparent rather than an actual "real"' (Grosz 2001: 80). Bergson gives an account of the real, as the actual and the possible, whereas Levy considers the virtual as a reverse movement, from the actual to the virtual. Kozel discusses Grosz's interpretation of Bergon's real and the possible as something rather predictable, rather

than the relationship she would consider to exist between the virtual and the actual, one of potential and surprise (Kozel 2006: 139). Perhaps Bergson's definition of the real as leading to the possible is too simplistic and too predictable a reading of the real after all.

For Massumi, 'it is the edge of the virtual, where it leaks into the actual, that counts' (Massumi 2002: 43). For that seeping edge is where 'potential' is actually found. For Massumi, there is a border, a boundary, and it is on that edge where the potential lies. Grosz writes that the model of 'inbetweenness' pervades the writings of a number of contemporary philosophers, including Deleuze, Derrida, and Irigaray, but she says 'it goes under different names: difference, repetition, iteration, the interval, amongst others' (Grosz 2001: 93). She concludes that Bergson was the first great thinker of the in-between:

> For whom the question of becoming, the arc of movement, is the most central frame. Instead of conceiving of relations between fixed identities, between entities or things that are only externally bound, the in-between is the only space of movement, of development or becoming: the in-between defines the space of a certain virtuality.
>
> (Grosz 2001: 92–93)

This suggestion of a certain kind of virtuality being attributed to this notion of the in-between can also be acknowledged in the seeping edge where Massumi sees potential to be located. Both associate the virtual with the act or development of becoming. In addition, the notion of the in-between can be reflected in the concept of the hybrid, whether made up of a combination of, for example, real and virtual, or physical and virtual, the condition of the hybrid can indeed be seen in the in-between.

The virtual and the body

The concept of the virtual body, as discussed by Merleau-Ponty and Kozel (1994), is described by James B. Steeves: 'The virtual body provides an imaginative basis for the embodied experience and enables the body schema to move beyond instinctual behaviour, acquiring for the individual a sense of freedom and personal existence' (Steeves 2007: 26).

Steeves's connection between the body and the imagination sees 'the body schema and the virtual body as two poles of a dialectic [that] constitute[s] what might be called the imagining body' (Steeves 2007: 26–27). Kozel suggests that 'the virtual does not have to be confined to a set of relations external to the body; we can consider the meaning of traces of virtuality within our bodies' (Kozel 2006: 138).

Doruff differentiates between Bergson and Deleuze's meaning, or rather, the location of experience of the virtual:

> For Bergson, the virtual is embodied, actualized from its own resources, resonant within the space of the body. For Deleuze it is the plane of immanence and the Body without Organs (BwO) and the abstract machine. The virtual is not embodied/embedded, but rather a surface-like skin.
>
> (Doruff 2006: 78)

According to Steeves, in a phenomenological analysis of perception, there are 'two essential aspects of the experience: the logic of the sensible world as it appears to the observer and the role of the observer (and most importantly her body) in the interpretation of that experience' (Steeves 2007: 37).

The virtual embodiment of people as avatars is a term used in many online worlds, according to Tom Boellstorff (2008: 128). Avatar is the Sanskrit word and originally referred to the incarnation of a Hindu god, particularly the god Vishnu (Boellstorff 2008: 128). In fact, within a digital or virtual space, an avatar is a form of stand-in for our presence within that space and can take on many forms. However, Boellstorff notes that: 'While "avatar" […] historically referred to incarnation – a movement from virtual to actual – with respect to online worlds it connotes the opposite movement from actual to virtual, a decarnation or invirtualization' (Boellstorff 2008: 128).

In this context then, how for example do we understand our avatar as our represented 'presence' in virtual and game spaces? What are we identifying with when we identify with an avatar or a virtual body? How do we understand the phenomenon of digital embodied experience in virtual worlds and immersive environments? Steeves notes that:

> Without the virtual aspect of the body schema, the body's original set of abilities could not be developed into more complex modes of behaviour. This realm of possibility exists through the virtual body, which is an *embodied mode of the imagination*.
>
> (Steeves 2007: 23, my emphasis)

In 'Performing in (virtual) spaces' (2007), Morie begins with the ontological assumption that the body has been re-contextualised in the age of digital technology. Morie claims that there is a specialised and intrinsic set of qualities of 'being' in immersive virtual environments and suggests that there has been a paradigm shift in what humans are now able to experience. I would argue that in the decade and a half since the publication of her article, this has become even more

acute in the context of immersive technologies. Morie points to the research of visual and performance artists and their contribution to the exploration of virtual environments as key to our future understandings of ourselves in the physical and digital domains (Morie 2007: 123). Morie, in agreeing with writer Katherine Hayles, sees the body as a container. Hayles suggests that the virtual body needs 'bits of information as well as bits of flesh and bone' (Hayles in Morie 2007: 124). Morie claims that 'there would be no mind as we know it without the body that engenders, contains and nurtures it' (Morie 2007: 124).

According to Morie, when a participant engages in virtual space through a third-person avatar, the form of embodied experience they take on has 'an experiential locus that is outside their perceptual self'. She explains that this is, in fact, 'in front of the experient's physical and imaginal locus' (Morie 2007: 132). The act of emplacing a body into an immersive environment signifies 'a shift to a dualistic existence in two simultaneous bodies' (Morie 2007: 127). She claims that, now, the lived body has 'bifurcated and become two' (Morie 2007: 128). This concept of the experience of multiple bodies will be further taken up in Chapter 5. In her article she explores the representation of the body, or presence, in virtual environments in five ways: as no representation/no avatar, as the mirrored self, as a partial or whole graphical personification, as a third-person/observed avatar, and the representation as experience in shared environments. She suggests that virtual environments such as those created artist by Char Davies (well known for her incorporation of virtual reality into her artistic practice) become a:

> Sacred, encompassing space, where mind transcends body even as it references the body, the felt organism even in visual absence. This body, as felt phenomenon, is how we know the world, true as much within the virtual as in the real.
>
> (Morie 2007: 133)

Morie returns to Merleau-Ponty's phenomenological standpoint as he views the body as 'the common texture of which objects are woven' (Merleau-Ponty in Morie 2007: 133), but suggests that he did not have to grapple with 'new forms of immaterial bodies beyond the phenomenal' (Morie 2007: 133) as we do now in light of new technologies and immersive environments.

On the imaginary and space

Massumi writes very little of the imagination compared to his discussions on the virtual. However, he suggests that 'imagination is the mode of thought most precisely suited to the differentiating vagueness of the virtual':

> Imagination can also be called intuition: a thinking feeling. Not feeling something. Feeling thought – as such, in its movement, as process, on arrival, as yet unthought-out and unenacted […]. Suspended. Looped out. Imagination is felt thought, thought only-felt […]. Outside any given thing, outside any given sense, outside actuality. Outside coming in. The mutual envelopment of thought and sensation, as they arrive together.
>
> (Massumi 2002: 134)

But is imagination something more than a 'thinking feeling', more than an equivalent of intuition? This chapter argues that intuition is an unexplained knowledge that is, as Massumi places it, a knowledge that is outside coming in. Yet the 'imaginary' is not static knowledge, if it is even knowledge at all. Is there an imaginary experienced as a sensation, as well as an image? Massumi's consideration of the imagination as a mutual envelopment of thought and sensation is helpful, and points to why virtual world spaces and immersive environments lend themselves so strongly to the study of the imaginary and the imagination, and in turn to consciousness itself. In particular, it is the dual experience of being there and being somewhere else simultaneously that echoes and replicates the process of the development of the imaginary in lived experience.

How do we understand our experience of the imaginary in the context of our own experience of a lived reality? Grosz suggests that things that are possible now would have literally been 'unimaginable' in Bergson's time (Grosz 2001: 117). The relevance of the term the imaginary in this chapter relates to our fundamental lived experience of reality and has a trace of the unseen, the movement in the shadows, the sense out of the corners of our eyes, the impulse of another space, somewhere. Through the emergence of technology-mediated spaces, and the development of avatar-mediated game spaces and in turn immersive technologies, it is apparent that this could be a space where the imaginary could be investigated, or as Grosz describes it, the tabula rasa, The Thing (Grosz 2001: 169–70).

Material imaginations

Bachelard was, amongst other things, a philosopher of the imagination. As a scientist, there was certainly surprise when he began his series of books on the imagination and matter, following his appointment as a professor of history and philosophy of science at the Sorbonne. Gaudin suggests that it was never really Bachelard's intention to develop a unified theory of the imagination (Gaudin in Bachelard 2005: xxxv). However, what can be taken from his many books are three main concepts that contribute to his thoughts on the imagination. Firstly, his concept of the literary imagination and the importance he places upon the

translation of forms (Bachelard 1983: 85), secondly, his concept of the material and dynamic imagination (Kearney 1998: 103), and finally, his writings on dreams and reverie (Bachelard 1969, 2005), the spirit of which actually permeates most of his writings, if not explicitly, then implicitly. There is a poetic expression and a form of exuberance evident in his writing, which is of deep significance to the way in which we could approach and interpret his theory of the imagination. Certainly, the way he writes reveals something of the 'act' of imagination, in literary form.

Professor of philosophy Richard Kearney considered Bachelard to be someone who, quite painstakingly, attempted to consider the imagination in terms of the four material elements: earth, fire, air, and water (Kearney 1998: 104). For Bachelard, 'the physiology of imagination, even more than its anatomy, is subject to the law of the four elements' (Bachelard 2005: 38). In fact, Steeves suggests that in approaching what Bachelard terms the material imagination:

> We must elicit […] not the power to recast perceptual images in a new configuration, as the image of a centaur is gleaned from perceptions of men and horses, but the imagination that gives itself to the object in its singular presentation and materiality. (Steeves 2007: 124)

Bachelard's first publication in what was to become a series of essays on the imagination of matter was *The Psychoanalysis of Fire* (1964) first published in 1938, followed by *Water and Dreams* (1983) first published in 1942, *Air and Dreams* (1988), first published in 1943, and *Earth and Reveries of Will* (2002), first published in 1945.

Objects, shadows, and forms

Writing in 1940, Sartre put forward his philosophy that the imaginary is based on our being conscious of the world and the objects in the world in a particular way. For Sartre, 'the two worlds, real and imaginary, are composed of the same objects: only the approach to these objects varies' (Sartre 2004: 57). Kearney elaborates further: 'the image and the percept are not therefore different objects of consciousness; they are different ways of being conscious of objects' (Kearney 1998: 57). Sartre sets out four modes in which the imagination posits its objects: as non-existing, as existing but elsewhere, as existing but absent, as neither existing nor non-existing. For the term 'non-existing', an example would be the image of an object that we know does not exist. 'Existing but elsewhere' is the image of an absent person or object in a particular place or space, in Shanghai or even in the next room for example. 'Existing but absent' is the image of an absent person or object that is simply absent but nowhere in particular, just somewhere; not localised in

space. The final term he uses is 'neither existing nor non-existing'. This is what Kearney describes as the dis-positional object or person that has been neutralised with regard to the positing of its existence. He gives the example of an agnostic's image of the dead Peter (or Pierre) in heaven (Kearney 1998: 58). Conversely, in Merleau-Ponty's notes in *The Visible and Invisible* (1968), he writes about his body, 'my body as an organ to be seen. i.e. to perceive a part of my body also to perceive it as visible, i.e. for the other' (Merleau-Ponty 1968: 244–45). He continues:

> Around each part of the body, a halo of *visibility* – But this visible not actually seen is not the Sartrean *imaginary*: presence to the absent or of the absent. It is a presence of the imminent, the latent, or the hidden – Bachelard [is] saying that each sense has its own imaginary.
>
> (Merleau-Ponty 1968: 245, original emphasis)

In this working note,[3] Merleau-Ponty brings together ideas and comments about Sartre and Bachelard and emphasises that this halo of visibility around each part of the body, this presence of the imminent, the latent, or the hidden is linked much more closely to Bachelard's philosophy than to Sartre's.

Imagining bodies

Through a phenomenological analysis of our experience of virtual space, it is Don Ihde that argues that there is 'a variation between what would be called full or multidimensional experience and a visual objectification of presumed body experience'. He continues: 'Where does one feel the wind? Or the vertigo in the stomach? Can it be felt "out there" in the disembodied perspective? The answers quickly show partial primacy to the embodied experience' (Ihde 2002: 4).

In exploring these ambiguities in virtual space, Ihde suggests that this duality of experience lies between what he terms the here-body and the image-body. In particular, when our presence is identified through a third-person avatar perspective, Ihde suggests that we move between the full multi-dimensional experience of the here-body and the disembodied experience of the image-body perspective, as represented by the image of the avatar (Ihde 2002: 6). The here-body is where we can have a full, multi-dimensional experience, 'whereas the visual objectification out there is spectacle like' (Ihde 2002: 4). The image-body is where the body of the avatar lies. As Ihde explores the ambiguities experienced in virtual space, particularly when our presence is identified through a third-person avatar perspective, he suggests that this is 'the opening to a sliding perspective from the multidimensional experience of my here-body toward the image-body perspectives [that] lie within these ambiguities' (Ihde 2002: 6). If Bachelard suggests that

we dream over the material elements, whether metaphorically through the earth or air, water or fire, in the material imagination, and if the here-body exceeds its physical bounds (Ihde 2002: 6), does the image-body have a sense of materiality that enables us to dream over it?

Interior and exterior spaces

Here I want to briefly explore two ideas that appear to fill either side of the virtual and the real divide, both of which can be understood in terms of a sense of interior and exterior space, that of Plato's Cave and the Aboriginal idea of *Dreamtime* (Doyle 2009). Imagination in relation to the interior space of meditational practice is discussed alongside exterior space and the concept of *the Dreaming*.[4] In *Embodying Virtue: A Buddhist Perspective on Virtual Reality* (1998), Damien Keown states that the goal of Buddhism 'is to make that which is at present virtual […] real and embodied in the individual' (Keown 1998: 76). For him, meditation can be defined as an altered state of consciousness, induced in a controlled way (Keown 1998: 82). He makes distinctions between different states that we might find ourselves in on a normal day and says that in fact, much of waking life is 'punctuated by daydreams, reveries and fantasies in which the mind withdraws to contemplate an interior landscape' (Keown 1998: 82). In *Conditions for the Imaginary in Virtual Worlds* (2008), I noted that the imaginary landscapes generated by visualisation practices and meditational techniques in the Vajrayana tradition of Tibetan Buddhism and the Hindu Tantric tradition are a deliberate form of virtuality (Doyle 2008: 148). In fact, 'With their focus on the particularity of the image these landscapes are not intended to be materialised: this pristine and deliberate virtuality is used as a tool for developing and transforming the body and mind' (Doyle 2008: 148).

The article detailed the stages of Tattwa Shuddhi, a meditational practice where the practitioner visualises a complex set of stages using five *tattwas*[5] which correspond to the five elements, earth, water, fire, air, and ether. An additional element, that of ether,[6] is used here, compared to the systems of the material imagination as developed by Bachelard, and to an extent, taken up by other phenomenologists working at varying times (Merleau-Ponty 1968; Steeves 2007).

With an emphasis on embodied experience in virtual worlds, parallels can be drawn between these yogic practices. Central to both the trained experiences of visualisation in meditation and our experience of presence in virtual worlds is the imagination. Both experience virtual and imagined spaces as real, whilst they are not actual. The Aborigines see imagination and dreams as 'a' version of reality, and *the Dreaming* determines 'the conditions of existence for all living things' (Rose in Donovan 2002: 11). Moreover, it is the boundaries that are identified as having transforming powers and indicate something quite specific:

> To say that there are boundaries is to say that there are differences; the universe is not uniform. Unlike European maps on which boundaries are lines that divide, tracks connect points on the landscape, showing relationships between points. These are the boundaries that unite. The fact that a Dreaming demarcates differences along the line is important to creating variation, but ultimately a track, by its very existence, demarcates a coming together.
>
> (Rose in Donovan 2002: 11)

In contrast, Plato believed the sensual world to be imperfect as it was constantly changing and in flux. Or as Jones puts it, 'what was perceived as reality was actually the virtual because the perfect forms of the real universe – truth, light, knowledge – were beyond apprehension' (Jones 2006: 5). The imaginary, then, maybe a residue after the act of imagining; and it could also be our approach to imagining, our framework, what we lay over the imagination as a construct and percept of experience. We can see from Bachelard that he associates the state of the imagination closely with nature itself. But, to what extent would we dream over nature, as opposed to dreaming over what surrounds us in the more familiar, increasingly, and more frequently occupied, virtual space and immersive environments?

Time–spaces of the virtual and the imaginary

According to Bachelard, when philosophers are confronted with a notion of outside and inside, they think in terms of being and non-being (Bachelard 1994: 212). In this section, a Groszian reading of time and space in light of the virtual is more closely examined. Of the notion of the in-between Grosz writes that: 'One could say that the in-between is the locus of futurity, movement, speed; it is thoroughly spatial and temporal, the very essence of space and time and their intrication' (Grosz 2001: 94).

Author and writer Jay Griffiths in *A Sideways Look at Time* (2004) describes time as *mythic*, or *silvered*, as *timeless time*, and even *distant time*, and 'time as another dimension of the present' (Griffiths 2004: 65). In fact, she notes that:

> [Once] you could say that time was so local that for every *genius loci*, a spirit of specific place, there was a *genius temporis*, a spirit of specific time, the history of Western timekeeping has been one of standardisation and of globalisation.
>
> (Griffiths 2004: 20)

Grosz claims that space itself actually requires two kinds of time: the first being 'the time of the emergence of space as such, a time before time and space' (Grosz 2001: 110); the other being 'the time of history, of historicity, the time of reflection,

the time of knowledge – a time to which we are accustomed' (Grosz 2001: 111). In Grosz's examination of the time and space of architecture, she explains that she is interested in:

> the relevance of the first sense of time, which I will represent through the concept of the virtual and virtuality, a concept that requires not only a time *before* time but also a time *after* time [...] the times before and after time are the loci of emergence, of unfolding, of eruption, the space–times of the new, the unthought, the virtuality of a past that has not exhausted itself in activity and a future that cannot be exhausted or anticipated by the present.
>
> (Grosz 2001: 111–12, original emphasis)

Grosz suggests that what Bergson did for time, we should attempt for space. In using this Bergsonian premise, she suggests that it may be possible that the qualities Bergson attributes to duration may be also attributed to space:

> [If] duration exists in states of contraction and expansion, in degrees of uneven intensity, either elaborated in increasing detail or functioning simply as 'shining points' of intensity, then perhaps space too [...] has a loci of intensity, of compression, of elasticity [...] the very configuration of space itself may be heterogeneous [...]. Perhaps, in other words, there is a *materiality* to space itself, rather than materiality residing with only its contents.
>
> (Grosz 2001: 127–28, original emphasis)

There are two aspects of this statement that are of interest here, firstly that of the potential heterogeneity of space and that it may be possible to describe its movements and configurations as a series of transitional spaces and spaces that we could more closely associate with the current use of immersive technologies and mixed reality. Secondly, the notion that space itself has a materiality to it rather than the materiality being only associated with the contents that are found within it. Grosz proposes a re-enervation of space through duration in the 'restoration of becoming to both space and time', and equally that when in 'virtual time becoming virtual space' (Grosz 2001: 120) a new kind of time–space relationship is established. The concept of hybrid spaces within a heterogeneity of space will be further discussed and explored in Section III of the book and in particular in Chapter 8.

Professor of geography, Doreen Massey, in an essay responding to the work of artist Olafur Eliasson, attempts to illustrate a set of relationships between time and space by using a narrative account of a journey between Manchester and Liverpool. In the process of travelling, she suggests, 'if movement is reality itself then what we think of as space is a cut through all those trajectories; a

simultaneity of unfinished stories. Space has time/times within it' (Massey 2003: 111). Further:

> Space has its times. To open up space to this kind of imagination means thinking about time and space together. You can't hold places and things still. What you *can* do is meet up with them […]. 'Here', in that sense is not a place on a map. It is that intersection of trajectories.
>
> (Massey 2003: 111, original emphasis)

Two interesting points emerge from this argument; firstly, if each space has a particular time, as Massey implies, then it could be that virtual world spaces and immersive environments also have a particular time (or times) attached to them. Not only, then, could there be different sets of time–spaces that may be located somewhere such as *Second Life* or emerging mixed reality environments, but the space could enable a particular reflection upon different time–spaces as phenomenal experiences. Secondly, if 'place' can be considered to be an intersection of trajectories of unfinished stories, does this challenge our understanding and articulation of what place is? Is 'place', in fact, physical at all?

On geographies of virtual space

> I have the experience of embodiment, although I know my body is virtual. Of course I do. There is little true form here, only a series of associations. I took a friend of mine to a volcano last night. He was in awe of it. In his mind's eye, in his imagination he saw before him a 'real' volcano. Well, real enough to evoke his awe. Is that not 'real' enough for it to contain a form of reality? A form of presence?
>
> (Wanderingfictions Story in Doyle and Kim 2007: 216)

The development of Kriti Island in 2007 in *Second Life* saw the online virtual space rapidly assume a sense of real presence and became a focus for collaboration, nationally, and internationally until it was decommissioned a few years later in 2014. The positioning of the island was significant at that time; the island 'next door' was maintained by artist and researcher, Jacquelyn Ford Morie, and at certain parts of the day[7] the outline of her island was visible for Kriti island itself. When our time zone allowed we would meet and share research and ideas about the virtual space we were engaging with. An artist residency that I took part in 2011 in India revealed that distinct folk art practices have developed in very specific regions and can even be linked to individual villages in the state of West Bengal, India. These folk art practices are intrinsically connected to (and are born out of) place. Certain parallels already exist between the virtual space of Kriti

Island and the physical places in West Bengal. Wanderingfictions Story (my avatar)[8] 'wanders' in her virtual place, just as the Bauls and Fakirs (minstrels) 'wander' through their place in the eastern region of the state (having already inspired many of the writings of the well-known Indian writer and poet, Rabindranath Tagore). Casey, in writing about place, considers that 'there is no knowing or sensing a place except by being in that place and to be in a place is not, then, subsequent to perception […] but is an ingredient of perception itself. Such knowledge, genuinely local knowledge, is itself experiential' (Casey 1997: 18). Yet Massey suggests that places should not be considered 'as points or areas on map, but as integrations of space and time, as *spatio-temporal events*' (Massey 2005: 130, original emphasis). Perhaps an understanding of place should be multi-layered and draw from a range of views in attempting to consider moreover the 'specificity of place' itself (Massey 2005: 130).

In her *Atlas of Remote Islands: Fifty Islands I Have Not Visited and Never Will*, (2009) writer Judith Schalansky suggests that 'the lines on a map prove themselves to be artists of transformation: they crisscross in cool mathematical patterns […] they ensure the earth retains its physicality' (2009:10). Having never travelled to these real islands (and never intending to), Schalansky pieces together information and descriptions of these imagined, yet real places. Comparing the earth represented as a globe and through the atlas she writes:

> This Earth has no borders, no up or down, no beginning and no end [whereas] in an atlas, the Earth is as flat as it was before explorers pinned down the white spaces of enticingly undiscovered regions with contours and names, freeing the edges of the world from the sea monsters and other creatures that had long held sway there.
>
> (Schalansky 2009: 11)

Rapa Iti, Pingelap, and Clipperton Atoll are but three of the 50 islands that are described by Schalansky (it is hard not to imagine Kriti Island to have been the 51st of Schalansky's Islands, full of stories yet to be told). Rapa Iti is 40 square kilometres with 482 inhabitants and lies in the Pacific Ocean as part of French Polynesia. Marc Liblin, who lived near the foothills of the Vosges in France, dreamt that he spoke an unknown language. Eventually, he meets an old woman who speaks the old Rapa of her homeland. Liblin, 'who has never been outside Europe, marries the only woman who understands him, and in 1983 he leaves with her for the island where his language is spoken' (Schalansky 2009: 72). A total of 75 of the 250 inhabitants of Pingelap in the Caroline Islands see no colour, 'not the fiery crimson of the sunset, not the azure of the ocean […]. Silly talk about the gloriousness of colour makes them indignant' (Schalansky 2009: 98). Clipperton Atoll, with barely two kilometres of land, is uninhabited. Schalansky suggests that the

very construction of an island lends itself to narrative, or to stories in literature (everything becomes a stage):

> The absurdity of reality is lost on the large land masses, but here on the islands, it is writ large. An island offers a stage: everything that happens on it is practically forced to turn into a story, into a chamber piece in the middle of nowhere, into the stuff of literature.
>
> (Schalansky 2009: 19–20)

If Kriti Island were to be described in similar ways (if her stories could be told), the space (or place) would not be unlike the islands described by Schalansky (2009). When Kriti Island was specifically placed adjacent to the virtual island of Symobia in 2007, there was barely another island nearby. By 2013, it was as though Kriti had become part of an archipelago of islands. Beyond its locality, it was hard to determine the situation of Kriti with any geographical certainty. But when I try and 'imagine' the differences and similarities between the real islands in Schalansky's atlas and Kriti, their differences seem to fade and their similarities strengthen – the island offering up a stage writ large.

Space, Lefebvre, and the Third Space

The notion that the concept of space can be seen as Cartesian, definable and contained is at odds with the concept of space as lived, as experienced such as the 'Thirdspace' that Edward W. Soja describes and is discussed further below (Soja 1996). In *The Production of Space* (1991), Henri Lefebvre attempts to define the experience of space from both a metaphysical and an ideological perspective. Initially, he outlines two terms in relation to space, that of the illusion of transparency and the illusion of opacity (or the realistic illusion). Of the illusion of transparency, he writes that the emphasis of the written word is to the detriment of what he terms social practice. In what he describes as the grasping of the object by the act of writing, he suggests that this is supposed to bring:

> The 'non-communicated into the realm of the communicated' […] such are the assumptions of an ideology which, in positing the transparency of space, identifies knowledge, information and communication […]. The illusion of transparency turns out […] to be a transcendental illusion: a trap, operating on the basis of its own quasi-magical power.
>
> (Lefebvre 1991: 28–29)

In turn, the illusion of opacity, of substantiality, is philosophically closer to naturalistic materialism. However, and most interestingly, Lefebvre continues to say

the two illusions are not necessarily in opposition to each other and do not 'seek to destroy each other'. Rather, he argues that: 'each illusion embodies and nourishes the other. The shifting back and forth between the two, and the flickering or oscillatory effect that it produces, are thus just as important as either of the illusions considered in isolation' (Lefebvre 1991: 29). This flickering, from opaque to transparent to opaque again, these oscillations, suggest a complex system of relationships between a space and the objects found in that space. Yet, Lefebvre (1991: 29) writes that it is the texture of space that allows us to create space through social practice as sequences of acts that become a signifying practice in itself.

An article by Axel Stockburger, 'Playing the Third Place' (2007), extends Lefebvre's ideas to the work of Soja and his definition of what he terms the Thirdspace. As Stockburger notes, beyond the dualism of subject and object Lefebvre suggests that spaces can be understood within the triad of the perceived, the conceived and the lived. According to Stockburger, Soja 'identifies perceived space (Firstspace) with the real, and conceived space (Secondspace) with the imaginary, leading to lived space (Thirdspace), as a field of both, imagined and real' (Stockburger 2007: 232). Stockburger continues with his interpretation in the context of game space and describes the hybrid mix between real and imagined spaces created through digital game universes as resonating strongly with the concept of Thirdspace. He notes that 'this insight is crucial because it defies the idea of computer games as merely "virtual" or purely imaginary spaces. It is precisely the interaction between real and imagined spatiality that makes this medium so compelling and unique' (Stockburger 2007: 232). A concept of space that suggests a mixed experience of both real and imagined spatiality proves to be useful when considering online virtual spaces, whether they are games-based or not.

Conclusion

> The very construction of matter is at stake when we consider the virtual: matter is permeated with ephemeral and dynamic elements, such as memory and kinaesthetic processes. Once again, we see that the virtual cannot be pinned to one side of the tenuous divide between the material and the immaterial.
>
> (Kozel 2007: 138)

This chapter has interrogated a range of definitions of the virtual and concludes that a close reading of the virtual through Grosz's writings in particular enables a new reading of the imaginary and imagination in light of the virtual. A re-reading of the imaginary in this way uncovers a new relationship between space and the imaginary where space itself (when seen as heterogeneous) can expand our understanding and

placement of the virtual and what can be seen to be the development of mixed reality spaces and immersive environments. It appears that movements of the virtual, as described by Grosz, find echoes in the description of the invisible of the visible of Merleau-Ponty, and to an extent in Bachelard's writings on the imagination. However, both of these terms, the virtual and the imaginary, remain equally illusory and equally intangible (and yet both are fundamental to any form of human existence).

In the same way that the virtual is linked with time, the imaginary can now be linked to space. The term imaginary may also be understood to have a specificity of space associated with it. This is of particular significance to this research undertaken in avatar-mediated spaces and the current development of mixed reality and augmented reality spaces. Each creates a specific and potentially unique space that necessitates the use of the imaginary in order to negotiate them. Using Sartre's philosophy of the imaginary, we may shift into, and between, spaces of non-existing, existing but elsewhere or absent, and neither existing nor non-existing when travelling between real and virtual space. It is possible to take forward notions of the virtual in relation to time, and notions of the imagination in relation to space. The nature of the virtual as a process of becoming confirms how the virtual continually reminds us of the realm of the actual. The virtual according to Grosz, has been unhinged, becoming like a kind of mobius strip rendering it possible to separate its nature from current technologies that have claimed the virtual so clearly for their own (Hayles 1999: 196).

The aim of this chapter was to explore and articulate the heterogeneous nature of space and further understand the hybrid spaces created when moving between physical and virtual worlds, immersive environments and mixed reality space. It is in a phenomenological enquiry of the imagination that experiences of time and space, and time–space relationships, can be better understood. There are varying accounts of the phenomenal experience of the body in virtual space as presented by Morie and Ihde. Each attests to some form of bodily response in virtual space and they each establish a connection between embodied experience and the represented virtual body. Connor suggests that there is a connection between the imagination and the senses, and certainly, Merleau-Ponty's late musings on Sartre and Bachelard place his ideas central to a discussion on a sense imaginary. The chapter suggests that there is a bodily base to the imagination as explored through the work of Steeves in the context of the imagining body. Not only this but the geographies of virtual space are compelling enough to understand that through our embodied experience of the virtual body, we can indeed experience place in virtual space, however tenuous. Whatever the avatar-mediated experience, whether through the virtual worlds we inhabit online or through the virtual immersive environments we navigate through, it is clear that these are rich grounds for the articulation and understanding of consciousness through

digital embodied experience and in understanding the movements (and importance) of the imagination itself.

NOTES

1. The chapter draws on previous research originally published in 'Transitional spaces: Consciousness, the imagination, and the avatar-mediated experience', in Gackenbach, J. (2012) (ed.), *Video Game Play and Consciousness*, Nova Science Publishers.
2. The chapter discusses both the pre-digital and digital notion of the 'virtual'.
3. This extract of a working note, entitled 'Telepathy – Being for the other – Corporeity' was dated April 1960. It was first published in 1968 along with the main manuscript for *Visible and Invisible*, following the sudden death of Merleau-Ponty in 1961.
4. The term used for the Aboriginal interpretation of the spiritual, natural, and moral order of the cosmos.
5. *Tattwa* means 'energy' in Sanskrit.
6. This fifth element has other names given to it by various systems including Chi or Spirit.
7. Jacquelyn lives on the other side of the world to me in California, USA.
8. Further exploration of the creation of Wanderingfictions Story and her contribution to my research practice, and the role that Kriti Island played within the research will be further discussed in Chapter 4.

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SECTION II

BODY

3

The Gravitational Body

What then shall we choose? Weight or lightness?

(Milan Kundera, *The Unbearable Lightness of Being*, 1984: n.pag.)

When we are born we pass in an instant from the dark to the light, from weightlessness to heaviness; here is our first contact with life […] our planet and its life are moulded by gravity and yet this force is the weakest in the universe. We find its mysterious presence in our bodies, in our language, and we fight against it to grow and to reach the stars.

(Mantra 2015: n.pag.)

Introduction[1]

As artist Nahum Mantra suggests our planet and the life existing on it is moulded by gravity yet for almost all of our waking (and sleeping) lives we are not aware of it. Yet as Mantra points out it is a 'mysterious presence in our bodies'; it is central to our bodily and embodied experience. It is the force that is pressing us down onto terra firma. Eduardo Kac goes even further in describing both 'gravimorphism' and 'gravitropism' as:

> The process through which gravity conditions all forms and behaviours created on Earth, including art and poetry. It may be a truism to state that gravity has a fundamental effect on our sensibility and the physical worlds and that it necessarily conditions art and poetry as well.
>
> (Kac in Murnik 2017: 30)

The decades of the 1950s and 1960s can be seen as a time when, with new tools and technologies, the exploration of the extreme limits of outer space developed new imaginaries of space itself. In a contemporary context, and since the 1990s, a

relatively small group of artists have had access to the experience of zero gravity and outer space through initiatives developed by science–art organisations such as Leonardo and the Arts Catalyst[2] that have come together to develop 'a strategy for the cultural utilization of the International Space Station programme' (Triscott 2008: 194). The Outer Space Treaty (1967) developed by the United Nations states that the use of the moon and other celestial bodies should be for peaceful purposes and forbids any government from claiming a celestial body since they are the province of mankind (Triscott 2008: 195). This chapter considers the artistic exploration of embodiment in relation to gravity at the frontiers and edges of space. With a focus on the physical body in space and in outer space, the chapter explores the practices employed by artists aiming to free their physical bodies of gravity and experience weightlessness in the artistic exploration of outer space. After a brief sojourn reflecting on outer space and virtual space, the chapter reviews the artistic practices of small yet dedicated groups of artists that each reflect upon their exploration of gravity and, at times, zero gravity. Their work can enable us to further understand the relationship between the gravity that is pushing down upon us at each moment and the way we experience our bodies and indeed how we inhabit our body. Philosopher Paul Virilio notes the impact that gravity has on us even in the way that we envision the world and it determines the position our bodies are in space:

> Our vision is actually determined by our weight and oriented by the pull of earth's gravity. […] One bound up with the delicate balancing act of a universal attraction which imposes on us its gearing towards the centre of the Earth, at the risk of our falling.
>
> (Virilio in Murnik 2017: 30)

Outer space and virtual space

Perhaps, it is a little far-fetched to compare outer space with that of virtual space, yet there are certainly threads connecting them according to independent art critic and curator Annick Bureaud:

> Weightlessness relates to cyberspace in the sense that there are no privileged directions or hierarchies. But, unlike cyberspace, weightlessness can be physically inhabited [...] weightlessness is inscribed in the limits of the self and the human body, in an inside and outside that we can see in current technological trends.
>
> (2009: 4)

According to Eduardo Kac, once the moon was first visited by the Lunik 2 spacecraft in 1959, it was Yves Klein's photomontage *Leap into the Void: The Painter of*

Space Throws Himself into the Void! (1960) that encapsulated the response 'to the visual and intellectual stimulation provided by humankind's first steps beyond the Earth [...] alluding to the new condition of the body considered, rather concretely, in relation to the cosmos' (Kac 2005: 20). The sense of reaching beyond is a thread that links both outer space and virtual space, and both change our relationship to our body, whether it is in the identification of our own body with that of an avatar, or the physical disappearance of our body in virtual reality, or in the experience of our physical body with little or no gravity applied to it.

There is a history to the relationship between art, embodiment, and technology, which spans a number of decades from the early 1990s, since early experiments in virtual environments (Davies 1995, 1998; Sermon 1992). Early writings on virtual reality (such as Damer 1998; Heim 1993; Heudin 1999; Rheingold 1991; Schroeder 2002), and the early use of virtual environments for artistic practice were explored in a series of projects undertaken at the Banff Centre, Canada, and subsequently documented in *Immersed in Technology: Art and Virtual Environments* (Moser and MacLeod 1996). A number of projects discussed placed the body at the centre of their exploration of virtual reality environments, notably Brenda Laurel and Rachel Strickland's *Placeholder* (1993), the *Archaeology of the Mother Tongue* (1993) by Toni Dove and Michael Mackenzie, and the virtual reality performance, *Dancing with the Virtual Dervish: Virtual Bodies* (1994) by Diane Gromola and Yacov Sharir. These works will be further discussed in Chapter 6. Artists such as Char Davies moved from painting to exploring virtual space in virtual environments in the early 1990s, resulting in the works *Osmose* (1995) and *Ephémère* (1998). In *Osmose*, the participant, or 'immersant', must concentrate on his/her breath as a device to navigate vertically through the spaces represented. In 'Landscape, earth, body, being, space, and time in the immersive virtual environments *Osmose* and *Ephémère*', Davies (2003: 1) says that 'within this spatiality, there is no split between the observer and the observed'. She argues that this is not tied to a Cartesian paradigm, but rather allows another way of sensing to come forward.[3]

At a similar time, a small number of artists were beginning to explore the experience of zero-gravity space and in particular the French dancer and choreographer Kitsou Dubois. Her first parabolic flight was undertaken as early as 1990 during her collaboration with the French National Space Research Centre (*Centre national de la recherche scientifique*) where she developed a training programme for astronauts based on her dance techniques. Reflecting on her experience of weightlessness she wrote (in her records of the experience):

> It was necessary to put oneself in a state of dance, this is to say to concentrate on internal bodily space and the relation this holds with the surrounding

> space as well as on the imaginary that emerges directly from this new body–space–time.
>
> (Dubois in Kozel 2007: 110)

There is a curious piece of research that links these two forms of exploration – that of virtuality and weightlessness – at this particular point in time, in the work of dancer and philosopher Susan Kozel who developed *Ghosts & Astronauts* in 1997. Drawing from her previous research, the work of philosopher Maurice Merleau-Ponty, and from reflections on Dubois's records (in *Gravite zero, un danseuse en apesanteur*, 1996) *Ghosts & Astronauts* (1997) was 'a performance experiment occurring simultaneously between the Riverside Studios and the Place Theatre London [...] connected via videoconference link [...]. Performers in each location were projected into the other for a physical exploration of intimacy, weightlessness and altered materiality' (Kozel 2007: 104). Writing (and reflecting years later) in her book *Closer* (2007), Kozel comments that 'it is uncanny to me how Dubois's experiences in microgravity converge with my experiences of telepresence in gravity' (2007: 109) (this work will be discussed later in this chapter).

Art practices at the frontiers of space

Since those early explorations in the 1990s, a whole range of artists, dancers, and other practitioners have explored and experimented in zero gravity or reduced gravity conditions. An exhibition in 2010 at Experimental Media and Performing Arts Center, Troy, New Jersey, *Dancing on the Ceiling: Art and Zero Gravity* brought together a range of explorations and projects such as Jane and Louise Wilson's video installation *Stasi City* (1997), Julia Fullerton-Batten's *In Between* (2008) photographic series (discussed below), and Arts Catalyst's *Gravitation Off!* (2004), a short film documenting what was termed 'the flying laboratory' at Star City in Russia between 2000 and 2003. Curator of the exhibition, Kathleen Forde, suggests that the works collected together in the exhibition draw on two broad themes, that of

> [firstly] the metaphorical theme of transcendence [...] and [secondly] the actual use of zero gravity, or something that looks very much like it, to evoke the force of gravity itself, which humans may attempt to defy but can never wholly escape.
>
> (2010: 1)

In 2013, an exhibition (and a retrospective of artworks conducted in outer space) entitled *Free Enterprise: The Art of Citizen Space Exploration* was held at the

University of California Riverside and brought together a host of artworks developed by 25 artists, collectives and organisations from around the world. Curators Tyler Stallings and Marko Peljhan note that 'from earliest times our sense of self has been defined by our sense of presence in the universe. The heavens have been our most significant metaphor for inspiration and vastness, voyage and possibility' (Stallings and Peljhan 2013: n.pag.). Yet now that 'we are at a dawn of a new radical change in near-earth space exploration' they stress the importance of engaging artists directly in the discussion not only on the technology and capital that allow for exploration but also on 'the imagination and the spiritual capital that create a new state of mind and allow for a broader awareness of humanity on Earth and beyond' (Stallings and Peljhan 2013: n.pag.). In 2015, *The Matters of Gravity* exhibition subtitled *A Space Mission: Artists Reflecting on Gravity by Its Absence*, curated by Nahum Mantra, presented the work of nine Mexican artists who all shared the environment of weightlessness on their zero-gravity flight at the Yuri Gagarin Cosmonaut Training Centre in Russia in the same year. The exhibition opened at the Laboratorio Arte Alameda in Mexico City and toured worldwide including showing at the Polytechnic Museum of Moscow and the University of Texas, El Paso, and returning later to Latin America in 2016. Researcher Sarah Jane Pell began her formal spaceflight training in 2016 graduating as an artist-astronaut on Yuri's Night 2016 (Pell 2017: 56). Pell describes her ambition in her project *Performing Astronautics* (2017–18) as one that aims to translate the 'first-person tacit knowledge embedded in the astronautic body' (Pell 2017: 55) in order to externalise 'how space impacts the human body/mind cadence to alter motion, rhythm, and perception of time/place spatiality in new ways' (Pell 2017: 56).

Zero-gravity flight

'I had nothing planned to make the state of weightlessness something special ... even a temporary stay in states of weightlessness and double gravity changes one's relation to the body and its terrestrial possibilities' (Ryklin 2005: 15). Professor of philosophy Mikhail Ryklin suggests that another way of sensing comes forward when physically leaving the space of our usual sensibilities, when travelling in outer space, or when experiencing zero gravity (created through parabolic flight conditions). When we lose the pressure of what holds us to the Earth's surface on our bodies (what enables us to move in the way we understand) and experience the lack of gravity as a condition of the experience, new sensibilities emerge. UK-based science–art agency, The Arts Catalyst, has been supporting artists' and scientists' exploration of zero-gravity conditions since the early 2000s. As founder

Nicola Triscott explains: 'to defy gravity is to defy the accepted, the unquestioned and the status quo. It is to embrace the unknown and to map a new territory, personal, artistic and political' (Triscott in Triscott and La Frenais 2005: 6). The agency has supported a whole host of artworks exploring outer space including *Gravity Zero* (1999) by Dubois, *Falling without Fear* (2001) by performer Morag Wightman, the film *Otolith* (2003) by the Otolith Group, and a work by Agnes Meyer-Brandis *Moon Goose Analogue: Lunar Migration Bird Facility* (2012). The organisation has curated a host of exhibitions including *Artists and Cosmonauts* (2002), *The Republic of the Moon* (2011, 2014), and *Matters of Gravity* in 2015. An example of a rather playful project supported by The Arts Catalyst is that of Ansuman Biswas and Jem Finer's *Zero Genie* (2001), where feats performed by 'genies and flying carpets of ancient myth' (Triscott and La Frenais 2005: 56) are recreated in zero-gravity conditions (see Figure 3.1). The project questions if the

FIGURE 3.1: Ansuman Biswas and Jem Finer, *Zero Genie* (2001). Photo: courtesy of the artist.

realities of shamanistic technologies are any less real than those of astronauts and cosmonauts suggesting any 'judgements of fantasy and reality are conditioned by relationships of power' (Triscott and La Frenais 2005: 56). Ryklin was on the same parabolic flight as Biswas and Finer and commented that 'I experienced a strange feeling, seeing, to my right a professional dancer turning complicated somersaults, to my left two men on flying carpets in orange turbans and red breeches, acting out Eastern fairy tales' (Ryklin 2005: 15).

During the same flight, Biswas and Finer also developed *Wave/Particle* (2001), a response to musings on 'how interstellar travellers might exercise led to a consideration of swimming pools in space, and […] a fascination with the complex behaviour of liquids in free fall' (Triscott and La Frenais 2005: 54). A crate was strapped to the aircraft floor with one glass tank full of water, sunflower, oil, glycerine, and food dye, and a second tank full of Chinese silver balls with a light box beneath and the resulting effects in zero gravity were videoed. As the colours and forms mutate in response to varying gravitational fields, the effect is like 'a surreal and sumptuous spectacle with haunting music generated by the sounds of the aeroplane and the harmonies of the metal spheres' (Biswas and Finer 2002: n.pag.). As discussed above, Dubois has been exploring the experience of zero-gravity movement for a number of years. Working with the Arts Catalyst, she produced the video installation, *Gravity Zero* in 1999, which was first shown projected onto the windows of the Lux Centre in London, followed by a number of works, *Fluid Trajectory* (2001–02), and *Analogies* (2004). Through these and other works, she cites a number of key references in zero-gravity movement such as the subjective vertical, continuous motion and the consciousness of the 'space between' as states associated with parabolic flight. Dubois suggests that in the space of weightlessness 'there is no need for a sense of balance [...] extremities of the body feel less defined and there is a sense of merging with the empty space around' (Dubois in Triscott and La Frenais 2005: 46). Further, she suggests that 'weightlessness forces [us] to build a new territory, the territory of the inner body, which has a whole geography, with landscapes and paths' (Dubois in Bureaud 2009: 7). In an earlier reflection on microgravity, Dubois notes that 'It is necessary to create subjective references in order to have a relation with the external world [...]. Once it is chosen it is possible to orient a movement around this point. It becomes a sort of subjective centre of gravity' (Dubois in Kozel 2007: 111).

Following a meeting with Kitsou Dubois in 2000, UK-based suspension artist Morag Wightman became increasingly interested in performing in complete weightlessness. Her *Falling without Fear* (2001) solo performance evolved from the desire to 'explore the concept and meaning of "suspension" in an environment where the fear of falling is not an issue' (Wightman in Matthai 2002: n.pag.). The performance spanning seven flight parabolas that created 25 seconds of

microgravity each time had roughly three stages: for the first two parabolas a rope was attached to her harness where she rose to the ceiling held back by the rope itself; during the third parabola she released the rope; and during the final parabola 'the instructor Vladimir Kalentiev initiated her movements whilst she remained passive, retaining one position' (Matthai 2002: n.pag.). Four cameras captured the events while Wightman held a fifth camera in her hand for one parabola. This brief encounter with weightlessness revealed gravity to Wightman in a new way and the work provided the materials for a further project, *Gravity – A Love Story* (2002), an interdisciplinary performance comprising dance, video projection, and music (and was commissioned for the Artist and Cosmonauts events discussed above). Following the zero-gravity experience Wightman, according to Carlotta Matthai, wanted to investigate the characteristics of gravity recognising 'the love-hate relationship that binds humans permanently to gravity, while weightlessness taunts as an apparently ideal environment' (Matthai 2002: n.pag.). With a curious connection to the subjective centre of gravity described in zero gravity by Dubois Wightman describes the work as an exploration of 'physical consciousness in shifting relationships with gravity' (Wightman in Matthai 2002: n.pag.).

A work that focuses on the idea that one day we may inhabit outer space itself is the essay film *Otolith* (2003) where the story is centred 'on a meeting in the 1960s between the Russian cosmonaut Valentina Tereshkova [the first female to travel in outer space] and the narrators ancestor Anasuya Gyan Chand who was the president of the National Federation of Indian Women' (Triscott and La Frenais 2005: 81). The narrator follows the journey of her ancestor, Anjalika, who visits Star City and carries out a self-appointed mission of ten everyday actions during a parabolic flight. Here 'microgravity is presented as a dangerous interior that locates itself between a pressurized present and an uncertain future' (Triscott and La Frenais 2005: 81). Artist Carrie Patterson's *Homesickness Kits* (2013) are developed to counteract the feelings of unease, panic, or claustrophobia that can be experienced in outer space and 'to mitigate the psychological and physiological discomfort of space travel with time-lapse scent-journeys for both the space tourist and astronaut' that are related to important plants on Earth (Patterson in Stallings and Peljhan 2013: n.pag.). Patterson's scientific glassworks double as functioning perfume bottles and are modelled on concentric relationships observed at both a macro- and micro-level: 'This can be observed in the way the physical structure of solar systems and atoms also reflect human consciousness and how the "embodied mind" experiences the world – mind within body, body within society, society within world, world within beyond-world' (Patterson in Stallings and Peljhan 2013: n.pag.).

Other art projects and practices that echo the experience of outer space and its gravity-freeing elements include the work of Lithuanian artist Julijonas

Urbonas, whose speculative projects include the *Gravitational Dreams Lab* and *Gravitational Aesthetics*; he writes that 'gravity influences us – our physical and intellectual selves – to such an extent that it is unimaginable that we could have evolved the way we have without it' (Urbonas 2009: 1). The work of photographer Fullerton-Batten *In Between* (2008) uses the metaphor of gravity as a representation of a state of a girl literally 'in-between teenage-hood and adulthood' (n. pag.).

In a work that debuted at the Free Enterprise exhibition in California, artist, architect, and scientist Bradley Pitts's project *Singular Oscillations: Playback* (2013) is described as an 'eleven-channel video installation [that] presents a work that's not only technologically critical, but strangely intimate and phenomenological in its approach' (Stallings and Peljhan 2013: n.pag.). On board a Russian parabolic-flight aircraft, Pitts:

> entered the variable-gravity space with his eyes closed, ears blocked, and naked in an attempt to displace his own sense of orientation and create a minimal presence. Eleven video cameras recorded this flight from multiple angles, circumscribing the one perspective left undocumented: that of Pitts himself and his meditative experience.
>
> (Stallings and Peljhan 2013: n.pag.)

Documenting the experience in this way does suggest a phenomenological perspective as the resulting visual sequences in the eleven channels of the video installation disorient the viewers and challenge them 'to grasp all details at once or experience their own singular perspective' (Stallings and Peljhan 2013: n.pag.).

Embodiment and zero gravity: Tipping points, liminal states

In this section, the intention is to draw the common threads of embodiment and zero gravity together to consider how the themes are being explored through artistic practice in outer space. Whilst there are elements of common approaches to narrative and storytelling alongside a range of performance elements, there appear to be three aspects that are common to this experience: the body disappearing and reappearing, the state of being in-between, and the experience and flow of time through inverting our everyday realities in these 'out of this world' spaces.

There is an uncertainty of the body in extremes of space that is reflected in the experiences of Dubois who comments that in weightlessness the 'extremities of the body seem less defined' and there is 'a sense of merging with the empty space around' (Dubois in Triscott and La Frenais 2005: 46). Ryklin reflects on this sense of being 'acutely aware of your body's relativity [...] you can begin to relate to your usual weight as simply one of the possibilities of your body [...] this experience helps to develop the intuitive, nonverbal component of our consciousness'

(Ryklin 2005: 15). These changed states in consciousness in zero gravity and the relationship to how the body changes is paralleled in the descriptions given by Char Davies of the experience of travelling through the virtual space of *Osmose* (1995). Closely related to the sense of the body disappearing (and reappearing) is the sense of the state of in-between. Dubois concludes that:

> In weightlessness this direct confrontation between the subjective reference point and the spiral creates an interaction between the internal space of the body and external space. What is revealed is the space in-between: between bodies, between objects, between articulations.
>
> (Dubois in Kozel 2007: 112)

Kozel's exploration of the sense of the in-between in *Ghosts & Astronauts* (1997) in both the virtual state and in the state of weightlessness attempts to draw out those similarities. Most strikingly are her earlier comments on 'the return to the body' (Kozel 1994: n.pag.) once our sense of consciousness is displaced from our physical bodies and re-emerges from virtual space. Finally, another state of in-between is explored, as we have seen, in the named in-between photography series by Fullerton-Batten. She explores this state between childhood and adulthood and uses the suspension of bodies in mid-air as an interesting visualisation of the metaphor of this sense of suspension between two different stages of life.

Time, or rather the anticipated science fiction of future times, is associated with the 'imaginary' of outer space, and the ideas and visions of the beginnings of space travel from the 1950s and 1960s. However, in *Moon Geese Analogue* (2012), it is the seventeenth-century book *The Man in the Moone* by English bishop Francis Godwin that is capitalised upon by artist Agnes Meyer-Brandis and one that imagines a flock of geese flying a man to the moon. In the actual realisation of outer space travel or zero-gravity flight, a different sense of the actual flow of time has been noted by a number of practitioners and participants, and notably that of Ryklin as he had the sense that time was compressed in zero gravity:

> In this unusual state, spontaneous connections with other people are easily formed. You feel less separated from them, which is probably linked to the compression of time. Hence it is possible to draw the conclusion that we understand our individual selves in the strictly defined conditions of the flow of time.
>
> (Ryklin 2005: 15)

Ryklin further notes that 'the individual is essential and constant by force of habit' (2005: 15), perhaps suggesting that the individual and our sense of self may be more fluid than we realise. In contrast, in the in-between state, the flow of time is

'literally' suspended in Fullerton-Batten's *In Between* series. Perhaps, it is in this dynamic relationship between time and space where the introduction of another type of space (outer space) forces another relationship to time whether compressed, heightened, frozen, or even without a sense of time itself.

Consciousness, gravity, and embodiment

In 2015, I initiated and chaired a special conference symposium at the *Towards a Science of Consciousness Conference* hosted by the University of Helsinki, Finland. The conference (now named *The Science of Consciousness*) began in 1994 at the Centre of Consciousness Studies at the University of Arizona in Tucson. This long-standing interdisciplinary conference is the largest of its kind and considers all aspects of the nature of conscious awareness, feelings and existence. Having originally been invited to speak at the 2012 conference in Arizona, I was keen to convene a discussion around consciousness and embodiment, and what the experience of zero gravity and weightlessness enables us to understand about the significance of gravity itself to our everyday embodied experience. Four speakers agreed to present at the symposium: two artists, UK-based visual artist Dr Louise K. Wilson and Professor Susan Kozel, based in Sweden; Space doctor, Professor Thais Russomano; and Finnish filmmaker Professor Pia Tikka, whose work has already been discussed in Chapter 1. The four speakers were asked to address the following themes and questions: How do artists and scientists approach the relationship between the body, space and consciousness? How do artists and scientists approach the relationship between embodiment and technology? What future research directions should be considered for understanding consciousness in relation to embodiment, gravity and virtuality? Here I focus on the work of two of the speakers, both of whom are working in creative fields.[4]

Susan Kozel and Gravity and its Sisters

In her talk *Gravity and its Sisters*, Kozel recalled her dance experiment in 1997 (mentioned earlier in the chapter) *Ghosts & Astronauts* (see Fig 3.2) that used basic telematics to link dancers in two theatres in London. She explained that the piece was developed from hours of improvisation around the theme of weightlessness. The studio where they improvised was neither an anti-gravity chamber nor a sophisticated laboratory. However, by using Morton Feldman's Piano and String Quartet from 1985 and focusing on the pronounced spaces between the notes, and improvisation instructions adapted from Kitsou Dubois's observations of movement in zero gravity, Kozel explains that 'we transformed our physical

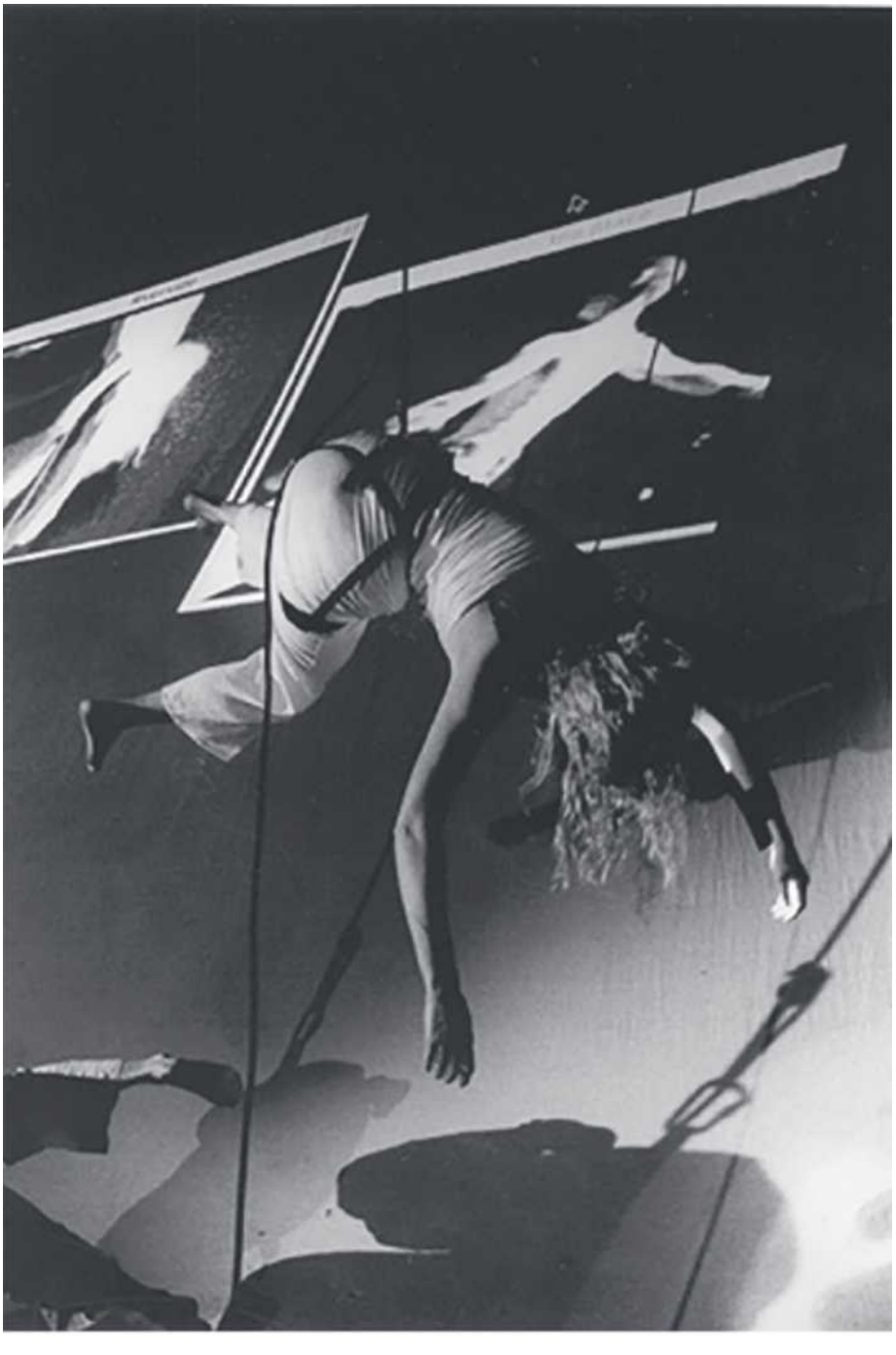

FIGURE 3.2: Anne Holst, Ruth Gibson, and Susan Kozel performing in *Ghosts & Astronauts* (1997). © Susan Kozel. Photo: Dee Reynolds. Courtesy of the artists.

states prior even to introducing the technological components. The altered states lingered long after re-entry into normal patterns of life' (Kozel in Doyle 2017: 75). Another artistic experiment with gravity that Kozel described was at the Reactor Hall of the Royal Technical University in Stockholm where she showed video imagery of dancers moving slowly, weightlessly, projected onto the wall (part of the *Close Encounters* symposium at the Dance and Circus University [DOCH] in Stockholm in 2007). Kozel explained that the Reactor Hall is twenty metres underground and is a research and performance space converted from a mid-twentieth-century scientific laboratory for testing nuclear reactors. She noted that 'the physical environment presses down on those in the hall; the weight of history, science and earth exists in a sort of frisson (if no longer fission) with immanent corporeal spaces' (Kozel 2015: n.pag.).

Kozel argues that 'somatic materialism opens the possibility for a phenomenological approach to affect and expands the reflective capacity for exploration of liminal corporeal and perceptual states' (Kozel 2015: n.pag.). Further, 'artistic and phenomenological experiments in somatics rely on powerful internal imagery, coinciding, at times, with distinctive external spaces. Affect and somatics overlap and diverge' (Kozel in Doyle 2017: 75). Kozel explains that the title of her talk, *Gravity and its Sisters*, refers to *Shame and its Sisters*, the collection of Sylvan Tomkins's writings on affect edited by Eve Kosofsky Sedgwick and Adam Frank (1995). Kozel expands:

> What are the sisters of gravity? Dropping, falling, rising, floating, sinking, spiralling: affective states, states of consciousness, improvisational and meditative practices, zones where knowledge and experience are constructed. In artistic experiments with gravity, corporeal states are even more tightly entwined with states of consciousness and external material environments.
>
> (Kozel in Doyle 2017: 76)

On the inspiration for the original project in 1997, Kozel explains that *Ghosts & Astronauts* was both a philosophical and a physical experimentation. Reflecting upon her memory of that experimentation, Kozel explains the relationship between the state of weightlessness and affect:

> We also can create a parallel with the qualities that come from weightlessness because weightlessness is a physical state of being but it's also highly affective. It can tinge the qualities of our memories. It can actually create a sense of inner buoyancy, or rootlessness, lack of connection, of great possibility, or of despair even. So I have some sisters of gravity like dropping, falling, rising, floating, sinking, spiralling. Some of these are tied directly to Kitsou Dubois's instructions but it's really significant that

> they are filtered through my recollection of the *Ghosts & Astronauts* process, and I will say that I remember more the devising process than the actual performance. The performance for me has faded in significance, but the physical experimentation, if anything, has become more powerful.
>
> (Kozel 2015: n.pag.)[5]

Louise K. Wilson and Aerial Stories

In her talk 'Aerial stories (revised): A return to a consideration of the flying laboratory', artist Louise K. Wilson describes her experience of being temporarily categorised as 'untrained naïve subject' on the Arts Catalyst (parabolic) MIR flight 001 in September 2001 (the same flight described by Mikhail Ryklin and others elsewhere in the chapter). Wilson was the counterpart to a trained naïve subject, Morag Wightman (aerial artist), as part of a movement experiment. Wilson explained that Dr Anthony Bull, 'the scientist who assigned us our roles had devised a preliminary study of different movement control techniques in microgravity conditions' (Wilson in Doyle 2017: 77). Wilson explains that:

> Of lasting personal impact, however, was the erroneous first parabola where I accidentally lost physical bearings […]. Any idea that the loss of gravity creates something analogous to 'floating' (a word employed to promote commercial zero G flight) did not correlate with the sheer brute force that we experienced.
>
> (Wilson in Doyle 2017: 77)

Aside from her role as a test subject, Wilson gathered material prior to, during, and post-flight by conducting (and audio recording) interviews with a number of her fellow flight participants, a number of whom were musicians. She explains that whilst largely anecdotal, they 'primarily touched on the relationship between felt haptic sensation and autobiography' (Wilson in Doyle 2017: 77). Wilson revisited the original interviews some years later and undertook a further set of interviews with the same people 'with a view to examining both the felt and the remembered responses to such momentous gravitational states, and the idea of gravitational frequency' (Wilson in Doyle 2017: 78). Wilson explains what had prompted her fascination with:

> The medical study of motion sickness [was] – the body's fault line (as I saw it) that often asserts itself when experiencing different gravitational states and propelled motion […]. In addition, for some, the brain's delicate chemistry had been modified by chemical intervention (Scop-dex, a mixture of Scopolamine and Dexedrine) to

> both dull (anti-nausea medication) and to heighten (stimulant to combat drowsiness) awareness […]. What was surprising subsequently was the affective response to double gravity and to the shared experience of loss of gravity flashbacks.
>
> (Wilson in Doyle 2017: 77–78).

In 'Naïve subjects: Intra-actions and gravitational states' (2017), Wilson argues that parabolic flight produces a form of 'intra-action' 'a process whereby bodies, technologies, discourses, gravitational variants and vibrations momentarily come into being with enduring significance' (Wilson 2017: 41), which could account for the loss of gravity flashbacks described by a number of the participants and outlined by Wilson. In quoting the physicist, Karen Barad, Wilson highlights further how this intra-action is embedded in the world. Barad states, 'we are not outside observers of the world. Nor are we simply located at particular places in the world, rather, we are part of the world in its ongoing intra-activity' (Barad in Wilson 2017: 44).

Conclusion

Bureaud and Dubois conclude their article on 'The embodiment of (micro) gravity' (2005) by stating that one of their mutual interests is:

> How art, through aesthetic and emotional experience [...] is a cognitive process for a better understanding of ourselves and of our world. A world now enlarged to outer space, bringing a new form of thought and phenomenology that needs to be explored and expressed.
>
> (2005: 8)

The filmmaker and artist Kowdo Eschun, and participant in the MIR 2001 Zero Gravity flight, argues that microgravity should be considered to be a counter environment, and that it can be seen as 'a space that allows us to detach from and thereby gain insight into a fundamental force that surrounds us, a force we remain as unaware of as a clownfish of water in its aquarium' (Eshun in Wilson 2017: 50). Gaining insight into this fundamental force of gravity can give us a perspective on what makes up our embodied experience, and as Eshun argues that it is through the study of this counter environment, this place where gravity is (almost) removed, is where we can further understand its impact on terra firma. We are so delicately balanced in gravity that any loss of gravity sends us into a kind of turmoil according to Wilson (Wilson in Doyle 2017: 77). According to Ryklin any loss of gravity can impact our memory, our sense of time, and perhaps even on our sense of consciousness. The research undertaken by Kozel in 1997 and then revisited

again twenty years later gives us clues as to what the experience of weightlessness can do at the level of memory and corporeality, and what that pressing down of gravity does to our sense of embodied experience.

Space technologies have enabled artists (and scientists) to experience first hand the effects of zero gravity or weightlessness in the works of Dubois (*Gravity Zero*, 1999; *Inversions*, 2005), Biswas and Finer (*Zero Genie*, 2001), and The Arts Catalyst (*Gravity Off!*, 2004), and are a result of this new physical access to outer space. In terms of furthering our understanding of embodiment and embodied experience, it is the work of artists such as Morag Wightman focusing on the emotional responses to gravity and weightlessness, and more recently the work of Sarah Jane Pell in her pursuit of understanding embodiment in zero gravity through the astronautic body and how space impacts on the perception of time and place spatiality, that can only lead us to see, inversely, how the impact of gravity determines the experience of ourselves in physical space (Pell 2017: 56). As Bureaud and Dubois suggest, it also brings with it its own new form of thought and phenomenology (Bureaud and Dubois 2005: 8).

If our sense of embodiment can be so clearly linked to the force or push of gravity on our bodies, what then can we consider to be the experience of the body in virtual space and immersive environments? In the following chapter, I take up the idea of the virtual body that usually occupies a different space to that of our physical body. Digital embodiment moves our bodies and our relationship to them into a different space – with a different affect, and does it therefore offer us a different form of embodied experience? I invite the reader to reflect on Stelarc's writing below (on an early project of his that he undertook) in each of the subsequent chapters in this book – and with it – the ever-present sense of gravity:

> Stretched between what it never was and what it could never become; suspended between the inward pull of gravity and the outward thrust of information, the body returns to the tree, anxious and vulnerable affirming its primal origins, amplifying its obsolescence […]. The brain is bursting from its genetic confinement, hovering between gravity and fantasy.
>
> (Stelarc 1982: n.pag)

NOTES

1. This chapter draws from the article 'Out of this world: Exploring embodiment and space through artistic processes and practice' in the *Journal of Performance Arts and Digital Media* published in 2015 by Routledge, and on the *Astronauts and Avatars: Exploring Consciousness through the Art and Science of Embodiment* symposium held in Helsinki, as part of the *Towards a Science of Consciousness* conference in 2015.

2. I attended *Kosmica: The Microgravity Sessions* in June 2012 at the Arts Catalyst in London, where there were a range of speakers including artist Louise K. Wilson and Kevin Fong, medical doctor and researcher in space medicine and extreme environments.
3. Char Davis's work will be discussed further in Chapter 6.
4. The third speaker Space Doctor Thais Russomano, MD, M.Sc. (aerospace medicine, Wright State University, US), Ph.D. (space physiology, King's College London, UK), founded and coordinates the Microgravity Centre – PUCRS, Brazil, internationally recognized for its space life sciences and eHealth research. The fourth speaker was Professor Pia Tikka, whose work engages with neuroscience and enactive media.
5. Kozel's contribution to the symposium was a pre-recorded interview between herself and the author that visually and conceptually engaged in the discussions that were due in the symposium. It lives on in archival format as part of the YouTube channel of the Medea Research Lab for Collaborative Media, Design and Public Engagement of Malmö University, Sweden. Sweden (see: https://www.youtube.com/watch?v=KVGwZ8z0vTE&t=2s).

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4

The Virtual Body

VR bodies are thin and never attain the thickness of flesh.

(Ihde 2002: 15)

Introduction[1]

Whilst there has yet to be a treaty on the purposes and use of virtual environments and virtual space, artists have consistently gravitated towards these spaces for artistic exploration. Whilst online virtual space and more particularly the 3D virtual worlds and virtual immersive environments have become mainstream experiences, they are certainly easier to access than the outer limits of physical space; instead of transporting our physical bodies, we can take on another body – that of the body of the avatar. The virtual embodiment of people as avatars is a term used in many online worlds, with its first use in the context of technology being around 1986 for the graphical representation of participants in the Habitat virtual world (Dixon 2007: 259). When we embody an avatar or develop a new relationship with our body outside of gravity (as we saw in the previous chapter), there is a phenomenal experience registered actually or by proxy; those new experiences can have a profound effect on the person who has experienced them. Kozel writes an interesting account of her experience of being the performer in an early telematic project by artist Paul Sermon in her *Spacemaking: Experiences of a Virtual Body* (1994) noting that 'telepresence has been called an out-of-body experience, yet what intrigues me is the return to the body which is implied by any voyage beyond it' (Kozel 1994: n.pag.). She continues to discuss the claim of artists such as Myron Krueger that virtual technology changes what it means to be human and alters human perception but suggests that it does not 'simply refer to the voyage out, but the inevitable return and the lasting effect that the outward motion leaves on the reunited body' (Kozel 1994: n.pag.); there are resonances here to Ryklin's response to the experience of zero-gravity conditions discussed in Chapter 3. Whilst I take up the experience of 'other' bodies, both virtual reality (VR) and hybrid, in

subsequent chapters the focus of this chapter is how human presence is constructed through our avatar representation in virtual space.

Many of us now regularly participate and interact in the virtual space of our computer screens through our avatar forms, whether it is organising a raid in *World of Warcraft* (Blizzard Entertainment, 2004), chatting with our friends on Roblox (Roblox Corporations, 2006), building a home in *PK XD* (Afterverse Games, 2019) or exploring an island in *Second Life*™ (SL). Virtual worlds have made somewhat of a comeback alongside the aspirations of Mark Zuckerberg to create the ultimate 'metaverse' through re-envisioning Facebook[2] alongside the need for us to connect in new ways during and post the COVID-19 pandemic. This chapter focuses in particular on the SL platform created by Linden Lab. Launched in 2003 with barely 1000 users (Rymaszewski 2007: 5), the number of SL users with an account at the peak of its usage grew to over 16 million worldwide. Following the logic of the 'real' world, it follows most of the rules of our space, providing earth, sky, water, gravity, day and night, moon and sun within a three-dimensional networked grid. Experienced through an avatar, many users choose to represent themselves in human form, although other forms are readily available.[3] The question of how we are now creating and living second lives as our new avatar selves, and indeed, how we are creating new virtual communities on these shared virtual platforms is the wider debate that surrounds the representation of the self in virtual world space. This chapter concerns itself with digital embodiment and the construction of the self as an avatar, in the collaborative art practices that are being created in those technological platforms.

To further explore these issues and concepts of digital embodiment, both eastern and western philosophy are drawn upon from Benedict de Spinoza, and from discussions of the Dalai Lama on the mind–body relationship, against the backdrop of the virtual worlds. Central to the virtual world experience is the mediation of the space through the body of the avatar (Doyle 2011). Despite early promises for VR (Rheingold 1991), the body has never lost its significance or place in new technologies. From early research on virtual worlds and VR that includes the study of the social life of avatars and the metaphysical issues surrounding VR (Heim 1993; Damer 1998; Heudin 1999; Schroeder 2002) research based on the experience of an avatar suggests that it can create a bifurcated self (Morie 2007) or it can even act as some form of phantom limb (Veerapen 2011). Other research on the significance of the avatar has focused on virtual worlds as a mirror for our identity whether it is the exploration of an idealised self (Schomaker 2010), or another gender, race, or even another species (Cardenas 2010), and spaces to explore virtual corporeality and shared creativity, and the creation of shared avatars (Sousa 2017, 2013).

Immersion, telepresence, and the body of the avatar

As previously described in Chapter 2, the virtual embodiment of people as avatars is a term used in many online and virtual worlds and is a phenomenon that is increasingly embedded within our day-to-day experience. Boellstorff in fact suggests that as 'avatars make virtual worlds real, not actual, they are a position from where the self encounters the virtual' (Boellstorff 2008: 129). Using the terms the virtual, the real, and the actual, Boellstorff links his ideas to Bergson's examination of the real and the virtual in the early part of the twentieth century. Bergson makes this distinction between the real and the actual, which reframes his concept of the virtual. Whatever the change in the use of the term avatar towards the invirtual, how do we begin to examine this represented self in virtual space, and how do we approach the term 'the body of the avatar'? Christiane Paul writes that, in fact, it may be difficult to trace exactly when the term first became the cyberspace vernacular but 'it is at least interesting to note its connotations in the context of identity and community' (Paul in Chuk 2015: 78). Speaking of VR bodies in 2002, Ihde compares the virtual body with the real body. Virtual bodies are less than real, as they can never attain even the thickness of flesh (Ihde 2002: 15). Further discussion of Ihde's investigation of virtual bodies can be found later in the chapter.

We turn again to the imagination to further understand the role it plays in our represented presence through the body of the avatar in virtual space. Moira Gatens and Genevieve Lloyd suggest that for the seventeenth-century philosopher Spinoza, the imagination has a 'powerful ontological dimension – a direct and strong contact with bodily reality' (Gatens and Lloyd 1999: 12). His version of the imagination has an equally strong emphasis on the reality of the mental and:

> the figments of the imagination are just as real – just as appropriate objects of systematic investigation – as the modifications of matter. Imagination involves the coming together of mind and body in the most immediate way: *mind is the idea of body*.
>
> (Gatens and Lloyd 1999: 12, my emphasis)

So the imagination, according to Spinoza, is rooted in the body, or to put it slightly differently: the body has a mind of its own. It is interesting to note that there is an emphasis here on the relationship between the body and the mind, and that the mind does not exist without the body. In *Air and Dreams*, Bachelard (1988: 4), writing in the twentieth century, proposes that 'the imaginary is imminent in the real, [and] how [there is] a *continuous* [original emphasis] path [that] leads from the real to the imaginary'. In *Water and Dreams*, he writes that by following the daydreams of man: 'Who abandons himself to the imagination of matters, […] a substance will never seem sufficiently worked over for him because he never stops

dreaming of it. Form reaches completion. Matter, never. Matter is a rough sketch of unrestricted dreams' (Bachelard 1983: 113).

The meaning of the 'material' imagination for Bachelard, according to Steve Connor, is described through two intersecting ideas: firstly, that the material world is imagined by everyone all of the time and this is termed the 'imagination of matter' (Connor 2004: 40); and secondly, that the imagination itself is:

> Always implicated in the world that it attempts to imagine, made up, like the gingerbread enquiring into his dough, of what it makes out. This is not least because the merely visual or image-making faculty suggested by the word 'imagination' is always toned and textured by the other senses.
>
> (Connor 2004: 40)

According to Bachelard (1969: 203), what we 'imagine' works in our being, in our substratum. Connor suggests that the phrase material imagination 'must signify the *materiality of the imagining* as well as the imagination of material' itself (Connor 2004: 41, my emphasis). Of the skin, Connor writes that, '[it] provides a good opportunity for enquiring into the material imagination because it is bilateral, both matter and image, stuff and sign' (Connor 2004: 41). Brian Massumi suggests that imagination is the mode of thought that is most suited to the virtual. And further that the 'Imagination can also be called intuition: a thinking feeling. Not feeling something. Feeling thought […] Imagination is felt thought […] the mutual envelopment of thought and sensation, as they arrive together' (Massumi 2002: 134).

To draw these ideas together, it appears that Spinoza and Massumi agree that there is a strong relationship between the body and the imagination. Bachelard talks of the material imagination, although his poetic theory of the imaginary is often about an elsewhere, that is not here, not a place that begins with the body. However, if we dream over the material, we must also dream over the body. Ihde sees only a thinness to the surface of the VR body, with no possibility of skin, or of substance. But what of avatar representations that are closely connected to a person's identity? Some avatars that physically very closely represent a person are actually recognisable to another person. What if the representation of the avatar is physically completely different, but the person is closer to the way they see, or experience themselves?

Of the relationship between the body and mind, the Dalai Lama writes that even in:

> Extremely subtle states of consciousness, the mental state must have a physical base, however subtle it may be. Sometimes there is a tendency among Buddhists to think that these very subtle states of consciousness as if there were no embodiment or

> material basis for them […] the brain is the basis for all cognitive events. Without the brain there is no cognitive function of the mind.
>
> (Dalai Lama in Harrington and Zajonc 2006: 96)

It is interesting to consider the relationship between Spinoza's and the Dalai Lama's emphasis on the relationship between the body and the mind, one cannot exist without the other. The contemplative texts of the Sutra system acknowledge the cultivation of heightened awareness in relation to two senses, visual and auditory perception. However, as the Dalai Lama notes, the other senses are not considered. Drawing parallels with modern technologies he commented in 2006 that:

> You can project images on a television screen, or you can project sounds through radio waves, but you still cannot transport smell and tactile sensation. But in the Vajrajana tradition […] there is an understanding that it is possible for advanced yogis to gain mastery over these physiological elements. These bodily energies that are normally confined to the function of specific sensory facilities can actually be co-opted or transferred.
>
> (Dalai Lama in Harrington and Zajonc 2006: 97)

Does the interface with virtual world technologies give us a glimpse of the effects of co-opting or transferring our sensory facilities as suggested by the Vajrajana tradition? Does this translation of the senses occur when we interact with virtual worlds? Can we sense this experience through our avatar? Ihde, in *Bodies in Technology* (2002), investigates the duality of the notion and experience of what he terms, the here-body and the image-body. In asking questions about our phenomenological experience of virtual space, he observes that:

> An analysis shows a variation between what would be called full or multidimensional experience and a visual objectification of presumed body experience. Where does one feel the wind? Or the vertigo in the stomach? Can it be felt 'out there' in the disembodied perspective? The answers quickly show partial primacy to the embodied experience.
>
> (Ihde 2002: 4)

The here-body is where we can have a full, multidimensional experience and 'gestalts in the here-body of the embodied perspective, whereas the visual objectification out there is spectacle like' (Ihde 2002: 4). The image-body is where the body of the avatar lies. As Ihde explores the ambiguities in virtual space, particularly when our presence is identified through a third-person avatar's perspective, he suggests that this is the 'the opening to a sliding perspective from the multidimensional experience of my here-body toward the image-body perspectives lie

within these ambiguities' (Ihde 2002: 6). Ihde draws the comparison to actual skin which he says is 'at best polymorphically ambiguous, and even without material extension, the sense of the here-body exceeds its physical bounds' (Ihde 2002: 6). If the here-body exceeds its physical bounds, does the image-body have a sense of materiality that enables us to dream over it, and in turn, have a sense of the body of the avatar?

Being in (an)other body: Joseph DeLappe and MGandhi

Christiane Paul comments that avatars as a new form of representation 'have been a fertile ground for artistic experimentation' (Paul in Chuk 2015: 78). A durational project by performance artist and activist Joseph DeLappe was realised in *Second Life* in 2008. He had already incorporated online gaming into his work since 2001 in work such as his *Dead_in_Iraq* series (2006–ongoing), *Killbox* (2015–16), and more recently his project *Elegy*, a gaming mod for *Grand Theft Auto V* (Rockstar Games, 2013) (2018–19). However, in 2008 he re-enacted Mahatma Gandhi's Salt March to Dandi (2008), spending 26 days walking through *Second Life* using a customised treadmill that powered the movements of his inWorld counterpart, MGandhi Chakrabarti (see Figure 4.1). In 1930, Gandhi walked 240 miles in protest of the British Salt tax to the village of Dandi in Gujarat, India.

Inspired by a comment, or rather a criticism, by a player in *America's Army*[4] that DeLappe was suffering from a 'Gandhi Complex', he began researching the history of protest and Mahatma Gandhi's forms of protest; the result was the re-enactment of Gandhi's 1930 Salt March to Dandi. Using a customised treadmill that controlled the Gandhi avatar, MGandhi Chakrabarti, DeLappe walked for 26 days to cover the 240-mile march but this time in virtual space.

For DeLappe, the main theme that was indicated as prominent in his horizon of experience of the *Second Life* space was the overriding impact of embodying the MGandhi Chakrabarti avatar. Another major theme was DeLappe's experience of time and duration in undertaking the Salt March to Dandi (2008) project and related works. Spending such a prolonged period of time in *Second Life* during the re-enactment eventually impacted DeLappe's physical world experience. He explains:

> After about a week and half of doing this every day [the re-enactment], I would be walking back to my apartment in New York City and thinking I could click on people. It's what I did everyday. It got into my psyche, my consciousness, on such an intense level.
>
> (DeLappe in Doyle 2010: 247)

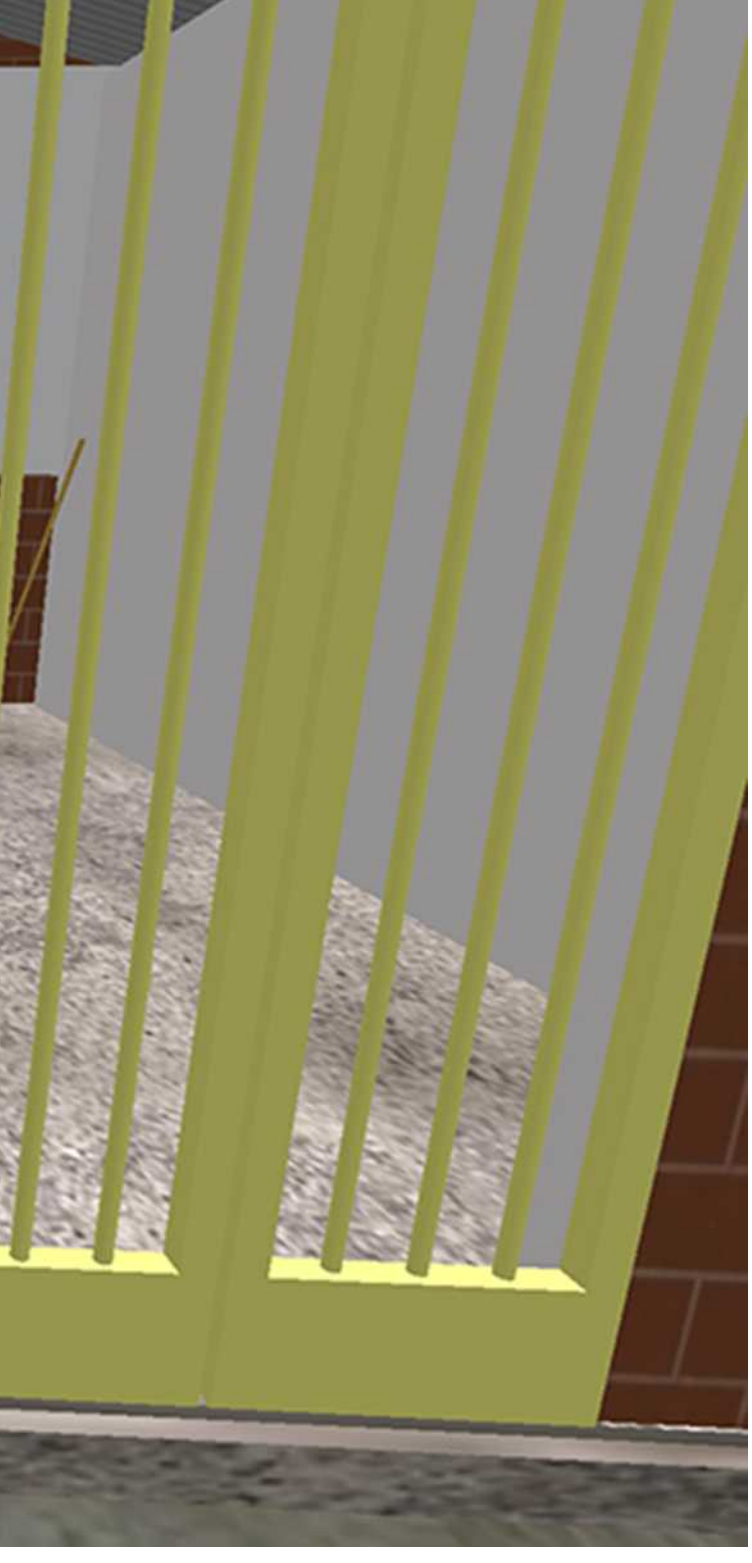

FIGURE 4.1: Joseph DeLappe, InWorld screenshot of MGandhi Chakrabarti (2008). Photo: courtesy of the artist.

When interviewing DeLappe he commented that 'what's fascinating about these performance projects, this walking gives you number one time, this physical movement, and contemplating this reality as it is presenting in front of you' (DeLappe in Doyle 2010: 244). He commented at the outset of the interview that:

> The idea of playing Gandhi was ridiculous and absurd and really audacious, and the notion of me, a middle aged white professor playing Gandhi, was really, really scary and dangerous in a way, and that was interesting [...]. There is this rhetoric in *Second Life* that you can be anything, your wildest imaginings: if that's true then why not push this as far as it can go, [I thought] let's see what this would be like [to be Gandhi].
>
> (DeLappe in Doyle 2010: 243)

During the interview, DeLappe described a number of times that he was 'walking with Gandhi', and in the process of the re-enactment, a real connection had been made through the physical experience of walking on the treadmill at the Eyebeam Gallery. He was surprised at how connected he became to MGandhi Chakrabarti:

> There was something about the physical control, and this connection with walking with him. Sometimes he would be walking off a mountain and I found myself almost falling off the treadmill – several times that happened, it was such a visceral connection.
>
> (DeLappe in Doyle 2010: 244)

The motivation to create artworks in the space was initially rather mixed, as DeLappe had 'heard about *Second Life* early on in, though it didn't really engage me until I did this march. There was something more about this experience' (DeLappe in Doyle 2010: 247). However, he commented that once the Salt March to Dandi walk had been completed, 'I was really sad when it was over and I really had a great sense of accomplishment that I had actually done something' (DeLappe in Doyle 2010: 246).

DeLappe commented that after Gandhi finished the Salt March and he was gone from *Second Life*, people would ask him when they would see Gandhi again. He commented 'I brought him back a couple times for some special events and I felt I was violating the principle of the concept. I didn't feel right just walking around with him without the treadmill' (DeLappe in Doyle 2010: 248). This suggests a deeper sense of the presence of Gandhi in the avatar representation. For DeLappe, 'with Gandhi it felt like I was a different person. There is something about an avatar that is a bit like putting on a clown's suit, you become this something else in a way' (DeLappe in Doyle 2010: 247). DeLappe went on to develop further projects based on Gandhi including a further nine months durational re-enactment of Gandhi's time in prison in *Second Life* following his arrest after the Salt March entitled *Twitter Torture/MGandhi in Jail* (2009–10) and his *Cardboard Gandhi* (2008–09), a

monumental seventeen-feet high sculpture echoing the height of Michelangelo's classic sculpture of *David* (1501–04). In contrast, and as part of the same series, DeLappe 3D printed a twelve-inch version of MGandhi that can be seen in Figure 4.2 at the Golden Thread Gallery, Belfast as part of the ISEA2009 exhibition.

FIGURE 4.2: Joseph DeLappe, MGandhi with Wanderingfictions Story at the Golden Thread Gallery, Belfast (2009). Photo: Denise Doyle. Digital object.

This visceral connection between the virtual body you see when interacting in a virtual space and the physical body you inhabit when doing so can give a curious sense that part of our 'consciousness' has moved to temporarily inhabit the virtual avatar body. UK artist Annabeth Robinson (aka Angrybeth Shortbread in *Second Life*) acknowledges that she has a 'kind of weird, disjointed relationship' with her avatar. Of her relationship with Angrybeth she notes that:

> When I am using *Second Life* my head is aware that I am in two spaces at once. I am a reader viewing the viewer and when I look at Angrybeth, it's a puppet [...]. I certainly don't have any kind of wish fulfilment that that is me in there. It is more in tune with the word avatar itself; it's an aspect of me that's in concurrent time.
>
> (Robinson in Doyle 2010: 258)

She commented that 'I can get quite easily sucked into the empathy of it having some kind of emotion', but notes that 'when I am not real-time inhabiting Angrybeth I think of it as a mouse-pointer [and] when I'm reminiscing and I'm not online, I think of it as the experience I had' (Robinson in Doyle 2010: 259). When the projects she has undertaken have been intensive or she has spent a long time working on a project in *Second Life*, Robinson remembers them as though they were real events. In fact, she notes that:

> There was a period [of time] a couple of years ago when I would actually have *Second Life* dreams. Not that it was about flying or things like that, it was more about the people I met but I knew I had never met in real life, they were real enough relationships [to me].
>
> (Robinson in Doyle 2010: 262)

The virtual body experience of Wanderingfictions Story

My own virtual counterpart, or avatar, Wanderingfictions Story, developed significantly since her birth in '2006'.[5] Following my initial introduction to *Second Life*, it was a relatively short time before I created her. The origin of her name was based on media archaeologist Siegfried Zielinksi's early writings on the Internet, in which he notes that:

> In the motion of crossing a border, heterology encircles the impossible place, that is unlocatable, that is actually empty, that in practice is created in the motion of crossing the border [...] this is what taking action at the border, that which I call subjective, targets in relation to the Net: strong, dynamic, nervous, definitely process-orientated aesthetic constructions, that are introduced into the Net as Wandering Fictions.
>
> (Zielinski 1996: 285)

Working within the realm of Art and Technology (and as an artist who engages with narrative as a method), my own exploration of virtual space over the last two decades has often been based on the retelling of narratives in a new context. An early practice-based project was to re-interpret Italo Calvino's *Invisible Cities* (1997) through an interactive artefact. The story was of Marco Polo's adventures to imagined cities, with Calvino providing the descriptions of the fantastic, symbolic and often conceptually based places. How do we travel without a map? Of note were my closing remarks where I suggested that the creation of a figure in the virtual space, that of Eleni, was worthy of further study:

> to produce Wandering Fictions for the web remained essential for the concept. The impact on the process, above technical constraints, of constructing a character to exist within this space was continually evident. The net space, if it has borders and boundaries, are not yet visible. A very different potential space could still emerge.
>
> (Doyle 2000: 24)

Performativity and the virtual body

Wanderingfictions Story, if translated back into physical space, would be over seven feet tall, brown-skinned, with a wardrobe full of saris. I was often asked why I represented myself in *Second Life* in this way during this research phase. It was in fact a result of a piece of performative writing undertaken in collaboration with the artist Taey Kim in 2007, shortly after the introduction of *Second Life* into the United Kingdom. In *Embodied Narrative: The Virtual Nomad and the Metadreamer* (2007), in conversation with Kim's virtual representation Dongdong whose presence was in the then Web 2.0 space, Wanderingfictions Story attempts to describe her experience of 'being' in the *Second Life* space. Seen through new eyes, comparisons were made between the early travellers exploring and discovering new lands. However, of her identity, she writes:

> At the beginning I looked like lots of other people here. That was shocking at times; when I was someplace and another 'me' was there too. Over time my shape seemed to change, though I only really found my identity when my skin changed. It's a brown shade now. Oh, and I wear glasses.
>
> (Doyle and Kim 2007: 214)

Inspired by a description of cyberspace, Wanderingfictions goes to search for 'place' in *Second Life*. In *A Sideways Look at Time* (2004), Jay Griffiths claims that in cyberspace there is no Africa:

> No mud, no beads or wells or such humanity in the very air. There's no India in cyberspace, no jasmine, no gupshop, no sari, no desert. There's no swampy, mucky, messy stuff, no tadpoles, no owls. There's no nature in the synthetic element.
>
> (Griffiths 2004: 269)

So Wanderingfictions tries to find India on the *Second Life* platform. She discovers that the Taj Mahal has been built somewhere, at some time. But India itself, with its jasmine and gupshop, was not so easily found. Wanderingfictions is now dressed in a sari. She explains: 'Yesterday I searched again for India and in a way I found it. There was no Taj Mahal, no sign to tell me. I changed my clothes so I could imagine India a little more. It seemed to work' (Doyle and Kim 2007: 218).

Exploring what is particular to her experience in *Second Life*, she explains the sensation of flying:

> Of course, I can fly here. But it's like having invisible wings that you cannot really spread widely or fully or freely enough. Sometimes I fly upwards as fast as I can, so I can feel that sensation of freedom, and I can dream of flying a great distance along the horizon. Eventually I get to a point where gravity pulls me back down, but I do seem to be able to have the fantasy of escaping gravity, at least for a moment.
>
> (Doyle and Kim 2007: 214)

She has discovered the joy of flight, although it does not give her that full sense of freedom, as she cannot fly far enough along the horizon. There is no doubt that the experience of Wanderingfictions Story as my virtual counterpart who developed this particular identity was a rewarding experience. Not able to present this identity in a physical way in the real world, this particular identity has 'stuck' following the performative writing experiment. This process, of exploring an(other) identity distinct from my own, has given me an opportunity not only to understand my own character but to understand another through 'virtually' sitting in their skin.

The Meta-Dreamer *project*

Having already developed a number of artist projects utilising and investigating *Second Life* as a space for artistic experimentation, in 2009 my interest in the notion of Wanderingfictions Story as a manifestation of, and from, virtual space became the basis of a new project, *Meta-Dreamer* (2009). After reflecting on DeLappe's MGandhi series, I began to create a series of digitally materialised objects of Wanderingfictions Story. By experimenting with digital processes that extracted data from

Second Life and investigating different types of materials, attempts were made to represent jade, and clouded glass, amongst other textures. The end result can be seen in Figure 4.3, the qualities of the figure are cloud-like and ethereal as though Wanderingfictions Story, the meta-dreamer, is 'almost there'. The digital object was presented in the Golden Thread Gallery space alongside DeLappe's figure of MGandhi (2008) in 2009 (see Figure 4.3) The visitor could also experience the virtual installation on Kriti Island that included the presentation of Wanderingfictions Story, the meta-dreamer, through captured images and her meta-dream writing.

In 'Exploring liminal practices in art, technology and science' (Doyle 2015), I reviewed the digital materialisation project *Meta-Dreamer* (2009), which explored the identity and development of the avatar, Wanderingfictions Story, in the context of the liminal lives discussed by Susan Merrill Squier. In commenting on the work of anthropologist Victor Turner, she advocates the 'need to move beyond Turner's exclusively cultural framing to understand liminality not merely as a cultural state but *as a biocultural process*' (Squier 2004: 8, original emphasis). The translucent yet frozen properties of the digital objects materialised in *Meta-Dreamer* suggest a state of in-between and perhaps even what Grosz describes as the 'loci of emergence' itself (Grosz 2001: 112). In the last fifteen years, materialisation costs have greatly reduced and further material processes have developed as evidenced by the work of Neri Oxman at MIT offering new research potential for the principle of avatar materialisation and many other practitioners. Today the cost of 3D printing is a fraction of the cost of 3D printing a decade and a half ago.

FIGURE 4.3: Denise Doyle, Wanderingfictions Story as part of the *Meta-Dreamer* project at the Golden Thread Gallery, Belfast (2009). Photo: Denise Doyle. Digital object.

Living between worlds

Writing of the concept of the in-between Grosz notes that 'one could say that the in-between is the locus of futurity, movement, speed; it is thoroughly spatial and temporal, the very essence of space and time and their intrication' (Grosz 2001: 94). Grosz claims that space itself actually requires two kinds of time: the first being 'the time of the emergence of space as such, a time before time and space' (Grosz 2001: 110); the other being 'the time of history, of historicity, the time of reflection, the time of knowledge – a time to which we are accustomed' (Grosz 2001: 111). In her examination of the time and space of architecture, she explains that she is interested in the relevance of the first sense of time:

> a concept that requires not only a time before time but also a time after time [...] the times before and after time are the loci of emergence, of unfolding, of eruption, the space-times of the new, the unthought, the virtuality of a past that has not exhausted itself in activity and a future that cannot be exhausted or anticipated by the present.
>
> (Grosz 2001: 111–12)

Dew Harrison takes up Nicholas Bourriaud's notion of 'journey-forms' to explain the art concerns of a number of artists who developed artworks for the *Second Life* platform (Harrison 2011: 237). In fact, the use of 'journey-forms, which is a combination of, a way to exchange, time and space values' (Bourriaud in Harrison 2011: 238). If each space has a particular time, as Massey implies, then the transitional and liminal spaces identified in avatar-mediated space may also have a particular time attached to them. Not only, then, are there heterogeneities of space but also different sets of time–spaces that can also be located in the avatar-mediated experience. Casey writes of 'edges in time' (Casey 2008: 12), where these edges are forms of boundaries of what he calls 'further wrinkles in the face of the temporal field' (Casey 2008: 12). All of these expressions suggest a plasticity to time as a lived experience, but also to the specificities of time–space relationships. Squier notes that the field of contemporary bioethics is indifferent to the 'epistemological power of fiction' (Squier 2004: 5). Yet, fictions within artistic practice are those spaces that can 'imagine' and create from that 'loci of emergence' in ways that are truly reflecting the actual 'science' of manifestation in current bio-medical practices. As Squier herself comments:

> The interpenetration of realms and processes once believed to be separate means that it is increasingly difficult to tell whether variation is the result of nature or culture.

> No longer stable, the boundaries of our human existence have become imprecise at best, contested at worst.
>
> (Squier 2004: 7)

The idea of creating or manifesting from a liminal space (in the case of Squier describing the frontier practices of biomedicine, in the case of the *Meta-Dreamer* project manifesting from the space of the virtual itself) is here interrogated and explored as new spaces of existence. In fact, this new 'biomedical imaginary' is described by Catherine Waldby in *The Visible Human Project* (2000) as 'the generally disavowed dream work performed by biomedical theory and innovation' (Waldby in Squier 2004: 14) in which she points towards the place of the ambiguous, liminal, and symbolic realm within biomedicine. Waldby further suggests that biomedicine:

> realizes or struggles to realize these narratives through their embodiment. It anatomizes its narratives in the sense that it orders its images of bodies according to their logic [...] it reads into lived bodies in ways that are constitutive of important aspects of corporeality itself.
>
> (Waldby in Squier 2004: 16)

The digital object realised in *Meta-Dreamer* (2009) implies a state of in-between, of a 'time before time' and the 'loci of emergence' itself. Perhaps it could even be a representation of a 'time after time', of a passing through, of leaving rather than entering. Equally, a sense of a frozen-ness is suggested in the material chosen to represent the figure in physical form. Harrison suggests in 'Crossing over: Oscillations between the virtual and the real' (2011) that this renders the Wandering-fictions Story avatar 'inanimate', 'being frozen from the life she had in SL' (Harrison 2011: 238). Rather it is an attempt to represent the position at, or on both sides of, a boundary or threshold that of the liminal state itself. Grosz proposes a re-enervation of space through duration in the 'restoration of becoming to both space and time', and equally that when in 'virtual time becoming virtual space' (Grosz 2001: 120) a new kind of time–space relationship is established.

Ontologies of virtual bodies and spaces

In 'Performing in (virtual) spaces' (2007), Jacquelyn Morie begins with the ontological assumption that the body has been recontextualised in the age of digital technology. Morie claims that there is a specialised and intrinsic set of qualities of 'being' in immersive environments and suggests that there has been a paradigm

shift in what humans are now able to experience. She points to the research of visual and performance artists and their contribution to the exploration of virtual environments as key to our future understandings of ourselves in the physical and digital domains (Morie 2007: 123).

Morie, in agreeing with Hayles, identifies the body as an integral part of the concept of the post-human and also sees the body as a container. Hayles suggests that the virtual body needs 'bits of information as well as bits of flesh and bone' (Hayles in Morie 2007: 124). There are echoes of Stelarc here. Morie claims that 'there would be no mind as we know it without the body that engenders, contains and nurtures it' (Morie 2007: 124). She suggests that the act of emplacing a body into an immersive environment signifies a 'shift to a dualistic existence in two simultaneous bodies' (Morie 2007: 127) and claims that, now, the lived body has 'bifurcated and become two' (Morie 2007: 128). In her article she explores the representation of the body, or presence, in virtual environments in five ways: as no representation/no avatar, as the mirrored self, as a partial or whole graphical personification, as a third person/observed avatar, and as experience in shared environments. According to Morie using the observed or third person avatar, in this form of embodied image the participant takes on 'an experiential locus that is outside their perceptual self. An avatar appears, at some distance out in front of the experient's physical and imaginal locus' (Morie 2007: 132). For Morie a representation or metaphor of her body icon may compete with her own inner representation of herself in inhabiting an environment, and suggests that virtual environments such as those created by Char Davies become a:

> sacred, encompassing space, where mind transcends body even as it references the body, the felt organism even in visual absence. This body, as felt phenomenon, is how we know the world, true as much within the virtual as the real.
>
> (Morie 2007: 133)

She returns to Merleau-Ponty's phenomenological standpoint as he views the body as 'the common texture of which objects are woven' (Merleau-Ponty in Morie 2007: 13) but suggests that he did not have to grapple with 'new forms of immaterial bodies beyond the phenomenal' (Morie 2007: 133) as we do now in light of new technologies.

Conclusion

These new forms of immaterial bodies, not least the body of the avatar, are more often experienced through immersive technologies. Our embodied

presence, or digital presence is an interplay of a number of elements: that of ourselves experiencing telepresence, our imagined presence in virtual space, and sometimes of ourselves switching to the disembodied perspective of Ihde's 'image-body'. This experience and response to the space and our sense of ourselves in it relies on a complex set of relationships between the body and mind. How the relationship between ourselves and the virtual body we see within the space develops and the extent to which the imagination plays a role within this has been of consideration within this chapter. The language we so readily use about 'us' and 'our body in there' clearly indicates the projection of ourselves onto the virtual body – accepting that it is a representation of 'us' in space. Morie claims that at the centre of our understanding of the world is the body. Yet, according to Morie the avatar perspective still has an experiential locus, even though it is 'out there'. Yet we see in DeLappe's experience of embodying Gandhi and in my own experience of embodying the avatar Wanderingfictions Story, the sense of presence in the *Second Life* space is rooted in the identity of the represented avatar, in the image-body presented. I will discuss a number of other interesting projects where artists incorporate the use of the avatar form in their work in Chapters 5 and 7. Virtual worlds are contributing to new dimensions of experience, and at its centre lies the experience of the body of the avatar as a complex construction of human presence in virtual worlds. The idea that there were new forms of immaterial bodies emerging beyond the phenomenal over fifteen years ago resonates even more deeply today. In the following chapter, the notion of the hybrid body in all its variations and complexities will be taken up and explored.

NOTES

1. This chapter draws on a previously published chapter 'The body of the avatar: Constructing human presence in virtual worlds' published in *Creating Second Lives* (Routledge 2011), edited by Astrid Ensslin and Ebon Muse, and from subsequent writings on the virtual body.
2. News of the launching of the idea in October 2021: https://www.theguardian.com/technology/2021/oct/28/facebook-mark-zuckerberg-meta-metaverse.
3. Animal avatars are common in *Second Life*.
4. Launched in 2002, *America's Army* was the first use of gaming technology to support recruitment into the US Army, and allows potential recruits to 'test out' if becoming a soldier was suited to them.
5. Wanderingfictions Story is no longer active within my research. I stopped using her as a point of research around 2016.

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5

The Hybrid Body

A cyborg is a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction.

(Haraway 1991: 149–50)

Neither pure information nor pure flesh, the hybrid body knots the strange experience of being digital, being plant, being animal, being mineral into a beautiful labyrinth of knowledge.

(Arthur Kroker 2012: 14)

Introduction

Arthur Kroker's description of what a twenty-first-century hybrid body is and what it represents sounds rather uncontested as an embodied experience compared to Donna Haraway's view of the hybridity of the cyborg (machine and organism) from her powerful *Cyborg's Manifesto* written in 1991. The previous chapter focused on the sense of the virtual body and what that means for an experience of digital embodiment, and was primarily focused on the avatar-mediated experience as a bodily representation of ourselves. In this chapter, I further explore the inhabitation of 'other' bodies (robots, avatars, hybrids) and various manifestations of the digitally embodied experience. Here, bodies are pulled apart, reassembled, and new identities are created and explored. Gender is a strong aspect of some of the work discussed in the chapter, as is a bio-cultural approach to the construction of identity. Research on the significance of the avatar/hybrid body has focused on virtual worlds as a mirror for our identity whether it is the exploration of an idealised self (Schomaker 2010), or another gender, race, or even another species, as we shall see below (Cardenas 2010). This chapter concerns itself with the construction of the self as reflected in a hybrid body (so beyond that of a representational avatar), and the ways in which contemporary

arts practices are integrating this exploration of what can be termed digitally constructed realities.

Over the last two decades and beyond, there has been a staggering change in our experience of the world through new technologies and through the social and political upheaval that has occurred through the experience of COVID-19 and the subsequent global pandemic, alongside many other pressing world issues. In turn, the technological changes that enable immersive experiences have been relatively slow in their development, but most certainly significant, and more recently taking a decidedly ontological turn. There has been talk about the post-human for over three decades and it is true – we are no longer 'only' human. In this chapter, in particular, I focus on the visual and embodied manifestation of the posthuman through the work of artists engaged in exploring this concept. In short, the chapter considers what it is to be a 'hybrid human'.

Hybridity: The cyborg body

> *In typical Björk fashion, she arrived not as a human but as a surreal shadow figure, shrouded in a sparkling frenzy of kaleidoscopic matter.*
>
> (Monroe 2018: n.pag.)

It is difficult to grasp any historical sense of the hybrid body in relation to technology, although there is most certainly a history of the body as 'other', and certainly there is a hybridity associated with sexuality. It is however in the work of Donna Haraway that we find the clearest expression of the hybrid as a cyborg. She writes:

> By the late twentieth century, our time, mythic time, we are all chimeras,[1] theorized and fabricated hybrids of machine and organism, in short, we are cyborgs. The cyborg is our ontology […] the cyborg is the condensed reality of both imagination and material reality.
>
> (Haraway 1991: 150)

The last part of this quotation is of interest to the theme of this book, that of the relationship between the material and the imagination, a condensed reality of the two combined, and this will be taken up at a later point in the chapter. In fact, Haraway suggests that far from any resistance to this state of affairs the cyborg appears in myth 'precisely where the boundary between human and animal transgressed. Far from signalling a walling of people from other living beings, cyborgs signal disturbingly and pleasurably tight coupling' (Haraway 1991: 152). Haraway argues that, in fact, a cyborg opens up new possibilities for humans: 'people are nowhere near as fluid, being both material and opaque. Cyborgs are ether, quintessence' (Haraway 1991: 152).

In Haraway's sense of a cyborg as 'living' quintessence, there is none more so who epitomises this than the singer Björk who has been at the forefront of experimenting with new technologies since her first experiments with music videos in the 1990s. A writer in *Dazed* magazine notes that 'it's fair to say that no other musician is as embracing of technology's intersection with digital art as Björk' (DeWolf 2016: n.pag.). In 2015, The Museum of Modern Art (MoMA) in New York presented a retrospective of the work of the composer, musician, artist, and singer drawing from more than twenty years of Björk's innovative projects and her full-length albums to chronicle her career through sound, film, visuals, instruments, objects, and costumes. In Chapter 6, her *Björk Digital* (2016) global exhibition will be discussed in more detail alongside a number of works presented in the context of virtual reality (VR). Here I want to focus on the press event for the launch of her *Björk Digital* exhibition where Björk appeared via live-stream motion capture from Iceland. I keep returning to this interchange. Watching Björk talking to the interviewer in this way opens up a kind of normalisation of seeing the body hybridised, wrapped around Björk's own expression of her identity, and perhaps representative of her own embodied experience.

This hybrid body that she embodied live echoed that of the creative work she undertook for the music video for *Family VR* (2016) with film director Andrew Thomas Huang. Huang collaborated with Björk on her earlier album *Biophilia* (2015), which will be discussed later in the chapter in relation to bio-cultural transformations, as well as directing other VR and immersive pieces in the *Björk Digital* exhibition including 'Black Lake I' (2015) and 'Stonemilker' (2015). The original music video for 'Family' was made in 2015. By the time Björk and Huang came to make the VR version of 'Family', as Huang noted:

> All the VR technology had changed. The HTC Vive really proved to us that this is what we'd been waiting for. You want to be able to move around volitionally through a space, not just be stuck in one place. In other headsets you can look around, but you're kind of stuck as a passive viewer. Now you can walk around in a space that is one-to-one with the virtual space that you're looking at.
>
> (Huang in Larson 2016: n.pag.)

Working with visual artist, James Merry, who works with hand embroidery and mask making, and who created the head and face pieces for the video, Huang notes that with his own drawing and painting background he was able to create the 'entire world' for the VR piece, including the objects and the set design for it. The work echoes the sentiments of Haraway when writing 25 years earlier notes that in our experience of the cyborg 'the boundary between physical and non-physical is very imprecise for us' (Haraway 1991: 152).

Stelarc and the cyborg/hybrid body

> *Contemporary science fiction is full of cyborgs – creatures simultaneously animal and machine, who populate worlds ambiguously natural and crafted. Modern medicine is also full of cyborgs, of couplings between organism and machine.*
>
> (Haraway 1991: 149–50)

> *The breeze is attaining planetary escape velocity. The brain is bursting from its genetic confinement, hovering between gravity and fantasy, intuitively.*
>
> (*Prepared Tree Suspension: Event for Obsolete Body No. 6, Black Mountain, Canberra 1982)*

Any discussion of the hybrid body has to include the work and ideas of Australian performance artist Stelarc. Working for a number of decades rethinking the body and its relationship to technology, he declared that the 'body is obsolete' (Stelarc n.d.: n.pag.). His aim was and still is to 'expand the material limits of the body in order to meet the exponential growth in technologies' (Burton 2015: 39). The quote above is a description of one of his suspension works that were performed between 1976 and 1988, where he suspended his body by hooks pierced through his flesh in wide-ranging situations. Other significant works developed in the decades that followed were the *Third Arm*, first created in 1980, a mechanical human-like hand that is attached to Stelarc's right arm as an additional hand, made to the same dimensions as his real right hand. *Ear on Arm* (2006), *Exoskeleton* (2009), and *Body on Robot Arm* (2015) all point towards a performance artist who is pushing the physical boundaries of the body and our understanding of the limitations of the body itself. In a 2020 artist statement for his *Audiograms* series, as part of the *52 Actions* online exhibition of Australian artists, he writes:

> The body has become a contemporary chimera of meat, metal and code. Its metabolism, musculature, sensory and cognitive capabilities are hard-wired to its instruments, machines and computational systems. Bodies become end-effectors for other bodies in other places and for machines elsewhere […] the body is neither all-here nor all-there, but partly here (as this body) and partly elsewhere (as its digital doppelganger).
>
> (Stelarc 2020–21: n.pag.)

Noting that especially living in the information age, 'the body is biologically inadequate' (Stelarc 1980–2022: n.pag.), and argues, 'the body must overcome centuries of prejudices' (Stelarc 1980–2022: n.pag.). Contrary to other views of the post-human he further argues that 'to be human *is* to be augmented, extended

and enhanced by technology' (Stelarc 1980–2022: n.pag., my emphasis). Philosopher Paul Virilio, writing at that time criticises Stelarc and his 'eugenic' activities and rather dismissively notes that 'he thinks that technological forces will allow him to transfigure himself – become something other than what he is. An angel, an archangel, a mutant, a cyborg or whatever' (Virilio in Zurbrugg 1999: 179).

I want to look now at a performance by Stelarc that builds upon a piece of work that he had developed in *Second Life* a few years earlier, that of *Avatars Have No Organs* (2009). *Out of Your Skin* (2013) performed in Melbourne saw Stelarc develop a system of three avatar clones in *Second Life* that were each choreographed to move in and out of each other's bodies: one a skeleton, another a musculature, and the other was 'skinned' to look like Stelarc's avatar with a mechanical right arm attached and with an animated heart outside of its avatar body (see Figure 5.1). A series of sounds mapped to the animations and the *Second Life* space provided a projected backdrop to Stelarc performing in front of the screen. A fourth avatar was performing live in *Second Life* as an animation that was choreographed by Stelarc's right arm movements on stage.

This seemingly complex performance incorporates an active and critical exploration of what Stelarc terms unexpected kinds of performative interaction in situations where 'you have the choice' to define the performance situation (Stelarc 1980–2022: n.pag.). He further explains that 'because you are aware of what's going on, this loop of consciousness creates the possibility of response and interaction' (Stelarc 1980–2022: n.pag.). Earlier in 2003 Stelarc, in discussing a work called *Movatar*, anticipated such an interaction:

> Consider, though, a virtual body or an avatar that can access a physical body, actuating its performance in the real world. If the avatar is imbued with an artificial intelligence, becoming increasingly autonomous and unpredictable, then it would become more an AL (Artificial Life) entity performing with a human body in physical space.
>
> (Stelarc in Hatziyiannaki 2017: n.pag.)

A further work to discuss by Stelarc, described as a work in progress, is *Walking Head Robot* (2006) (see Figure 5.2). This work consists of a 2m diameter six-legged autonomous walking robot with a scanning ultra-sound sensor that detects the presence of a person in front of it. Vertically mounted on its chassis is an LCD screen that can rotate from side to side. It is imaging a computer-generated human-like head.

Installed in a gallery space it sits still until someone comes into the space – then it stands, selects from a set of movements from its library of pre-programmed motions, and performs the choreography. At that time Stelarc commented that 'increasingly,

FIGURE 5.1: Stelarc, *Out of Your Skin*, Westspace, Melbourne (2013). Photo: courtesy of the artist.

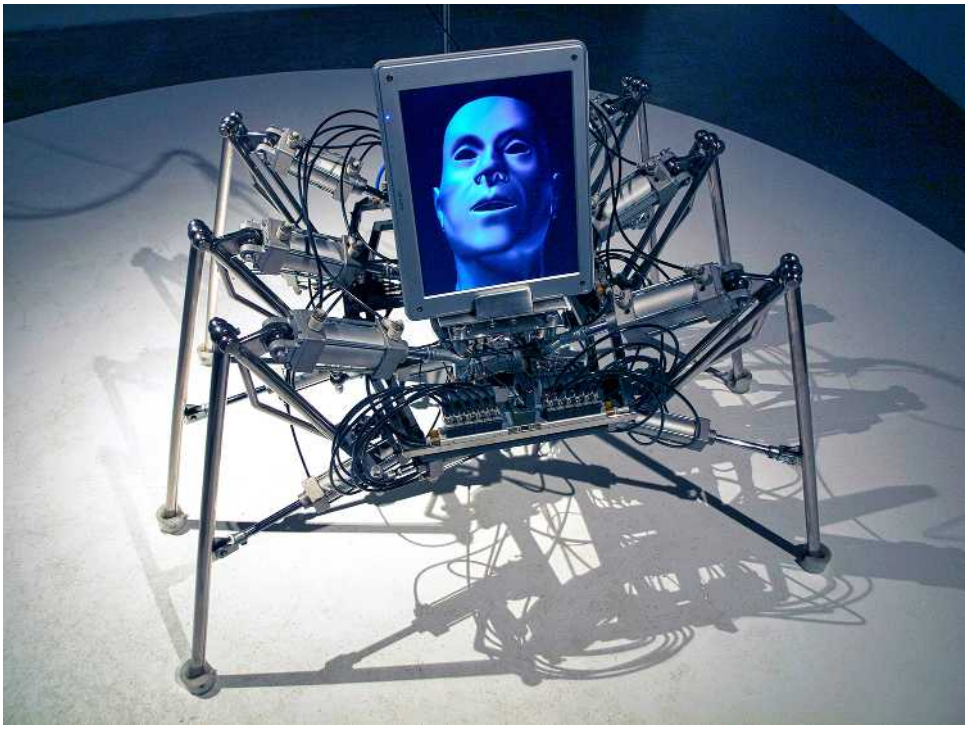

FIGURE 5.2: Stelarc, *Walking Head Robot* (2006). Photo: courtesy of the artist.

robots will go beyond biomimicry to human-insect-animal hybrids. […] But having a human face and human-like manipulators will facilitate its interaction with other people in social spaces' (Stelarc 2006: n.pag.). Watching recordings of the *Walking Head Robot* 'perform' echoes the words of Haraway: 'our machines are disturbingly lively and we ourselves, are frighteningly inert' (Haraway 1991: 152).

In her book chapter 'Dialogues with dolphins and other extraterrestrials', Mette Bryld quotes porpoise watcher Ken Norris who refers to the dolphin as 'the creature of the interface' (Norris in Bryld 1996: 68). Bryld explains further, 'living where air and water join, the animal meets the period's strong and still continuing quest for hybridizations, for the binding together and rematching of what used to be very odd and incompatible worlds' (Bryld 1996: 68). Stelarc, like the dolphin, continues to explore and live where two worlds meet, although two decades beyond the comments by Virilio seem closed to the future, and Stelarc himself and his ambitions appear less strange, and certainly more familiar to those who engage heavily in new technologies. It is true, it is hard to imagine what it feels like to be Stelarc; what it's like to have a half-formed ear growing on your arm, being strung up on hooks by

your skin, or having a mechanical arm mimicking your own. However, his exploration beyond his own skin has raised many important questions about what it is to be truly human. Other work by Stelarc will be discussed later in this chapter and in Chapter 7 with reference to other work he developed on the *Second Life* platform.

Inhabiting the robot body

The inhabitation of other bodies and being able to be 'present' in a geographically different space beyond a sense of telepresence has undertaken a new research focus in recent years not least in light of the lockdown experiences many of us faced in the Spring of 2020 and beyond, and further advances in digital technologies. In 2018, the XPrize Foundation[2] launched the ANA Avatar XPrize with the aim of creating an avatar system that can transport human presence to a remote location in real time. The challenge was to create a physical robot (rather than digital) avatar that a person can inhabit and perform in from a different location. This allows a transfer of physical aspects such as touch, wind, temperature, and smell, alongside the ability to interact in the remote space with physical objects or people for example. NIMBUS, winners of the prize in 2022, describe their project as an avatar system that allows 'full immersion into a remote space while embodying the operator in a robotic system, giving them the ability to navigate and physically interact with both remote environment and persons' (Swartz et al. 2023: n.pag.). While the technology to provide this functionality already existed, the prize served to incentivise new innovations and the results from the winning teams are already adding much to our understanding of embodiment through hybrid forms. The technologies have yet to be fully explored by artists within the domain of digital technologies but it is interesting to consider what the embodied and embedded experience of the operator might be and research with this focus would give an interesting juxtaposition alongside the hybrid/cyborg/robot bodies inhabited.

Identity and the hybrid body

Returning briefly to Stelarc's response to Virilio's position in 1999 draws out an important point about our bodies place in relation to our identity:

> He (Virilio) sees technology as a kind of threat to the body […]. Technology outside of the body might be OK, but he seems to see technology as more of a threat when it invades body tissues – as if it betrays a body operating with a capital 'I'.
>
> (Stelarc in Zurbrugg 1999: 188)

This potential threat to our identity is evident for Virilio but now, this chapter turns to the relationship between identity and a continued examination of what we are terming the 'hybrid body'. A UK study in 2013 forecasting how our identities will change in the following decade noted that until now a kind of inner narrative has provided individuals with an ongoing subjective, internal commentary but through the growth of online social media, identity is no longer an internal, subjective experience, but is constructed externally and therefore is much less robust and more volatile (Future Identities 2013). American artist Micha Cardenas notes that:

> Because we are surrounded by avatars, ghostly doubles of ourselves which exist in digital form [...] our identities are multiple and constantly being produced by our imagining of them and by others' interactions with them. Avatars are just one way in which identity becomes an assemblage, a distributed network of feedbacks, flows and processes.
> (Cardenas et al. 2009: 12)

However, the UK study argues that the internet has not created a new kind of identity, 'rather, it has been instrumental in raising awareness that identities are more multiple, culturally contingent and contextual than had been previously understood' (Future Identities 2013: 4). Geoffrey Batchen describes the modern human subject in his article, 'Spectres of cyberspace' (1995) as, 'a being produced within the interstices of a continual negotiation of virtual and real' (Batchen 1995: 7), in which, 'in Lacan's schema, a never resolved assemblage of virtual and real is what makes up the very fabric of human subjectivity' (Batchen 1995: 7). However, what the internet and new technologies have allowed, is for us to have the tools in order to further explore those multiple identities. As a veteran of the *Second Life* space, Morie describes herself as having a 'closet full of avatars to match her multi-faceted personality' (Morie in Doyle 2011: 100). One of Morie's first social experiments in *Second Life* was the creation of avatars Chingaling Bling and her sister China. Using two separate computers she would log in as both sisters to see if other avatars she met would believe they were two different people behind the avatars: they did. Whilst avatars can be used to playfully explore our identities, artist Lynne Heller comments that: 'An avatar is not object. Nor though is it subject. The avatar occupies an uneasy position between the two and destabilizes our sense of self within user-created environments' (Heller 2015: 156–57).

The bio-cultural body

Returning again to the fields of literature and feminist science studies, Squier in her pioneering and provocative text *Liminal Lives: Imagining the Human at the*

Frontiers of Biomedicine (2004) observes that 'no longer stable, the boundaries of our human existence have become imprecise at best, contested at worst' (Squier 2004: 7). In further discussing elements that contribute to those changing boundaries of human existence, Squier challenges Victor Turner's notion of the liminal as a purely cultural construct that is played out in key moments in a person's life. Turner presupposes that biology is a constant, something that is fixed; it is rather culture that offers the potential for liminal spaces to be created (Turner in Squier 2004: 4). As Squier notes, 'as Turner understands it, while the liminal is shifting, life *is* still stable' (Squier 2004: 6, original emphasis). However, she argues that 'contemporary biomedicine necessitates a significant revision of Turner's thesis, one that acknowledges the shifting, interconnected, and emergent quality of human life' (Squier 2004: 6).

Liminality is bound to the temporal, to the passage of time itself. Squier advocates that 'we need to move beyond Turner's exclusively cultural framing to understand liminality not merely as a cultural state but as a biocultural process' (Squier 2004: 8). Creating from a liminal space or a liminal zone, making manifest from these transitional spaces raises questions about the relationship between technology and biology. Squier notes that creations from the space of the liminal (for example the case of adopted embryos) are neither one nor the other, neither life nor not life, suggesting that this becomes 'a new biological personhood mingling existence and non-existence' (Squier 2004: 5). Finally, she suggests that 'to discover the sources and significance of new forms emerging in our era, we must engage in the same kind of boundary crossing that characterizes the new bio-technologies' (Squier 2004: 10). Again, turning to Björk to consider her *Biophilia* project and eventual music album, Richards notes that '*Biophilia* announced a deeper phase of scientific enchantment for Björk. She rejoiced in the magical aliveness of chemistry, musicology and the planets, all rendered with pixels on touch-screens' (Richards 2011: n.pag.). Describing the concept behind *Biophilia*, she notes that: 'It's just the feeling when you start thinking about your ancestors and DNA. The grounds open below you and you can feel your mother and her mother, and her mother, and her mother, and her mother 30,000 years back' (Björk in Raby 2012: n.pag.).

In the music video for 'Hollow', Dutch animator and director Drew Berry combined molecular models of DNA and proteins to produce, what he calls a whimsical and playful journey where, 'inside a cell nucleus the audience encounters Björk's ancestral spirit – her ghost in the machine – that watches over her genes as they flow from one generation to the next' (Berry in Raby 2012: n.pag.). Björk was in discussion with (sometimes controversial) ecological philosopher Timothy Morton, who argues that nature, 'instead of existing "over there" with the forests and fields – is a master network in which humans are totally intertwined,

along with our tools and technologies' (Monroe 2018: n.pag.). This concept is not in competition with the view of Stelarc. These varying states of liminality, whether they be between worlds (such as that expressed by the dolphin between land and sea), between biology and technology as expressed by Stelarc, or deep into the chronological history of DNA – there is both a horizontal and a vertical connection – in these varying states of liminality. In fact, Squier observes that it is the liminal lives that should demand our attention as powerful representatives of transformation (Squier 2004: 5).

The post-gendered body

> The cyborg is a creature in a post-gender world, it has no truck with bi-sexuality, pre-oedipal symbiosis, unalienated labour or other seductions to organic wholeness through a final appropriation of all the powers of the parts into a higher unity.
>
> (Haraway 1991: 150)

Haraway breaks apart the sense of unity proposed by others. I turn now to a discussion of gender and consider what Haraway indicates as a post-gender world in the quotation above. This exploration of gender has found rich and fluid grounds in new technologies and in particular in virtual worlds negotiated through avatar form. Arthur Kroker's quote from *Body Drift: Butler, Hayles, Haraway* (2012) at the start of the chapter needs reinforcing here. He comments on Haraway's concept of the hybrid body, and that, in fact, it only knows the borderlines, the intersections, the unsituated, as 'neither pure information nor pure flesh, the hybrid body knots the strange experience of being digital, being plant, being animal, being mineral into a beautiful labyrinth of knowledge' (Kroker 2012: 14). Further he highlights how when we explore 'different forms of life that appears when the borderline comes inside our bodies [...] we become the intersections, ruptures, and intermediations of our most creative imagination' (Kroker 2012: 14). Using a range of art projects, the chapter now explores how technology can aid the exploration of new forms and senses of our own identity, extending the notion of transformation through digitally constructed realities through the exploration of gender and identity transformations, constructions, and deconstructions. There are three art projects, all developed in *Second Life*, that in many ways reflect the sentiments of Kroker's observations of Haraway's hybrid body, or certainly they all attempt to explore it: *Becoming Dragon* (2009) by Micha Cardenas, *The Adventures of Nar Duell* (2007–ongoing) by Lynne Heller, and *Meta_Body* (2011–ongoing) by Catarina de Sousa.

Micha Cardenas's Becoming Dragon

An enduring project entitled *Becoming Dragon* (2009) was developed by Micha Cardenas[3] whose goal was to 'develop a working, immersive Mixed Reality system […] to control a character in *Second Life* […] in order to examine a number of questions regarding gender, identity and the transformative potential of technology' (Cardenas et al. 2009: 1). The project questioned 'the one-year requirement of "Real Life Experience" that transgender people must fulfil in order to receive Gender Confirmation Surgery' in the United States at that time through the mixed-reality performance (Cardenas 2010: n.pag.). Cardenas however explains that she remains critical of the concept of mixed reality 'as it presents an idea of realities as totalities and as objective essences independent of interpretation through the symbolic order' (Cardenas et al. 2009: 1). For the performance Cardenas 'lived' for 365 hours immersed in *Second Life* via a head-mounted display: 'Only seeing the physical world through a video-feed [...] during the year of research and development of this project I began my real life hormone replacement therapy' (Cardenas 2010: n.pag.).

Cardenas explains that the performance was initially inspired by an essay by games designer and academic Celia Pearce and Artemesia (Pearce's avatar) entitled 'Communities of play: The social construction of identity in persistent online game worlds', which was later to become an MIT Press book publication.[4] In it they wrote about how 'many players feel "more themselves" in their avatar persona than they do in real life' (Pearce and Artemesia in Cardenas et al. 2009: 2). Cardenas connected these responses to those of the transgender and transsexual community where they feel they are in the wrong bodies or the gender they were assigned at birth do not reflect their true selves (Cardenas et al. 2009: 2).

The 365 hours 'lived' in *Second Life* by Cardenas amounted to approximately 15 days in December 2008 remaining inside the Centre for Research in Computing in the Arts (CRCA) at the University of California San Diego throughout the performance. During that time Cardenas discovered there were many beautiful and interesting places in *Second Life*, she gave three research talks (one of which was with Stelarc) and met many visitors inWorld during the performance. Explaining the physical experiences associated with the durational performance, Cardenas notes that she often sensed a loss or distorted sense of time and often a lack of hunger as her consciousness shifted away from her physical body. Anna Munster wrote of a distortion of time that was common in VR experiences (Munster in Cardenas et al. 2009: 7). A sense of a deep connection to the virtual space and a distorted sense of time in a durational performance was expressed by Joseph DeLappe in his Salt March project already discussed in Chapter 4. It is interesting how quickly this shift can occur in humans,

and in fact, it can take only a matter of days in which to occur. So too, a sense of becoming, and as Munster further notes:

> The incorporeal vectors of digital information draw out the capacities of our bodies to become other than matter conceived as a mere vessel for consciousness or a substrate of signal […] we may also conceive of these experiences as a new territory made possible by the fact that our bodies are immanently open to these kinds of technically symbiotic relationships.
>
> (Munster in Cardenas 2009: 1)

Cardenas notes that both virtual worlds and biotechnology are technologies of transformation and 'offer the promise of becoming something else, of having a new body and a new life' (Cardenas 2010: n.pag.). Writing in 2009 she comments: 'I see my own gender as outside of male and female, and I see the notions of male and female as flawed, essentialist constructs that that do not match the rich multiplicity of the material world' (Cardenas et al. 2009: 10).

This mixing of realities and ultimately mixing of genders in her performance piece focuses on this process of becoming and she concludes that 'the epistemological topology of becoming is shaped by the radical unknowability of the future' (Cardenas 2010: n.pag.). Cardenas identifies with the concept of 'a million genders for a million people' and that through the transgender experience, new and unexpected geometries can appear. Cardenas continues that 'the dragon, a mythical shapeshifting creature of magic, is one such unexpected geometry' and is close to the Coyote spirit of transformation of Haraway (Cardenas et al. 2009: 10). The enduring legacy of *Becoming Dragon* is evident in its inclusion in the *Beautiful Worlds: Virtual Realities in Contemporary Art* exhibition at the Zeppelin Museum in Friedrichshafen, Germany in 2017.

Catarina de Sousa's Delicatessen *project*

In her ongoing art projects in *Second Life*, Portuguese artist Catarina de Sousa's work creates as many questions as it may answer. In partnership with her mother and Portuguese artist Sameiro Oliveira Martins, they focus on the construction of embodied identity through the avatar where they have developed the concept of shared creativity through collective creation, distributed creation, and collaborative creation (Sousa 2012), which will be further discussed in Chapter 7. This emerging method opens up new avenues to understand and explore the construction of gender and identity in virtual worlds. The project focused on two concerns: 'the avatar as body/language, open to experimentation and potency, and avatar

building as a shared creative process and aesthetical experience' (Sousa 2015: 187–88). Here I focus in particular on the avatar as body/language. Writing in 1988 Judith Butler comments on how gender is constructed: 'In this sense, gender is in no way a stable identity or a locus of agency from which various acts proceed; rather it is an identity tenuously constituted in time – an identity, instituted through a stylized repetition of acts' (Butler in Sousa 2012: 11).

Initially, it was Sousa's mother who created her avatar Meilo Minotaur in *Second Life* in 2008 and quickly encouraged her daughter to join her. Sousa describes her and her mother's reaction to the *Second Life* space as similar to that in her childhood playing dress-up or like 'playing with dolls' was their initial response to the avatars and the space they found themselves in. Sousa notes in her Ph.D. thesis that *Second Life* itself tends to be a mixture of fictional and factual, a tension, where two perspectives meet – firstly as immersive, where the space is seen as self-contained and allows for fictional role-play and the second, a kind of augmentation, seen as an extension of real life (Sousa 2016: 166–67). Sousa's mother played with 'alt avatars', each having their own characteristics and personalities and as Sousa notes 'playing dolls was getting more and more complex' (Sousa 2012: 3). An example is *Darkdoll* (see Figure 5.3).

In 2009, they developed their first *Second Life* region called *Delicatessen* consisting of a number of connected islands. Following an invitation to participate in the 5th *All My Independent Women* (AMIW) exhibition in Coimbra, Portugal in the same year, they worked on their *De Maria, de Mariana, de Madalena* (2009) project together in response to a collective reading of the controversial book *New Portuguese Letters* (1972) by Maria Isabel Barreno, Maria Teresa Horta, and Maria Velho da Costa. The book was banned by the Portuguese authorities at the time and only made available a few years later in 1974 following the April 25th revolution in Portugal. Responding to research undertaken by Nick Yee and Jeremy Bailenson in 'Walk a mile in digital shoes' (2006) where they suggest that the possibility of embodied perspective taking in virtual environments has an impact on negative stereotyping, they built three avatars corresponding to the three Maria's. Subsequently, participants were invited to 'embody' one of the three female avatars before exploring the *Delicatessen* space for their exhibition. Describing Maria, a pregnant woman; Mariana, a tree inspired by verses from Björk's 'Bachelorette';[5] and Madalena, the gaze prisoner, as avatars who were not intended solely as female stereotypes, but rather, as Sousa expresses it, 'to problematize such concepts through metaphorical appropriation of the body, giving them away to be torn apart and rebuilt' (Sousa 2016: 171).

Sousa notes that Haraway's version of the cyborg is fitting to the work created for *De Maria, de Mariana, de Madalena*: 'Liberation rests on the construction of the consciousness, the imaginative apprehension of oppression, and so of

FIGURE 5.3: *Darkdoll* by avatar Meilo Minataur (2012). Photo: Catarina Carneiro de Sousa AKA CapCat Ragu.

possibility. The cyborg is a matter of fiction and lived experience that changes what counts as women's experience in the late twentieth century' (Haraway 1991: 149).

Sousa argues that the customisation of avatars enables this 'imaginative apprehension' of the body and its construction and meaning (Sousa 2016: 171). This can be undertaken individually, or collectively. Describing later in her participatory *Meta_Body* project where eighteen original avatars were distributed, full permissions were given to alter and develop the avatar representations, with a subsequent call for derivative artworks based on one or more of the avatars made. Sousa writes that: 'by distributing free and open material, further enabling users to experiment and express themselves through their avatar, actively inciting their transformation and the process of becoming in the liminoid space of the metaverse' (2015: 209).

Lynne Heller's The Adventures of Nar Duell

In the exploration of identity and gender through the avatar in *The Adventures of Nar Duell* (2007–ongoing), Canadian artist Lynne Heller suggests the relationship between herself and her avatar is akin to that of a mother/daughter relationship, and explores issues of appropriation and the avatar as a found object (Heller 2015). She traces 'a process of creating in SL from found object collage, through collecting/consuming practices and finally to the notion of the bought self, avatar representation in virtual worlds through consumerist artistic practice' (Heller 2015: 140). Heller remarks that 'when naming an avatar in *Second Life* you are confronted by the realization that you are creating an alter ego [...] the name you choose is the only aspect of your avatar that can never change' (Heller 2015: 150). As with Wanderingfictions Story (see Chapter 4), Heller's avatar name perhaps has influenced her approach to her artistic methods within the *Second Life* space. Further to this Heller, whilst acknowledging the significance of embodiment, stresses how this is actually 'advanced through the nurturing and aestheticisation of the avatar [and] is fundamental to the relationship between person and virtual representation' (Heller 2015: 153). As Heller notes, 'SL is a petri dish under the microscope due to all the "real" that people bring into this virtual world' (Heller 2015: 155). Each of these art projects intentionally challenges our understanding of our identities as fixed and stable, questioning to an extent the process of nature that is echoed in the sentiment offered by Brian Eno: 'we come from a cultural heritage that says things have a "nature", and that this nature is fixed and describable. We find more and more that this idea is unsupportable' (Eno in Ayiter and Ugajin 2015: n.pag.). All of the projects imply either a birthing or a bio-technical process, and all highlight the potential of online worlds and in particular *Second Life*, as a platform that can transform the 'real' that is brought into it.

Conclusion

In this chapter, I have attempted to chart the hybrid body, noted by Kroker in response to changing technologies. Haraway's seminal manifesto in the early 1990s still holds true today, although 30 years on her argument is ever more persuasive and certainly being lived out in the twenty-first century. In turn, the work of Stelarc is closely aligned with Haraway's thinking on the cyborg body and again, reading the responses to his work in the 1990s attests to early his understanding of what can be termed the post-human, although Stelarc himself would not agree to the term.

The work of Cardenas opens up the discussion on the very nature of gender and to what degree we need to identify as any gender at all. The exploration of gender is significant to the hybrid body and perhaps it is the very hybridity that allows the discussion to begin at all. A striking theme found in a number of works in this chapter is that of the strong gender female lines discussed and evident in Björk to the Sousa's and in Heller's work. Is there something about the space created by new technologies, particularly as they emerge, that can be claimed outside of a dominant patriarchal view that needs to be further considered? Björk herself noted that working in VR seems like 'a stage for women outside of the patriarchy' (Björk in Monroe 2018: n.pag.). Perhaps new technologies can be that same stage for female artists and practitioners.

The potential of new technologies for exploring issues of transformation and identity by the artists discussed in this chapter points to new relationships to the hybrid body, sometimes offering entirely new embodied experiences. As the real and the virtual, and the real and the imagined are no longer strangers (or opposites), it is also true that the physical and the virtual have become more firmly entangled. In the accounts of those who have experienced hybrid bodies, the heterogeneity of the experience points towards a complex interweaving of the virtual and the physical, and that of the body pulled apart and reconstructed to suit our new experiences of hybridity through new technologies whether they are cyborg, robotic, or other.

In the last three chapters, I have explored 'bodies' in a range of ways – firstly taking on the persistent experience of gravity that is almost entirely unnoticed by us yet forms such a significant part of our embodied experience on terra firma. What is revealed when artists play with the idea of gravity is that it is deeply embedded in the physical experience of our bodies. When we turn to the virtual body and its relationship to the physical body, as discussed in Chapter 4, we find that there are multiple virtual bodies and multiple experiences of embodiment because of this. When we move to the hybrid body, we see that there is the inevitability of the cyborg body and its cultural consequences through the very existence of new

technologies. I turn now to an examination of the specific technologies that have and continue to be explored by artists in this arena in VR, virtual worlds, and mixed and extended realities.

NOTES

1. The scientific definition of a chimera is an organism made up of two kinds of DNA. See: https://www.newscientist.com/question/what-is-a-chimera/.
2. The XPrize Foundation is global movement that was set up more than 25 years ago in order to solve the world's most pressing challenges by incentivising innovation through large-scale competitions and prizes. See https://www.xprize.org/.
3. I was on a conference panel with Cardenas in 2009 during the *Digital Arts and Culture Conference* (DAC09) at the University of California, Irvine in December 2009.
4. Pearce, C. (2009), *Communities of Play: Emergent Cultures in Multiplayer Games and Virtual Worlds*, MIT Press: https://mitpress.mit.edu/books/communities-play.
5. 'I'm a tree that grows hearts / One for each that you take' (Björk 1997: n.pag.).

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SECTION III

TECHNOLOGY

6

Two Waves of Virtual Reality

The medium of immersive space is not merely a conceptual space but, paradoxically, a physical space in the sense of being extended, three dimensional and enveloping. As such it is an entirely new kind of space that is without precedent.

(Char Davies 1998: 69)

Introduction

Writing in 2016 Brenda Laurel, author of the influential book *Computers as Theatre* (1991), commented that 'Virtual Reality is everywhere again – and that's a problem […] when the terms is appropriated its meaning disintegrates' (Laurel 2016: n.pag.). Neuroscientists Mel Slater and Maria Sanchez-Vives note that the resurgence of interest in virtual reality (VR) in recent years can be attributed, at least in part, to a combination of market forces and technological development (Slater and Sanchez-Vives 2016). As the title of this chapter suggests, there appear to be two distinct waves of artistic engagement with VR, the first during the initial technological development that enabled VR to become accessible to some artists and the second wave, as Slater and Sanchez-Vives suggest, has been based on a much greater accessibility of immersive headsets for artists and for a wider general public. This chapter will discuss works that are entirely immersive using a head-mounted display (HMD) or similar immersive device to experience an immersive environment with a view to distinguishing this from other hybrid experiences. As Slater notes, 'VR must be used as a medium in its own right, with its own conventions, allowing people to realise experiences that can only be done in VR' (Slater in Kozel et al. 2018: 4). The term virtual reality has been interchangeably used to mean virtual environments and virtual worlds amongst others but here the intention is to solely examine the use of VR in artistic practices (where the intention is for the participant to largely experience virtual space through total immersion), reserving the analysis of the mixed use of VR within mixed reality environments to other chapters. Hybrid

projects that also utilise VR will be explored in Chapter 8 and projects that focus on the body and utilise VR have already been discussed in Chapter 4.

Brief history of the development of VR

There are various claims for the first use of the term 'virtual reality', but it was Jaron Lanier who is attributed to have first coined the term in the 1980s to distinguish between being wholly immersed in a virtual environment (Dixon 2006: 26–27). However, Steve Dixon suggests that it was in fact the theatre theorist Antonin Artaud who first coined the term 'virtual reality' in 1938 describing how theatre's own reality develops in a dreamlike and alchemical way (Artaud in Dixon 2006: 24). While the term 'virtual reality' is considered to be an oxymoron by Grosz (2001: 80), Ken Pimental and Kevin Teixeira assert that 'virtual reality is all about illusion. It's about computer graphics in the theatre of the mind. It's about the use of technology to convince yourself you're in another reality' (Pimental and Teixeira in Dixon 2006: 26). Oliver Grau likens VR to earlier panoramas or what he terms 'the specific media of an epoch' (Grau 2003: 5) and explains that:

> The idea of installing an observer in a hermetically closed-off image space of illusion did not make its first appearance with the technical invention of computer-aided virtual realities. On the contrary [...] the idea goes back at least as far as the classical world, and it now reappears in the immersion strategies of present-day virtual art.
> (Grau 2003: 4–5)

Writing of the ontology of VR in the early 1990s, Howard Rheingold defined it using three interrelated aspects: 'one is immersion, being surrounded by a 3D world; another is the ability to walk around in that world, choose your own point of view; and the third axis is manipulation, being able to reach in and manipulate the 3D world' (Rheingold 1991: 34). What Rheingold terms 'the third axis' will be discussed later in this section as it is a key feature of the attempts of the first wave of VR development to bring about a sense of embodiment in virtual space. One of the features of this is the development of the data glove, not only to feel immersed in a virtual space and see a visual representation of ourselves in the virtual space through a virtual hand representing the data glove but also to be able to interact with it.

According to Morie, in tracing the roots of the development of VR, it was Ivan Sutherland, a young doctoral student at MIT who, in 1963, invented the forerunner of all interactive computer systems, the *Sketchpad* (Morie 2007: 15). The user could draw lines, circles, and other geometric shapes that could also

be manipulated. Computers of the time generally outputted data onto paper. However, in *Sketchpad* this was the first time a computer had a visual output device, which was a radical departure for the time. Two years later in his article 'The ultimate display' (1965) Sutherland defined the concept of a computer-mediated virtual world, 'if the task of the [computer] display is to serve as a looking glass into [a] wonderland constructed in computer memory, it should serve as many senses as possible' (Sutherland 1965: n.pag.). In his work for DARPA,[1] he created the first HMD, as it became known.

Morie notes that the DARPA scientists were not alone in their visions of simulated worlds. Artists, scientists, writers, and what she terms 'entertainment visionaries' were also engaged in similar pursuits and 'out of their imaginations came conceptually different ideas about creating the world as a simulation' (Morie 2017: 16). Out of the field of literature came William Gibson's novels *Burning Chrome* (1982) and *Neuromancer* (1984) coining the term 'cyberspace' and from the field of film American cinematographer and inventor, Morton Heilig built a multisensory entertainment system called the *Sensorama* (see Figure 6.1) in the early 1960s, and it is considered to be one of the first attempts at creating an immersive, multi-sensory experience using technology. One of the five 3D films Heilig made for the *Sensorama* enabled the participants to feel like they were driving through the streets of New York City, with the wind in their hair and strategically released smells in line with the shops they were passing (Morie 2007: 6–7).

Artist and scientist Myron Krueger created *Videoplace* which was a pioneering creation of full-body interactivity and virtual environments containing 25 different environments in which people could engage. Developed in the mid-1970s through to the late 1980s, *Videoplace* was a form of VR simulator, which was made up of projectors, cameras, and a screen. Participants in one lab interacted with shadows of a participant in another lab using coloured shadows superimposed on each other. Even though there was no direct tactile response from the other shadow, participants would pull away from it to avoid overlapping. This response suggests a feeling of virtual space, an environment with a different body altogether. He coined the term 'Artificial Reality' to describe what he was striving to create. According to Morie it was Jaron Lanier who started the first company in the early 1980s to commercialise personalised versions of VR technology (Morie 2007: 18). The 'Reality Built for Two' system used full body data suits to capture the user's movements that were transferred to the graphical model of the human represented in the virtual space (Morie 2007: 18). In the late 1980s, he developed the *EyePhone* system utilising a data glove (see Figure 6.3) that will be discussed later in the chapter. Finally, the invention of the Cave Automatic Virtual Environment (CAVE) by Carolina Cruz-Neira and her colleagues at the University of Illinois in 1992 consists of an immersive virtual projected environment where

FIGURE 6.1: *Sensorama*, Morton Heilig, 1962. Source unknown.

the participant stands in the centre wearing stereoscopic glasses surrounded by between three and six walls where virtual imagery is rear projected (Cruz-Neira et al. 1992). So, it was both new concepts that emerged and at the same time the

coming together of a number of new technologies that enabled VR to be created and experienced in this way through this first wave of VR.

First wave of artists engaged in VR

The earliest account of an artist gaining access to VR was, according to Morie (2007: 23), the French artist Nicole Stenger by way of the Human Interface Technology Lab (HITLab) at the University of Washington in 1989. The result was the first 'virtual reality movie' entitled *Angels* (1992) which was shown at the Biennale des Arts Electroniques in 1993 in Paris (Popper in Morie 2007: 23). However, it was also in the early 1990s that a series of projects were undertaken at the Banff Centre, Canada, and subsequently documented in *Immersed in Technology: Art and Virtual Environments* (Moser and MacLeod 1996). In the preface to the book, Douglas Macleod, the project director, likens this 'moment of virtual reality' to a similar moment in time when Vertov's *Man with a Movie Camera* was released in 1929, cataloguing the potential of the film medium (MacLeod in Moser and MacLeod 1996: ix). Morie notes that the importance of the Canadian government's support for this 'fledgling medium cannot be overstated' (Morie 2007: 23). A total of nine artworks were developed through the overarching *Art and Virtual Environments Project* at Banff between 1991 and 1994. Of particular note were three works: Brenda Laurel and Rachel Strickland's *Placeholder* (1993), *The Archaeology of the Mother Tongue* (1993) by Toni Dove and Michael Mackenzie, and the VR performance, *Dancing with the Virtual Dervish: Virtual Bodies* (1994), by Diane Gromala and Yacov Sharir, each will be discussed further below. These projects were particularly innovative in their exploration of VR environments in an art context.

Placeholder (1993), explains Laurel, 'explored a new paradigm for narrative action in virtual environments' (Laurel et al. 1994: 118). The project took inspiration from three actual locations near the Banff National Park: a cave, a waterfall, and a river valley, and the subsequent VR system was intended for two players wearing HMDs who were networked together in the virtual space. They could each physically move within a ten-feet circular stage (see Figure 6.2) whilst wearing display helmets and body sensors. Each 'experient'[2] could take on the persona of a spirit animal: a snake, a spider, a raven, or a fish. Strickland notes that this was in part inspired by the German word *Umwelt*, a term used by naturalist Jakob von Uexküll to mean the unique point of view any creature has depending upon their particular sensory or cognitive apparatus. The strategy of enabling the experient to take on the persona of an animal as a form of 'smart costume' in the space was further inspired by the traditions and spiritual practices through ancient stories and myths (Laurel et al. 1994: 118). Laurel explains that:

FIGURE 6.2: *Placeholder*, virtual environment project, designed by Brenda Laurel (left) and Rachel Strickland (right). CC A 4.0 by Rob Tow and Brenda Laurel. Photo: Rob Tow.

> The experience of VR hinges on human action and the environment's response. This is true in both perceptual and emotional terms. In VR, one is not *done unto*, but *doing* [...]. One comes to know a place with all one's senses and by virtue of the actions that one performs there, from an embodied and situated point of view.
>
> (Laurel et al. 1994: 118, original emphasis)

A further strategy to give a sense of place was the inclusion of 'Voicemarks', a device where people could mark the virtual environment with their presence (Laurel et al. 1994: 122). Of note is Laurel's reflection at that time on how a key aspect of creating for VR was determined by embodied experience:

> Working on this piece has demonstrated to me that the art of designing in VR is really the art of creating spaces with qualities that call forth active imagination. The VR artist does not bathe the participant in content; she invites the participant to

> produce content by constructed meanings, to experience the pleasure of embodied imagination.
>
> (Laurel et al. 1994: 123)

In *Archaeology of the Mother Tongue* (1993), a work by Toni Dove and Michael McKenzie, described by Dove as a 'virtual reality murder mystery' (n.d.: n.pag.), the participants see the virtual world through a camera. The mystery is focused around the murder of a child and features a coroner and a pathologist. It takes 40 minutes to experience the whole narrative through three environments that take the experiment through a dream, a ribcage, and a geometric structure of a hand and skull, both of which are full of memories. Dixon notes that the project is exquisitely designed and contains 'breathtakingly beautiful digital imagery' (Dixon 2006: 28). The authoring tools for virtual reality were at such an early stage of development in the early 1990s that Dove explains that it was like 'build[ing] the piano in order to write the symphony' (Dove in Moser 1996: 277). The participants wore a data glove and saw 'a disembodied virtual representation of their own hand that allowed both navigation and interaction with objects' (Morie 2007: 25).

Dancing with the Virtual Dervish: Virtual Bodies (1994), by artist Diane Gromala and choreographer Yacov Sharir, resulted in 'several dance performances where the dancer and the audience members performed and interacted with a virtual environment in real-time' (Gromala and Sharir 1995: 49). The focus of the project, developed during a two years residency at the Banff Centre, was to explore 'concepts and experiences of the body on many levels. Visually, sonically, and behaviourally, it was created to provoke reminiscences of the body, of skin, of materiality, growth and decay' (Gromala and Sharir 1995: 50). Gromala describes the structure of the performances and programming as 'a constellation of if-then scenarios' (Gromala and Sharir 1995: 50). Of the use of the body they describe: 'These organs can be "entered" to reveal otherworldly chambers. The virtual body thus becomes an immersive, non-linear book, a text to be read, an architecture to be inhabited' (Gromala and Sharir in Dixon 2006: 36).

Artists such as Char Davies moved from painting to exploring virtual space in virtual environments and VR in the early 1990s, resulting in the works *Osmose* (1995) and *Ephémère* (1998), describing them in 2006 as the 'most talked about experience in the short history of VR art' (Dixon 2006: 31). According to Dixon the revolutionary aspect of *Osmose* was the use of an upper body interface in tandem with the use of an HMD creating an 'advanced sense of fully embodied immersion' (Dixon 2006: 31). The interface 'reads' the body from the waist up and in addition monitored the user's breathing. The single user, or 'immersant', must concentrate on their breath as a device to navigate vertically through the spaces represented. Standing in a small private chamber that faces the audience's space,

the immersant journeys through forests, clearings, sky, and earth. The audience can see two screens, one presenting the live VR point-of-view of the immersant, and the other showing the shadow of the immersant. This becomes a theme later in the second wave of VR, that of observing the participant (see *Tree VR* [2017] and *Nothing Happens VR* [2017]) discussed later in the chapter. Many immersants explain their experience of *Osmose* in similar terms to that of Mark Hansen:

> You are floating inside an abstract lattice […] you have no visible body at all in front of you, but hear a soundscape of human voices swirling around you as you navigate forward and backward by leaning your body accordingly […]. Exhaling deeply causes you to sink down through the soil as you follow a stream of tiny lights illuminating the roots of the oak tree.
>
> (Hansen 2006: 107–08)

Mark Jones expresses it in another way, 'I look all around me and the grid extends to infinity in all directions. I inhale and gradually begin to rise; if I lean forward I move forward. Lean back and I move backwards. I'm flying. I am an enigma, I have no physical form, yet I am whole. I am an "immersant"' (Jones in Dixon 2006: 32). Davies notes that the reliance on the breath as a mechanism to navigate through the space 'depends on the body's most essential living act […] – not only to navigate, but more importantly – to attain a particular state-of-being within the virtual world' (Davies in Thwaites 2005: 150).

In 'Landscape, earth, body, being, space, and time in the immersive virtual environments *Osmose* and *Ephémère*' (2003), Davies says that 'within this spatiality, there is no split between the observer and the observed' (1). She argues that this is not tied to a Cartesian paradigm, but rather allows 'another way of sensing to come forward, one in which the body feels the space very much like that of a body immersed in the sea' (Davies 2003: 1). In this private virtual space, by 'leaving the space of one's usual sensibilities, one enters into communication with a space that is psychically innovating [...] for we do not change place, we change our nature' (Bachelard [original 1966] in Davies 1997: 3). Davies notes that:

> I think of immersive visual space as a spatio-temporal area, wherein mental models or abstract constructs of the world can be given virtual embodiment in three dimensions and then kinaesthetically, synaesthetically explored through full-body immersion and interaction. No other space allows this, no other medium of human expression.
>
> (Davies 1998: 69)

Dixon notes that *Placeholder*, *Osmose*, and *Dancing with the Virtual Dervish: Virtual Bodies* all share an anti-Cartesian concern and each want to 'excite an

"embodied" experience' (Dixon 2006: 36). Further, Morie notes that it is sometimes the technology that adds something to the experience that may not have been intended by the artists[3] and in particular in *Osmose*, 'the text of the code, green on black, becomes one of the ethereal visions floating past the immersant's space as if she were seeing through the machine's eyes' (Morie 2007: 84). Other notable uses of VR in the first wave is *Desert Rain* (1999) a collaboration between Blast Theory and the Computer Research Group at Nottingham University, UK, combining video gaming with a performance installation with each participate undertaking a mission in a virtual world; Agnes Hegedus's *Memory Theater VR* (1997)[4] and Monika Fleischmann and Wolfgang Strauss's *Home of the Brain* (1992) featuring 'houses of philosophers represented as buildings of thought [exploring] their opposing positions on digital culture' (Fleischmann and Strauss 2019: 111). Morie extensively surveyed what she termed 'artistic virtual environments' clarifying that this meant by her own definition works that used 'an HMD at best, and a CAVE at least' (Morie 2007: 355), documenting over 90 artworks that were created between 1991 and 2006.

Extending the senses: Touch and smell and the sense of 'being there'

A particular challenge, and interest of many of the artists in the first wave of VR, was how to further develop a sense of 'being there' in the works that they made. Extending the senses of the person beyond the visual and aural was primarily explored through haptic gadgets and also in some experiments in 'virtual smell' that will be discussed further below. In Figure 6.3, two people demonstrate the EyePhone system that used special goggles and a data glove that allowed them to see and move objects around in a computer-created environment developed by VPL Research, Jaron Lanier's company in the late 1980s. However, according to Dixon the performative possibilities of VR took a quantum leap when Lanier developed the full-body version of the data glove, the data suit (Dixon 2006: 27).

Of course, the use of 'virtual smell' had already been utilised in Heilig's *Sensorama*, and this concept was taken up and explored again in the 1990s and into the early 2000s by Jacquelyn Ford Morie amongst others. The scientist James Knox Millen's study on the sense of smell claims that 'only the olfactory nerves are directly connected to the hemispheres of the brain […] the original brain is a smelling-organ' (Millen in Morie 2007: 71). Morie notes that 'this makes smell capable of generating strong affective emotions' (Morie 2007: 72). In fact, a pioneer in VR during the first wave, artist and scientist Morie developed a scent collar to facilitate the use of smells within virtual environments.[5] Writing in 2007, Morie explains that in her scent collar there were four chambers, each holding a unique scent:

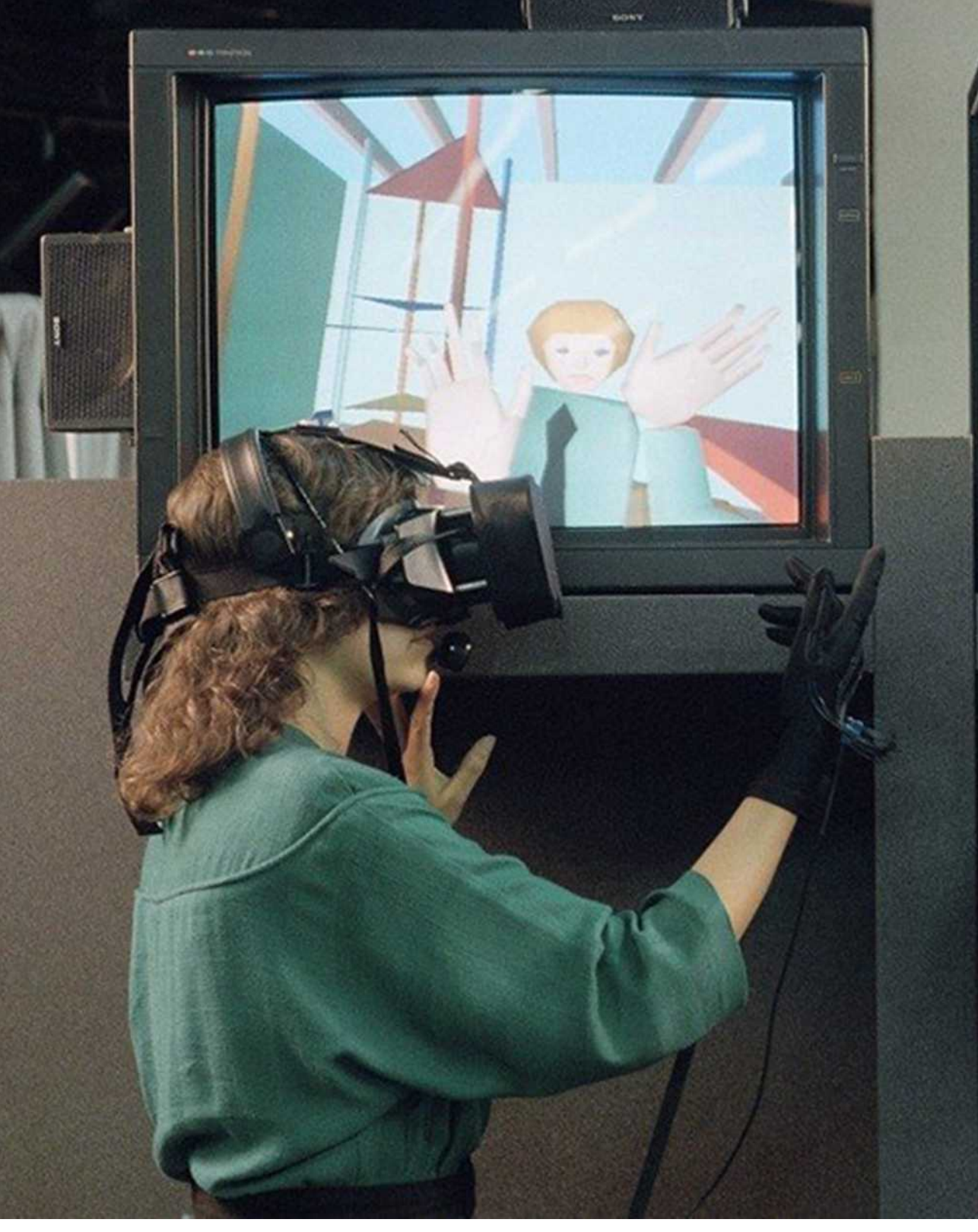
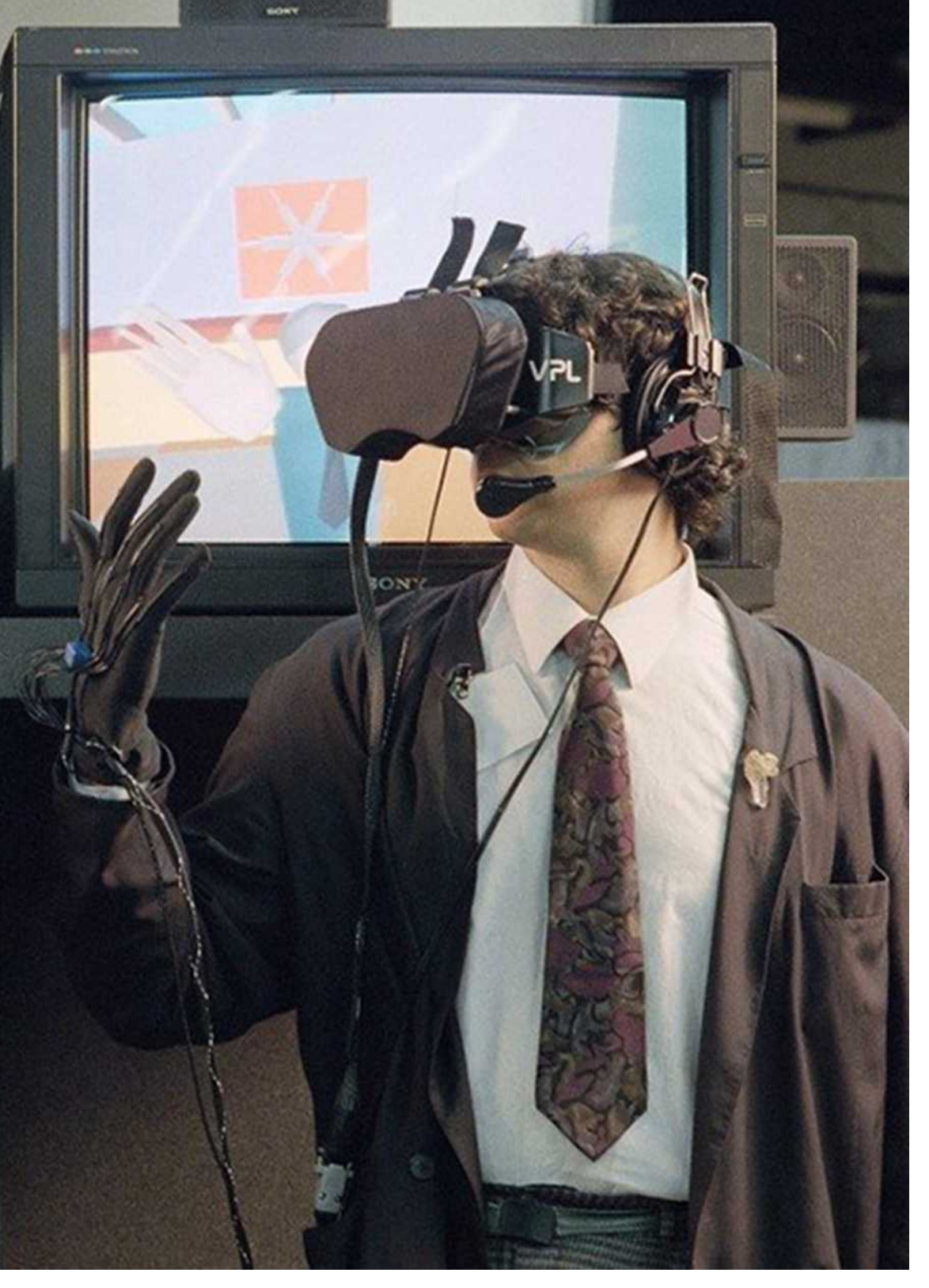


FIGURE 6.3: *EyePhone System* developed by VPL (1989). Source unknown.


VPL

> In the prototype, chambers are triggered individually to release a specific smell when the wearer enters a specifically marked location in the virtual terrain. Because of the proximity of the collar to the wearer's nose, only miniscule amounts of scent are required.
>
> (Morie 2007: 32)

Further techniques to add to the sense of being there was a vibrating floor developed for the virtual artwork *DarkCon* (2001) by Morie. Whilst artworks did continue to be developed for VR between the two waves of VR, the second wave can be considered to have begun in 2014 and into 2015 when the availability of Oculus Rift and later HTC Vive became available to buy 'off the shelf' at a relatively low cost, and therefore much easier to experiment with by interested artists.

Second wave of artistic practices in VR

The conceptual foundations of interacting with immersive VR environments were already being laid at the end of the previous century through the work of artists engaged during the first wave of artistic practices in VR. More than twenty years on with a whole new generation of accessible technologies such as the VR Oculus Rift, HTC Vive, and other technologies that enable augmented or mixed reality experiences such as wearables and see-through headsets (HoloLens) there is a need to develop the cultural, social, and phenomenal understanding of these new spaces and accessible worlds. However, with a focus on artistic practices, the chapter section begins with a painting by Joseph DeLappe, whose work was already discussed in Chapter 4, from his series of paintings entitled *Virtual Paintings 2* (see Figure 6.4). In 1996, DeLappe created a series of oil paintings portraying people engaged in VR technologies during the first wave, and in his new series, begun in 2018, he developed a series of watercolour paintings in response to the second wave. DeLappe notes that he 'remains fascinated by our eager embrace and adaptation to current interface technologies – VR remains awkward, expensive and ungainly to use' (DeLappe 2018: n.pag.). However, reflecting on the observation of another person experiencing VR goes further than this embrace. When we observe this (as so many VR artworks encourage us to do) we are observing a disjoint between two experiential realities. Kozel calls it the 'weird giggle' and suggests that it:

> Reflects the movement of the shimmer, the strange ripple of reality that is pre-reflectively sensed and escapes from the body in a shudder or a jolt. Disorientation

FIGURE 6.4: *Virtual Paintings 2*, Joseph DeLappe, watercolour on paper (2018).

> and delight converge, together they reflect the appeal and the controversy of VR. For some a longing to return to VR, for some a longing to return to the outside world.
> (Kozel et al. 2018: 20)

Early adopters of the second wave

As already noted in the previous chapter artist, composer and singer Björk has always been at the forefront of experimenting with new technologies since her

first experiments with music videos in the 1990s. Some notable examples are her first video as a solo artist 'Human Behaviour' (1993) with director Michal Gondry and 'All is Full of Love' (1997)[6] directed by Chris Cunningham. However, in 2016 she embarked on her most ambitious engagement and exploration of new virtual technologies in her *Björk Digital* Immersive Virtual reality exhibition that toured globally in 2016, opening in Australia as part of the Vivid Sydney Festival, and travelling to a number of cities around the world including Tokyo, London, and Mexico City.[7] In London, the exhibition was housed at Somerset House in September and October 2016. The exhibition included her first experimentation with VR technologies in 2014 entitled *Stonemilker VR*, using her first song from her 2015 album *Vulnicura* and further included an immersive film room showing *Black Lake* (2015) and a number of immersive VR experiences including *NotGet* (2016).[8] Of all the works seen in the exhibition, which was a real mix of experimenting with VR technologies (some more successful than others), it was the music video *NotGet* that has stayed in my memory. As you stand up with your HTC Vive VR headset on you encounter a small digital being while listening to the *NotGet* music – perhaps half your own size – made of nothing but light (this is of course the digital avatar of Björk). Over the course of the next seven minutes of the music playing this digital being morphs continually and almost imperceptibly grows until, by the end, it is towering over you. Its presence has never left me: this encounter with a morphing and slowly growing avatar of light was an extraordinary experience with an intensely altered sense of reality, intensified by the sense of immersion and immediacy possible in VR.

In an article for *Crack Magazine*, a freelance music journalist writes of his experience with *NotGet*:

> Björk was transforming before my eyes: her insectile mask sparkled golden, her aura fluoresced and her marionette hands made an odd paddling motion, bombarding me with cosmic confetti particles. As she stamped out a rogue, vicious beat, she grew and grew, until the monolith of her body was all I could see. When the music stopped, everything went black, and I removed the VR headset.
>
> (Monroe 2018: n.pag.)

In an interview with Monroe, Björk explains that in *NotGet* the figure 'had to be a larger than life character, like a giantess – but it's not me. I'm trying to tap into the myth of all wounded women' (Björk in Monroe 2018: n.pag.). Björk writes of her use of VR that it is 'not only a continuity to the music video but has an even more theatrical potential, ideal for this emotional journey' (Björk 2017a: n.pag.). Reflecting upon its application in *NotGet* and its use in *Björk Digital* she notes that it is 'ideal for the private circus virtual reality is: a theatre able to capture the

emotional landscape of it' (Björk 2017b: n.pag.). Further to this Björk's collaborator on *Family*, *Black Lake*, and *Stonemilker* Huang (already discussed in Chapter 5) writes of the VR medium from the perspective of a filmmaker:

> VR is more a spatial medium than it is a temporal one. You can tell a story through the objects you place and arrange in a space, rather than through the temporal events that you force upon the viewer. That's inherently different from filmmaking, which is more like music. Doing this last VR experience for Björk, in a way, played more to my strengths in that I could design the entire world, design all the objects and the set design of the world.
>
> (Huang in Larson 2016: n.pag.)

In 2017, I was keen to develop an understanding of emerging developments in the second wave of VR, and in my role as principal editor of the *Journal of Virtual Creativity*, and with my colleague Lynne Heller the reviews editor. we embarked on a survey of the current use of VR in contemporary artistic practices through work presented at ISEA2017, in Manizales, Columbia, with the aim of editing a special issue of the journal outlining the current state of the art. In 2017, there were scant signs of VR engagement in the work presented there. One of the keynote speakers Lance Putnam presented a discussion on space curves and audiovisual composition that was used in his VR work *Mutator VR* with collaborators William Latham and Stephen Todd, and other work included choreographer Johannes Birringer's *metakimosphere* series of theatre/dance/VR installations and further presented in his article 'Immersive dance and virtual realities' (2017).

The Lumen Prize for VR

Among the various prizes that have celebrated the work produced by artists working in new technologies, it was in the Lumen Prize projects that the use of VR was being particularly highlighted for a relatively short time and was then subsumed into other new categories. But for a few short years, it served to provide a focus for these particular developments within the field. In 2012, the Lumen Prize[9] was set up as a global competition to celebrate the best art projects created with new technologies initially awarding first, second, and third prizes. In the following years, a number of prizes were created with the Gold Award in 2014 and 2015 saw the first VR/AR award given to Micahel Takeo Magruder for *A New Jerusalem* (2014), an immersive VR installation that sought to embody the spirit of the new Jerusalem described in the *Book of Revelation* in the New Testament of the Bible. In 2016, the VR/AR award celebrated the project *Nature Abstraction* cited as 'an

immersive sensory experience that explores the arcane forms of fractals, mathematical visual representation of natural and biological forms' (Lumen Prize 2016: n.pag.) by Matteo Zamagni, Ben Hur, and David Li. This award remained until 2017 and further differentiated awards were created in XR and in a new category 3D/Interactive from 2018 onwards. In the last year of the VR/AR award in 2017, Michelle and Uri Kranot were recognised for their cinematic VR experience and art installation, *Nothing Happens*, which was also shortlisted for the Venice Film Festival's first-ever VR category, explores the role of the spectator as *Nothing Happens* invites you to participate in an event (see Figure 6.5). In this animated VR short, a group of people gather on the outskirts of a town on a cold, wintery day. The artists explain:

FIGURE 6.5: Michelle and Uri Kranot, *Nothing Happens*, VR installation shot (2017). Photo: courtesy of the artist.

> VR allows us to choose our perspective, allows us to become absorbed in the unique atmosphere and participate. The project explores a different kind of narrative, a new way of being in a painting, a work of art that is truly comprehensive and immersive. *Nothing Happens* offers a new way of looking.
>
> (The Lumen Prize 2017: n.pag.)

In 2018, the XR award went to the New Reality Company, based in the United States for their location-based VR experience *Tree*. The artist's aim was to personalise the effects of global climate change by transforming the participant into a rainforest tree, with arms as branches and the participant's body as the trunk to experience deforestation first hand:

> Unlike passively watching a nature documentary, we wanted to use the full capacity of immersive VR to promote empathy and engage a full emotional experience of becoming the tree […]. To fully immerse you into the experience, it is enhanced with sensory elements such as a scent track, wind, heat and haptic vibrations to simulate growth.
>
> (Kranot and Kranot in Lumen Prize 2018: n.pag.)

The artists utilised custom scents, heat elements, air movers, and bass transducers that are activated at key points in the experience in order to engage both the body and mind in the tree's narrative. This work holds a number of resonances with Davies's earlier work *Osmose* (1995) discussed earlier in the chapter, and the early experiments by Morie into extending the senses into the immersive virtual space.

Two other projects during this period that used VR and were both awarded the Lumen Prize Gold Award in 2015 and 2016, respectively, were *MAN A VR* (2015) by Gibson and Martelli, and Fabio Giampietro and Alessio De Vecchi's *Hyperplanes of Simultaneity* (2016). *MAN A VR* was originally made for the Google Cardboard and was then converted into a VR piece, exploring the figure and ground relationships of a set of dancers in space. Inspired by block universe theory,[10] Giampietro and Vecchi explore the concept of space–time as an unchanging four-dimensional 'block' through a series of three paintings and the use of 3D technology.

The final two years of the XR award went to Kristina Buozyte and Vitalijus Zukas for *Trail of Angels* in 2019 and Elyne Legarnisson for *(Un)Balance* in 2020 (this will be discussed further in Chapter 8). From 2021, the XR award has become the Immersive Environment awards.[11]

As discussed above, some of the VR pieces attempt to enhance the 'immersive' or 'embodied' experience through a further stimulation of one or more of the senses. A VR project that was shortlisted for the 3D/Interactive Lumen Prize category in 2021 is artist Camille Baker's *Inter/HER: Immersive Journey Inside the Female Body* (2019–23) (see Figure 6.6). Baker explains that:

> The *Inter/HER* project comes directly from my own experience in fighting – and winning – against ovarian cancer throughout 2016 and 2017. This intense battle gave me the imperative to make something personal through my art practice; to give something back to other women, based upon my own experiences and journey through the healthcare system.
>
> (Baker 2019–23: n.pag.)

In addition to her own experience, Baker interviewed a number of women about their own experiences of fighting diseases of the female reproductive system and the response of the health care system to them. This physical and immersive installation gives the participant a sensory and emotional experience within a real dome space in VR space, 'with a 3D audio soundscape of the voices and stories of real women recounting their experiences, making it an intimate, emotional and possibly haunting experience' (Baker 2021: n.pag.). In addition, the artwork employs the use of a wearable haptic corset that the participant wears when seated inside the dome that enables 'a visceral vibration responsive experience on the lower abdomen, where the various diseases occur' (Baker 2021: n.pag.). Baker explains that through this transference of physical sensation, the participant can 'share in an experience of the body that may resonate with theirs, or with the experiences of women they know' (Baker 2021: n.pag.).

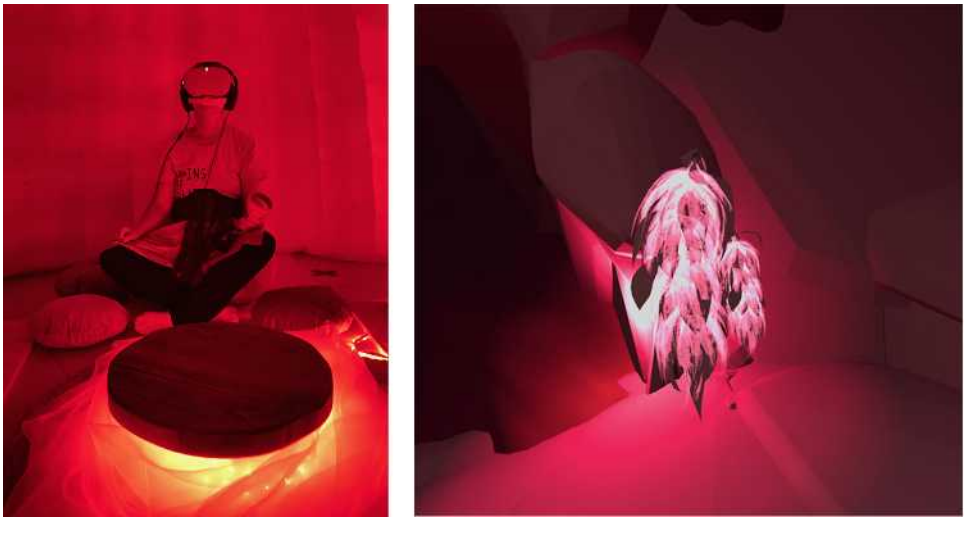


FIGURE 6.6: Camille Baker, *Inter/HER* (2020), 2021 Lumen Prize 3D/Interactive (Short List). Photo: courtesy of the artist.

The dome can host up to three people on this immersive journey. Inside the dome, each participant sits on a beanbag and can navigate the VR space using a hand-held controller. The internal experience of the body and the use of haptic techniques echo the space created by earlier VR works with some audience responses suggesting the empathic and affective nature of the work: 'an excellent immersive experience – especially for a man' and noting the experience as 'very strong and visceral' (Davies 1998: 140).

Empathy and affect in VR

> I believe that it is only through the body, through body-centred interfaces (rather than devices manipulated at arm's length) that we can truly access this space and explore its potential. Such emphasis on the body's essential role in immersive virtual space may be inherently female.
>
> (Davies 1998: 65–74)

The development of empathy and affect appear to have been present in the first wave of VR in some of the artworks (Davies's *Osmose* in particular) but further developed, and more of a point of focus, though an enhanced VR language in the second wave (examples already discussed such as *Nothing Happens VR* [2017], *Tree* [2017], and *Inter/HER* [2020]). Writing in 2018 Kozel, Gibson, and Martelli note that:

> Current work in VR takes the embodiment of affect further than the earlier generation of VR, the wave from the 1990s that caught the imaginations of so many. The cyberpunk influenced rhetoric of that time celebrated leaving the meat of the body behind and escaping into the fluidity of seamless 3D digital cyberspace.
>
> (Kozel et al. 2018: 3)

The 'embodiment of affect' through the creation of what is termed 'Empathy VR' can be seen in the work of BeAnotherLab (previously discussed in Chapter 1) who were recipients of the 2017 STARTS Prize Honorary Mention for their work *Library of Ourselves*, an interdisciplinary and distributed project to create transformative encounters between communities in conflict. The *Library of Ourselves* is described by the collective as 'a highly adaptable Creative Commons system that bridges cognitive science and virtual reality techniques to create empathic-driven experiences' (BeAnotherLab 2017: n.pag.). This 'open book of embodied narratives', the ongoing archive of the *Library of Ourselves* is composed of stories recorded from a first-person perspective of individuals, belonging to various communities. Using their *Machine to Be Another* (*TMTBA*), they developed

a distributed system of stories of pre-recorded narratives that a single user listens to (see Figure 6.7). This ongoing project records stories about migration, bullying, gender, and many other stories from marginalised and underrepresented groups. The films are recorded from a first-person perspective and the participant or viewer sees the world through another person's eyes, from their unique perspective. The STARTS Prize Jury in 2017 noted that, in *Library of Ourselves*, the:

> BeAnotherLab team is successfully utilizing virtual reality technology as a true empathy machine by placing you in another person's body and making you see the world

FIGURE 6.7: A still taken from a first-person story in *Library of Ourselves* (2016). Photo: courtesy of the artist collective.

> through their eyes. While changing gender, age, race, or origin we potentially change somebody's perspective and view on the 'others' and on themselves.
>
> (STARTS Prize Jury 2017: n.pag.)

In 2019–21, I undertook a two-year multi-disciplinary project that investigated the successful STARTS methodologies employed by STARTS Prize recipients, in collaboration with Ars Electronica and the STARTS Prize. We selected a range of projects to study, one of which was the *Library of Ourselves* project. I interviewed four members of the collective at their studios in Hangar, Barcelona in 2019 (Christian Cherene, Daniëlle Hooijmans, Christian Betánzos, and Daniel González).[13] After I recorded the first interview with Daniel González, he set up the *Library of Ourselves* in order that I was able to experience the system at first hand. One of the films he showed me was about a transgender man who lived in Holland and was transitioning. After placing the VR headset on I am immediately seeing from a first-person perspective and standing at a railway station. Afterwards, I learned that it was filmed in Holland and I am standing at the station in Rotterdam. 'Standing still, no-one is really looking at "me" – I can feel the wind gently on my face. I feel strangely invisible' (Doyle 2019: 195). The scene moves to someone's home. '"I" am led into a bedroom. The wardrobe door swings open and I catch a glimpse of my breasts' (Doyle 2019: 195). The monologue reveals that these represent everything that the person transitioning is not. I have a visceral reaction to the scene. For the first time, I can imagine what it might be like to have this reaction to my own body. Seeing through this person's eyes was a revelation to me; I had understood something about another person that I had never even considered before.

In order for a participant to truly 'feel' they are immersed in a first-person perspective, the camera needs to be positioned in a way that the participant can 'see' parts of their body (such as their arms, legs, or knees if sitting down). The *Library of Ourselves* experience is supported through other senses, such as touch or smell, the 'documentary' builds in those moments when a participant's hands might be touched, or they might smell a particular smell from the environment. When I took off the VR headset at Hangar that day I realised that Daniel, in addition to touching my hand, had a box of perfumes and feathers and various other props in order to help me (the participant) to be further 'embodied' in the experience.

Conclusion

The experience of immersive virtual environments, or VR offers a very specific set of potential and powerful experiences for participants, even as far as one immersant in *Osmose* feeling like they had actually experienced a form of death (Davies

1998). The brief history of the development of VR enables us to understand that the inspiration to become totally immersed in another space using new technologies has been a human endeavour for many decades, and the curiosity of both artists and scientists that created and further developed the medium of VR to its current state of the art in the second decade of the twenty-first century. To an extent the work that was produced in the first wave laid the foundations for the development of the VR language that is currently being further developed in the second wave.

In the first wave, it is the first-hand accounts that become so useful in understanding the challenges and the successes of the visionary work done at that time (Laurel et al. [1995]; Davies [1997, 1998]; Gromala and Sharir [1995], and many others). The second wave, through the increased access to immersive HMD headsets, has given new audiences this 'weird giggle' experience articulated by Kozel et al. (2018). Though some criticism remains of the use of VR as the latest gimmick, in fact, it gives artists a powerful (though at times awkward) tool to enable a new generation of empathy and affect for the participant in a way that may not still be possible through other new technologies. However, there is no doubt that VR has its own limitations due to its reliance on an immersive interface that is necessarily all-encompassing. It is unclear as to when the second wave will end (perhaps it already has) but there is most likely to be further waves of VR or the future equivalent of immersive experience where the language of VR will develop further.

In the following chapter, I consider the use of another type of space; that of online virtual worlds as spaces for artistic investigation and exploration. Curiously, it seems that artistic practices utilising specific technologies tend to flow in waves of interest, but each time the artistic investigations – by the value of the artistic practice in those spaces – push our understanding of those technologies and their own specific affordances. This is no more prevalent than in the use of online avatar-mediated virtual worlds for artistic practice.

NOTES

1. The US department of Defense's Advanced Research Project Agency is based in Arlington, Virginia.
2. Jacquelyn Ford Morie coined this term in her Ph.D. thesis (see under lexicon, 2007). Morie considered a VR session to be an experience and therefore the term experient seemed logical.
3. The 'serendipity' pointed towards by the curator of the acclaimed exhibition *Cybernetic Serendipity* Jasia Reichardt in 1968 when working with new technological forms.
4. I include this work given the title and aspiration of the piece, although the project does not use an HMD and does not give a fully realized CAVE experience.
5. One of the issues of using smells in VR was the difficulty in clearing the smells from the physical space of the participant, so the creation of a collar using very small amounts of smell went some way to overcome this.

6. This music video won two MTV Video Music awards and is held at the Museum of Modern Art (MoMA) permanent exhibition in New York.
7. Initially billed as an 18-month touring exhibition, at the time of writing, the tour is due to continue following the end of the COVID-19 pandemic.
8. *NotGet VR* music video won the Grand Prix in Digital Craft at Cannes Lions International Festival of Creativity in 2017.
9. The Lumen Art Projects was founded by Carla Rapoport in 2012 in order to widen the enjoyment, understanding, and appreciation of art created with technology.
10. According to block universe theory the universe is a block of all things that ever happen at any time and at any place. Therefore past, present, and future all exist at the same time and are equally real.
11. To further enhance the diversity of the awards the Nordic award began in 2020 alongside the Global South award, which became the Global Majority award in 2022.
12. Jose Luiz Faria da Silva (Community of Acari), father of Maicon, who was killed at the age of two by a stray bullet during a police operation, while playing with other children outside his home in April 1996. The mother of little Maicon, Maria da Penha, wrote a brief account about those painful moments experienced by the couple. Penha reads the account during the experience and users are transported to their home, holding several objects representative of the parents' love for their child and the couple's joint struggle.
13. I interviewed four more members of the collective remotely: Norma Deseke, Marte Roel, Philippe Bertrand, and Arthur Tres.

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7

Artistic Practice in Virtual Worlds

Introduction

The proliferation of virtual worlds over the last twenty years has been extensive, particularly in regard to online gaming worlds. However, this chapter mainly concerns itself with user-generated virtual worlds where artistic practices have at times flourished. It is more than twenty years since *Second Life* was introduced in the United States as a user-generated virtual platform and more than fifteen years since its mainstream introduction into the United Kingdom (and other parts of the globe). *Second Life* remains a virtual world that is not easily defined and understood and has certainly stood the test of time despite it receding from mainstream interest a number of years ago (perhaps since the increased accessibility of other new technologies such as virtual reality (VR), as discussed in the previous chapter, and mixed reality technologies, that will be discussed in the following chapter). Whilst it no longer grabs the populist cultural headlines, as a platform, it has to be still fully understood in terms of its significance within a wider critical discourse of digital and new media art. Further to this, the new languages of artistic practice that were created during that time, in particular to virtual and avatar-mediated worlds, are still to be fully defined. This chapter points to the contribution and impact *Second Life* has had and presents a framework for the platform and future avatar-mediated virtual worlds through an articulation of these new languages and virtual aesthetics. In itself, *Second Life* may have stood the test of time as a continued interface to examine issues of the real and the virtual and may contribute to further theoretical and philosophical discussions of new technologies and artistic practice. The chapter further presents the significant and ground-breaking *Second Life* artworks such as *Watch the World* (2007), the *Presence Project* (2008), and more recently the immersive environments of SL artist Bryn Oh, and provides an overview of the key developments in practices since the platform's introduction.

Art and virtual space

There is an argument that, as soon as linear perspective was invented, painting became another kind of virtual space, and in fact, Lindstrand suggests that: 'before the invention of linear perspective, spatial experience was detached from imagery. Once the tools to depict three-dimensional space on a two-dimensional surface were developed, architecture and the understanding of space leaped into a new era' (Lindstrand 2007: 354). For Lindstrand, the possibility for the viewer to imagine herself walking around inside a painting opened up a whole new chapter in art as well as caused a fundamental shift in the experience of space. More recently, the relationship between art and virtual space appears implicit in its scope and engagement (Ettlinger 2009; Grau 2003; Lindstrand 2007). However, Or Ettlinger describes the 'fog of multiple meanings around the term the virtual' (Ettlinger 2009: n.pag.), and he suggests that, in fact, contemporary and digital art has lost its interest in the art of illusion and is only now marginally concerned with the pictorial. In developing 'The Virtual Space theory', he states that at its heart lies 'the interpretation of virtual space as the overall space which we see through pictorial images, and of "virtual" as describing any visible object which is located inside of that space' (Ettlinger 2009: 6).

The early history of arts practice in virtual worlds

Although there were early artistic experiments in virtual worlds in the 1980s[1] and 1990s, the actual migration of artists into virtual worlds and their subsequent artistic exploration largely began in 2003 when Linden Labs launched their virtual world, *Second Life* (to be later taken up in the United Kingdom and the rest of the world from late 2005 onwards). Whilst *Second Life* attracted existing arts practitioners, it also curiously enabled a community of 'artist avatars' to be created through the platform itself (such as Gazira Babelli, Angrybeth Shortbread, Robbie Dingo, Nar Duell, and Bryn Oh, among many others).[2] *Second Life* was initially developed as a commercial venture, and yet was still one of the first virtual worlds to be studied by scholars and educators, and explored by artists and practitioners. Donald Jones notes that, whilst *Second Life* could not be described as an immersive virtual world based on Heim's set of characteristics of virtual worlds (simulation, interaction, artificiality, immersion, telepresence, full-body immersion, and networked communications), it still sits 'squarely in the discourse of virtual reality because it provides a high level of interactivity and telepresence within a parallel world that allows for the construction of place and self' (Jones 2006: n.pag.). Although there has been extensive research in VR and virtual worlds within the

humanities and sciences, there has been less research undertaken concerning the use of virtual worlds for creative and artistic practice, particularly in the context of digital embodiment. A particular feature of *Second Life* is the accessibility of the platform for building and customising spaces. Using the *Second Life* building tools to create objects and manipulate terrain, along with the application of the *Second Life* programming language, it is possible to have a high level of control when creating an online virtual environment. This enabled a community of artists to take advantage of both the capability and online accessibility of the platform, and of the relatively low cost incurred when compared to that of developing a unique online virtual world from scratch. However, do new forms always bring new modes of practice and new artistic and creative opportunities? In the context of new media practice, Patrick Lichty proposes that:

> Exploration of new forms has been a modus operandi of the avant-garde for over a century, and New Media is doubly implicated in this gesture of praxis. New Media implicitly signifies novelty by virtue of its name alone, but also through its definition that includes emergent (but primarily digital) artforms.
>
> (Lichty 2008: n.pag.)

Through this history of artists exploring new spaces and new technological forms as referenced in the work of artists such as Char Davies, Paul Sermon, Andrea Zapp, Toni Dove, and Luc Courchesne, many of whom have already been discussed during the course of this book, this exploration has continued through sections of the artistic community that have seen the opportunity of utilising virtual worlds as a new form, or a new potential artistic space. Established real-world artists explored virtual worlds as environments for practice for a time. A number of artists and designers have continued to specifically work with *Second Life* to explore the potential and limitations of the platform, and a handful of established real-world artists have seen their own concerns reflected in the *Second Life* space itself. There has been a range of articles published discussing virtual worlds and creative practice developed in *Second Life* during the first decade of the twenty-first century from Sant (2008), Lichty (2008, 2009), and Morie (2010), each contributing research in the fields of performance, gaming, and the arts. More specifically, a number of articles focused on the contextualisation of artistic practice (Doyle 2008; Lichty 2011) and other edited collections reviewing artistic practices in virtual worlds were published (Mura 2010; Doyle 2015). This chapter focuses broadly on two time spans of artworks in virtual worlds, those of the early pioneers and work created from its inception up until 2009, and works created from 2010 until the present day. The chapter presents emerging themes over this time and articulates the contribution virtual worlds have made to creating new

opportunities for artistic practices based on issues of identity and the avatar, on augmented practices, and on issues of appropriated and collaborative practice.

Writing in the early days of virtual worlds, in 'Art and the avatar: The *Kritical Works* in SL project' (Doyle 2008), I concluded that there were at least two approaches that could be considered when exploring *Second Life* for creative practice, beyond the potential of using *Second Life* as a presentation space that echoes real-life gallery spaces (Doyle 2008). Firstly, *Second Life* was already being explored as a space for performance as the avatar could easily assume the role of the actor/performer; and secondly, the implications for the audience as avatar were that they could become a central element in the artworks created in the space, placing the audience themselves in the position of a performer. Writing at the same time, Lichty (2008) also comments on the avatar and the performative aspects of the space, although he also focuses on the potential for social practice and engagement. The *Second Life* space is intrinsically a performative space for both the artist and the audience in what becomes a shared 'performative play space' (Goodman 2007: n.pag.). Of the work of artists during this initial analysis (and in particular those working on the *Second Life* platform), there were two broad groups of artists who were identified; those working in contemporary arts practices such as new media, or performance practice, and supported by mainstream galleries and curators, and those artists who have developed work through grassroots, self-organising, and emergent practices. Lichty suggested that, although multi-user worlds had already been in existence for a number of years, it was not until the critical mass of artists was present that the emergence of new media art in virtual worlds was 'recognised by the contemporary art curators and the mainstream art press' (Lichty 2008: n.pag.). A whole range of galleries have now presented, supported, or included artworks developed in *Second Life* in their gallery spaces including the Serpentine Gallery, London, the Walker Art Gallery, Liverpool, and the Eyebeam Gallery in New York, either as part of themed exhibitions or artist-focused exhibitions and they continue to do so.

Having discussed the work of artists exploring virtual and hybrid bodies in Chapters 4 and 5, the significance of developing networked virtual spaces that became accessible via the desktop computer allowing artists to engage in a new way, it was *Second Life* that enabled this engagement to flourish in the earlier parts of the first decade of the twenty-first century. An array of work was created across a broad range of artistic disciplines such as art, architecture, performance, film, and media arts. From work such as *Thirteen Most Beautiful Avatars* (2006) by Eva and Franco Mattes modelled on a reworking of Andy Warhol's print series, to Brian Eno's *77 Million Paintings* (2007) installation recreated in *Second Life*, or the early *Second Life* music performances by Suzanne Vega (2006) and Duran Duran (2006), to the politics of virtual sweatshops in Stephanie Rothenberg's *Invisible*

Threads (2007), and finally to the inWorld projects of *Second Life* artists' such as *Ping Space* (2008), they all pointed towards a retesting of artistic principles in virtual world spaces. The Chinese artist Cao Fei developed a range of projects including *iMirror* (2007), an installation and three-part documentary about Fei's avatar identity, China Tracy, which was included in the Chinese Pavilion at the Venice Biennale that year, and *RMB City* (2008–ongoing) that was presented at the Serpentine Gallery, London, and in New York. Artist and filmmaker Lynn Hershman worked with Stanford University to develop *Life Squared* (2007–ongoing), documenting and archiving two of her projects, *The Dante Hotel* and *Roberta Breitmore* (this is discussed later in the chapter). A number of performance-based works relied on a re-enactment of historical performance art, such as *Seven Easy Pieces* (2005) which Marina Abramovic performed at the Guggenheim, re-enacting seven significant historical and noted performance art works, and Eva and Franco Mattes *Synthetic Performances* (2009–10), continued the exploration of what they term an 'imponderable medium' (Lichty 2008: 6).

Pioneering work in the early days of Second Life

Australian artist Adam Nash developed a substantial body of conceptual work in *Second Life* through an exploration of sound and immersive spaces from 2007 onwards. Typical of his early works is the interactive installation, or participatory artwork, *A Rose Heard at Dusk* (2007). Nash writes that the visitor avatar should 'play' the work by:

> Walking, flying and jumping through the space, avatars create a unique audio-visual composition, different every time. Colours and sounds combine to create a spatially immersive musical and visual experience. It blends the different meanings of 'play'. By playing in the space, visitors are actually playing the space like an audio-visual instrument, creating endless variations of sound and vision.
>
> (Nash 2007: n.pag.)

In a similar vein, *Bell Garden* (2007) is a proximity-activated audio-visual sculpture with the sound of bells triggered by the avatar entering the sculpture. *Eudemonia Stellata* (2007)[3] is a playable 3D audio sculpture and one that I particularly enjoyed visiting on Nash's Island Sim in the early days of my engagement with *Second Life*. Nash notes that this work was an attempt to build an ambient musical instrument specifically for a real-time 3D environment, 'where the playing of the instrument is as much a visual experience as aural. An experiment in immersion, where time slows, blurs or disappears' (Nash 2007: n.pag.).

In 2009, Nash developed an exhibition entitled *Seventeen Unsung Songs* (2009) on Odyssey Island.[4] This included one monumental sculpture and sixteen smaller immersive, audio-visual playable sculptures. A review of the exhibition noted that:

> These fascinating kinetic devices invite us to linger and play while probing the role of the avatar within the complex 3D space [...] each is an experiment in visual and sonic polyphony where the avatar is both audience and co-creator of the unearthly forms and music that float in the domain.
>
> (Dethridge 2009: n.pag.)

In 2008, Nash was brought together with Christopher Dodds and Justin Clemens, to produce what was a mixed reality, real-time, interactive, audio-visual artwork (Clemens 2008) entitled *Babelswarm* (2008). This was a group project supported by the first Australia Council Artist in Residence Award for *Second Life*. The installation, based on the story of the Tower of Babel, captures visitors' chat text which is fed into the 'meta-babeller' (Nash 2008: n.pag.), which spills out words from the *Second Life* sky 'in strings of audio-visual letterforms' after which the words shatter on descent (Nash 2008: n.pag.). In Figure 7.1, the separated letters can be seen as they 'swarm in random directions seeking out other letters in order to

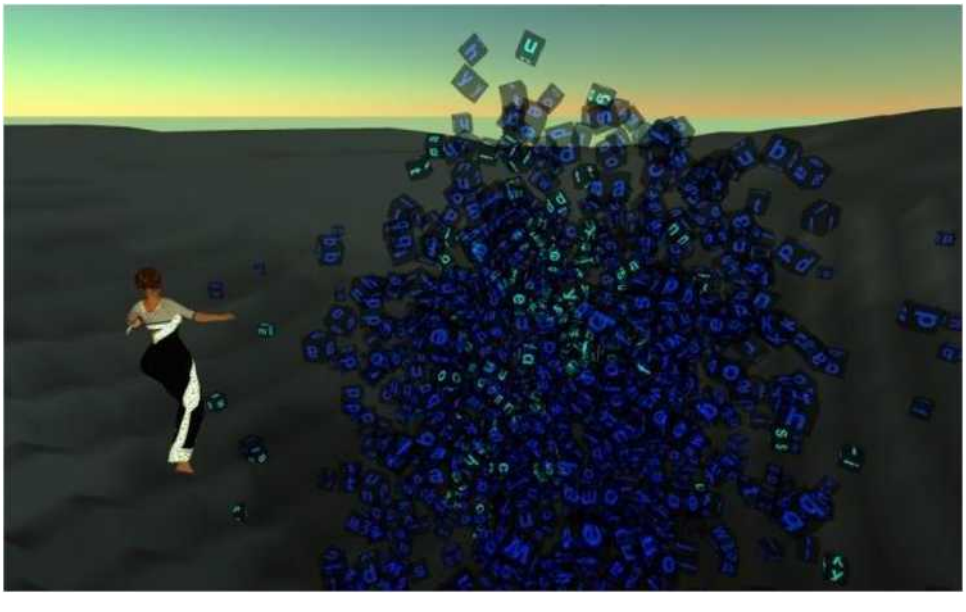


FIGURE 7.1: My avatar Wanderingfictions Story at *Babelswarm* (2008). Photo: Denise Doyle.

reconstruct the word they were born in' (Nash 2008: n.pag.). The artwork occupied the whole Sim that it was built on and created an interesting conceptual and abstract landscape in which to wander through or fly.

Working with Justin Clemens (as Wild System) Nash developed a further artwork entitled *Ways to Wave* in 2008. An immersive audio-visual volumetric sculpture in *Second Life* that uses a custom controller installed in physical space to make music in both *Second Life* (SL) and Real Life (RL). The controller is constructed of coloured etched Perspex in a lotus-like arrangement of three concentric circles of eight petals (reminiscent of Nash's inWorld work *Eudemonia Stellata* created in the same year) which can be played with by the audience. The position, angle, and velocity of the petals, each controls a different parameter of the virtual artwork, such as size, colour, sound volume, and speed.

The second category of artists working in *Second Life* were those who have consistently worked from within the platform itself, although there are obviously artists who are working between a supporting arts establishment and a more grassroots involvement with the space, so this divide is not so clearly defined. However, artists did emerge from the platform, and the *Burning Life*, an online virtual exhibition in the spirit of its real-world counterpart Burning Man, that was staged between 2003 and 2012, initiated by the founder of *Second Life*, Philip Rosedale, was an important showcase for the work of such artists. An article by Morie, 'A (virtual) world without limits' (2010), investigated artworks that have been produced primarily for a *Second Life* audience and includes accounts of her experiences of installations such as *Bogon Flux* (2008) by artists Blotto Epsilon and Cutea Benelli and the pastoral environment *Surface* by artist AM Radio (Morie 2007). Artist DC Spensley, known as DanCoyote Antonelli in *Second Life*, maintained an Island Sim for his hyperformalist work and extended his artistic practice into performance events during the early days of the platform. In 2006, he envisioned a potentially new art form in *Second Life* called 'hyperformalist live performance' (n.pag.). Most certainly staged as a visual spectacle the avatar performers often wore outfits that appear six times the size of the avatar performers themselves. In 2008, I attended the second-only presentation of *ZeroG Skydancers III* (2008) in which a group piece was performed live to a small virtual audience at a cost of $3000L per seat. In 2018, DC Spensley premiered a 40-level 100-artwork exhibition in *Second Life* in a retrospective exhibition of his artworks and performances produced over the previous twelve years. The performance collective, Second Front,[5] was founded in 2006 in order to create 'theatres of the absurd that challenge notions of virtual embodiment, online performance and the formation of virtual narrative' (Second Front 2006: n.pag.). The members of the collective included Gazira Babeli, Scott Kildell, and Patrick Lichty. Other artists have found that particular combinations of the attributes of the *Second Life* space echo their

own concerns, a notable example being the work of Paul Sermon. Sermon established a research hub in *Second Life* where he conducted a number of his telematics experiments such as *Liberate Your Avatar* (2007) and *Urban Intersections* (2009), which will be discussed later in the chapter.

Kritical Works in SL I *and* II *virtual exhibitions*

Kritical Works in SL

In 2007, the University of Wolverhampton in the United Kingdom purchased an island on the *Second Life* grid initially for the purpose of pedagogical and doctoral research in digital media. Kriti Island hosted a number of events, research projects, and experimental works over its virtual lifetime. Following the first inWorld exhibition on Kriti in 2008, this online space rapidly assumed a sense of real presence for those involved and became a focus for collaboration, nationally in the United Kingdom and internationally. The *Kritical Works in SL* exhibition showed the work of ten artists in *Second Life* and as part of the Inter-Society of Electronic Art event (ISEA) in Singapore in 2008. The project aimed to bring together a range of artworks from the *Second Life* community to explore whether common themes were emerging for creative practice on the platform: Were there perhaps certain characteristics of the virtual fabric of the *Second Life* space? Was there a possible maturing of the languages and spaces within *Second Life*? Was there a commonality of approach to creativity and aesthetic values? The artists selected were already exploring the *Second Life* platform in some way in their creative practice, with varied interests in art, design, media arts, virtual environments, and sound technology. The aim was to include a diversity of practice and to encourage responses from a range of backgrounds (see Figure 7.2 for the artist's avatars and their counterpart's names participating in the exhibition). Some contributors are very well known within *Second Life* but only through their virtual personas or counterparts. Their works in this exhibition were responses to one of the ISEA2008 themes, 'Reality Jam'. The confusion of real and virtual was hotly debated within the *Second Life* platform at that time and forced the re-evaluation of perceptions and registers of what is considered 'real' given the similarities of the logic and rules of *Second Life* and the physical world.

The ten pieces were created with a particular focus on the agency of the avatar, bridging the two worlds, the real and the virtual for the art viewer. These included *Remembrance and Remains*, a powerful recreation of an Iraqi village where stories are held, like memories, within the virtual brickwork; the *Autonomical Grid* created by Kisa Naumova (see Figure 7.3); the *White Cubist Chair* and the

FIGURE 7.2: The artists from the *Kritical Works in SL I* exhibition (2008). Photo: Denise Doyle.

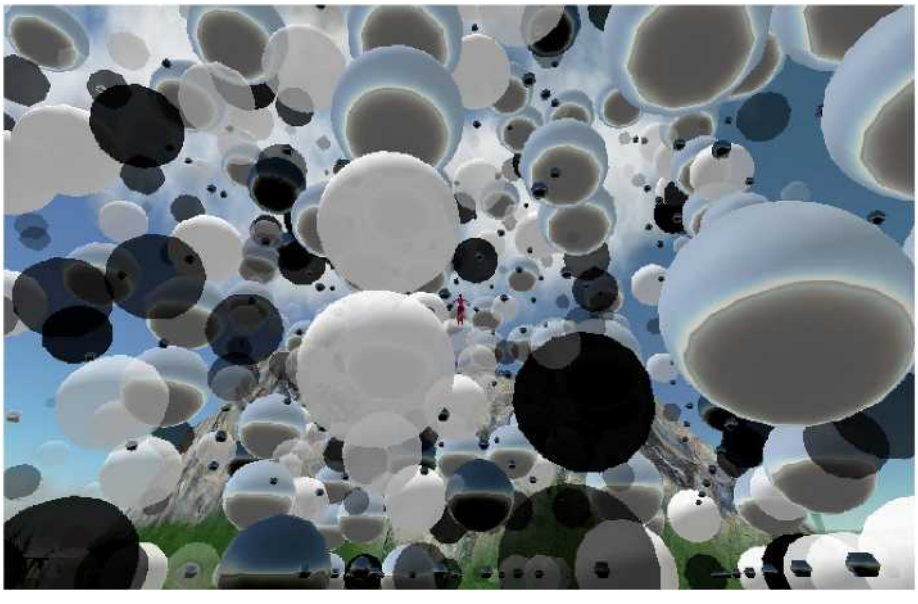


FIGURE 7.3: Kisa Naumova, SL artist, the *Autonomical Grid* on Kriti Island (2007). Photo: Denise Doyle.

associated works of Cubist Scarborough; and *whisperBox* (2006), a contribution by Robbie Dingo, that captured parts of your conversations in text form, and translated the text to music beats when an avatar is within the space. A machinima piece was available to watch in the amphitheatre area, *Watch the World*, made in 2007 also by Robbie Dingo and *Ping Space*, directly connecting real and virtual space and again worked with sound. Echoing Dingo's earlier piece, it captures conversations in either real or virtual space, and re-translated that information into binaural sounds projected into two different, but connected, spaces on Kriti Island.

Remembrance and Remains included a Wall of Remembrance of the Iraq War and a link to teleport us to an Iraqi village where the participant could wander at their own pace through this eerily deserted space. Of the work created by the avatar sisters Chingaling and China Bling, Morie writes:

> This project creates a space of remembrance, contemplation and renewal for those affected by the Iraqi war. It will serve as a gathering place where people can explore an Iraqi village in *Second Life* that is full of memories, sounds and images of the people who might have lived there […]. It is hoped that this artwork will, through sounds, videos and evocative imagery, give some sensibility of the spectrum of wartime experiences, good and bad.
>
> (Morie in Doyle 2008b: 12)

This project is incredibly powerful and is the only piece in the exhibition that works with narrative and memory. Wandering through a deserted village, meeting avatars (bots)[6] who understandably ignore you makes you feel that you are in a dream – where time has stood still. Held in these moments, the artwork allows you, or rather your avatar, to wander. This is a most disconcerting experience and a very powerful narrative emerges. The voices are quite literally held within the 'virtual fabric' of the brickwork.

The *Autonomical Grid* (2008) created by inWorld artist and educator, Kisa Naumova, could be 'rezzed' almost anywhere and covered an impressive geography on the virtual island. In the project description, Naumova writes:

> [It] is a self preserving synthetic ecosystem of digital life – created from altered versions of Conway's original algorithms in the Game of Life – that simulate a different kind of virtual existence, and reactively regenerate to form a contained entity that asks us to question what 'Second' life is when experienced in a space that is shared by our own creations who take on a life of their own.
>
> (Naumova in Doyle 2008b: 10).

It is an interesting experience teleporting into the centre of the *Autonomical Grid* from the Water Gallery space on Kriti Island. In Figure 7.3, it is almost possible to see my avatar, Wanderingfictions Story, if you look closely enough at the centre of the image. Either rezzed as spheres or cubes, watched carefully, the ecosystem quietly replicates, expands, contracts, and changes colour from white to black and back again.

In 2007, music technologist Rob Wright, known as Robbie Dingo in *Second Life*, produced a seminal machinima work called *Watch the World* (2007) utilising the *Second Life* space to produce the work (Au 2007). Taking its inspiration and fundamental concept from the imaginary picture space of Van Gogh's work *Starry Night* (1889), Dingo explains that it was shot 'on location' in *Second Life* and then post-produced, 'the Sim in this work was on temporary loan so it's all been swept away now, leaving only the film behind. It was always intended however that the video would be the end product, not the build' (Dingo 2007: n.pag.). Recreating the picture space in a virtual 3D space provides a kind of double virtuality.

The possibility for a viewer to imagine him/herself walking around inside a painting opened up a whole new chapter in art, as well as, causing a fundamental shift in the experience of space. There is a level of potency to what Dingo has produced in *Watch the World* (2007) on at least two levels. Throughout the machinima piece, Dingo allows us to see the construction of this virtual, imagined space and to watch, literally, the artist re-creates the landscape of the painting itself. In fact, it seems that the process of creation within the platform holds the biggest fascination for Dingo. Placing his avatar into the film space changes our relationship to what is being created. The use of Don McLean's song 'Vincent' (1971) provides a lyrical backdrop that perfectly matches the reflection upon real, imagined, and virtual space.

The final project *Ping Space* (2008) consisted of two cubes on Kriti Island, connecting real and virtual space. Each cube was 40 × 40 × 40m with a void interior other than small sound-emitting objects; one cube was placed at ground level, and the second cube was 300 m directly above the first. The project creator Angrybeth Shortbread explained that the sound generated was:

> a mixture of organic pink noise […] water/wind and binaural beats - sine wave tones of sound that range from 7-30 hz difference. The type of beats and other sound design within the void is controlled by an external source outside of *Second Life* […]. Avatars flying around inside the void will also be sending data back out to the interface – effecting its presentation. Between these two spaces ping playful interaction – where each space's activity affect the other.
>
> (Shortbread in Doyle 2008b: 14)

Shortbread further commented that the binaural sounds were used to explore the idea of 'virtual sound', an auditory experience created in the brain. The soundscape produced when moving through each cube space was quite beautiful and was entirely dependent upon the speed and direction of the participating avatar(s) travels in the space. Harder to tell were the subtle impacts of the other avatar, playing *Ping Space* through their interaction 300m above.

The fact that a number of the pieces presented in the exhibition specifically work with the opportunity of interaction from the presence of the avatar or audience to trigger events, sounds, or changes in the architectural space highlighted the specific opportunities of the platform. This realm of creative practice in *Second Life* developed because of the relationship of the work to the audience as an avatar. The nature of interactive space on a virtual world platform such as *Second Life* creates a complex set of relationships for participants, and also for the artists themselves. As Naumova writes:

> The virtual environments that we allow our alternate selves to inhabit are composed of ephemeral beings, in the form of the scripts, the prims and the animations that we litter around ourselves. These alternate inhabitants of our imaginations are often neglected [...] ignored, forgotten, sidestepped, brushed aside as a background to our avatars' meshes.
>
> (Naumova in Doyle 2008b: 10)

Kritical Works in SL II

The following year, in 2009, the *Kritical Works in SL II* exhibition was presented at ISEA2009 and at the Golden Thread Gallery in Belfast, on the island of Ireland. For the second phase invitations to participate were sent to the phase one participants and extended to established real-world artists who have also used *Second Life* for their creative practice. Three existing works, Paul Sermon's *Liberate Your Avatar*, Lynn Hershman-Leeson's *Dante Hotel*, and Joseph DeLappe's small 8" Gandhi figure from his *Tourists and Travelers* show in 2008, were included in the exhibition. Five new and adapted works were presented including *Strangers in the Neighbourhood* (Taey Kim), *Traceroutes* (Jacquelyn Morie), *Dysmorphia II* (Jo Mills), *Gestalt Cloud* (Annabeth Robinson), and *Meta-Dreamer* (Denise Doyle) (already discussed in Chapter 4).

In *Liberate Your Avatar*, commissioned by Lets Go Global for Urban Screens, Sermon mapped the actual town square of 'All Saints Gardens' on the Oxford Road in Manchester, with its *Second Life* counterpart. The result enabled the realities of the 'All Saints Gardens' on Oxford Road, and its online three-dimensional counterpart in *Second Life* to be merged, and to allow 'first life' visitors and

'second life' avatars to coexist and share the same park bench in a live interactive public video installation. The concept of a portal between two worlds is evident in the project. The project examined the history of 'All Saints Gardens', where Emmeline Pankhurst was once locked to the railings of the park during a suffragette protest. In the *Second Life* space a Pankhurst avatar remains locked to the railings as the project 'continues to play on the Manchester location as a focus of demonstration and protest in both worlds, identifying the "big screen" as the mediator of change' (Sermon 2007: n.pag.).

This project looked specifically at the concepts of presence and performance in *Second Life* and first life and attempted to bridge these two spaces through mixed reality techniques and interfaces. The project further examined the notion of telepresence in *Second Life* and first life spaces, the blurring between 'online' and 'offline' identities, and the signifiers and conditions that make us feel present in this world. Sermon explains that:

> This work questions how subjectivity is articulated in relation to embodiment and disembodiment. It explores the avatar in relation to its activating first life agent, focusing on the avatar's multiple identifications, such as gender roles, human/animal hybrids, and other archetypes, identifiable through visible codes and body forms in *Second Life*. The project aims to evaluate the diversity of personas and social life styles of the avatar.
>
> (Sermon in Doyle 2009: 35)

The Dante Hotel in *Second Life* is part of a larger *Life Squared (L2)* project that was a collaboration undertaken in 2006 between the artist Lynn Hershman and the Stanford Humanities Lab (and included a second project *Roberta*). Hershman explains that the project: 'Aims at nothing less than converting the archive into wholly new works that are created in a mixed-reality architecture and environment. This means reshaping the archival experience as active, fragmented, exploratory, and personal' (Hershman in Doyle 2009: 30).

In the original 1972 version of *The Dante Hotel*, Hershman collaborated with Eleanor Coppola. They rented rooms in the rundown hotel in San Francisco and visitors to the artwork would enter the Dante building, sign in at the desk, and receive keys to the rooms. Room number 47 (Hershman's room) presented traces and fragments of a life – books, eyeglasses, cosmetics, and clothing, all clues to the possible identity of the former inhabitants of the room. This was to be the first public art installation outside of a traditional gallery space in the United States.

In the *Second Life Dante Hotel*, visitors enter the hotel when they click on a blue box that signs them into the project, and then click on a red box that gives

them a key to open the hotel door. The space is a mix of original photographs, from the archive of *The Dante Hotel*, with virtual avatars trespassing, maybe changing things and leaving their trail. Instead of a desk clerk, there is a 'bot' guide named Dante, who guides visitors to the room. Hershman's original room at the Dante Hotel was intended to stay open 24 hours a day being reconstructed by the flux and changes that occurred naturally through the stream of visitors. The *Second Life* experience is the same but reframed to the installation space of the screen.

The final piece presented here is *Gestalt Cloud*, a *Second Life* multi-user installation by Angrybeth Shortbread (aka Annabeth Robinson) that invites online social play (see Figure 7.4). When an avatar is within the Cloud's generating a 10-m^3 space, it reacts by creating cubes engulfing the avatar, producing a low-resolution 3D cloud that follows the user about. When additional avatars enter the generating space of the *Gestalt Cloud*, the overlap of each avatar's cloud becomes darker. When a group of four or more avatars are in close proximity, their combined cloud will be rewarded with precipitation, beginning a sequence of change to the space around them.

An interview with Robinson revealed that the main features of creating in *Second Life* space for her are the relationship she has to her artist avatar Angrybeth Shortbread, its potency as a social space, and the playfulness of the space itself. Observing that 'this is a world that is constantly living, even though it isn't tangible in our real world sense', she comments that 'what's nice about it is, it is certainly timeless' (Robinson in Doyle 2010: 260). She remarks, that 'even though it attempts to replicate a physical world there are certain levels that, things don't reflect. Everything feels close but when you walk to it [it] actually takes longer, because there is no depth of field' (Robinson in Doyle 2010: 260).

Translating art in virtual worlds

In his article, 'The translation of art in virtual worlds' (2009), Lichty outlines a number of interesting questions with respect to artists working between the virtual, and what he terms the tangible. He presents four modalities of art in which each modality 'refers to the location and vector direction of the work's relation between worlds' (Lichty 2009: 2). He notes that in terms of artistic praxis (beyond the associated problems of audience and questions of form) it is 'the representational modality and the permeability of the boundary between worlds' that is of particular interest in the creation of meaning in artworks produced in virtual world spaces (Lichty 2009: 1). He explains that: 'The nature of communication

of the work is dependent upon its location and vector. What I mean by vector is a gesture of direction, simultaneity, concurrence, or stasis in regards to its movements between worlds' (Lichty 2009: 2).

In suggesting that there are four modalities of art being produced in virtual worlds, the Transmediated, the Evergent, the Cybrid, and the Client/Browser work, he explains:

> This epistemological 'movement' within and between worlds has four basic structures; work that is essentially traditional physical art translated to the virtual, 'evergent' work that is physically realized from virtual origins, the virtual itself, designed entirely for the client/browser experience, and 'cybrids' that exist concurrently between various modalities.
>
> (Lichty 2009: 2)

According to Lichty, the semiotics of two modalities, the transmediated and the client/browser, are 'a straightforward affair' (Lichty 2009: 2). However, the Cybrids, 'are less concerned with continuity, but are interested in the differences and distinctions between worlds and scales' (Lichty 2009: 5). Both the Cybrid and the Evergent works demonstrate a 'movement from virtual to tangible, which includes the consideration of works existing in simultaneous physical and virtual components, [and] present more complex models' (Lichty 2009: 2). Manifesting from the virtual to the physical (or tangible) certainly has its parallels with manifesting from fictional worlds. Whatever the movement, this is a complex play and suggests in particular that it is those 'enigmatic liminal works that live between worlds' (Lichty 2009: 11) that create spaces that are the most potent for the imagination, demonstrating an array of creative potential for artists engaging in the *Second Life* space itself. Lichty's modalities were a useful way to make distinctions between the works that were being developed both in the initial stages and in the later stages which are discussed below.

Virtual worlds artworks since 2010

Cybrids and performance practices

Writing again in 2011, Lichty posed the question 'what happens to embodied art when the body is removed?' (Lichty 2011: n.pag.). He further proposed three aspects that contribute to the significance of virtual worlds for virtual performance art, in particular, that of Affect, Desire, and Mirroring (Lichty 2011). The

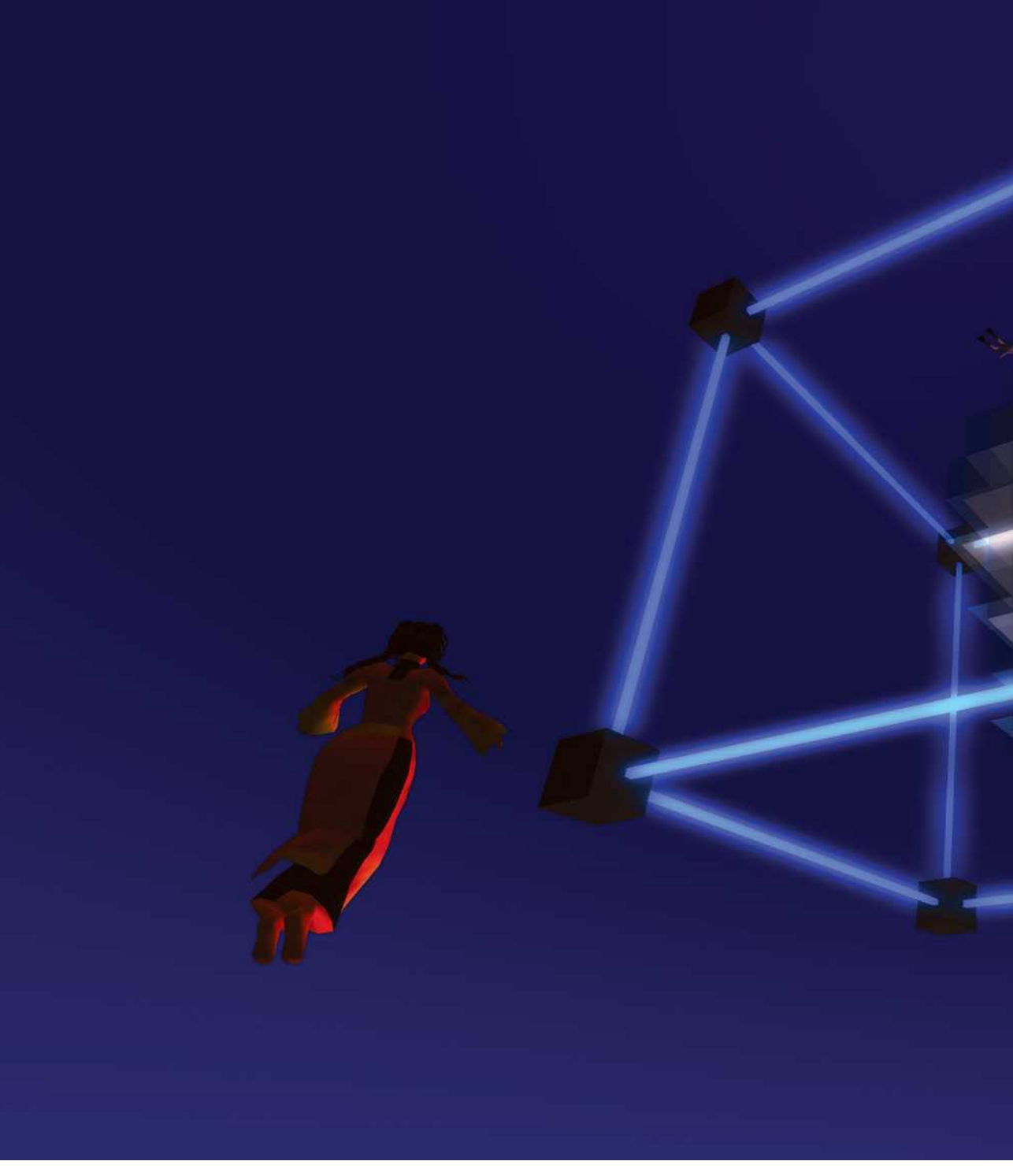
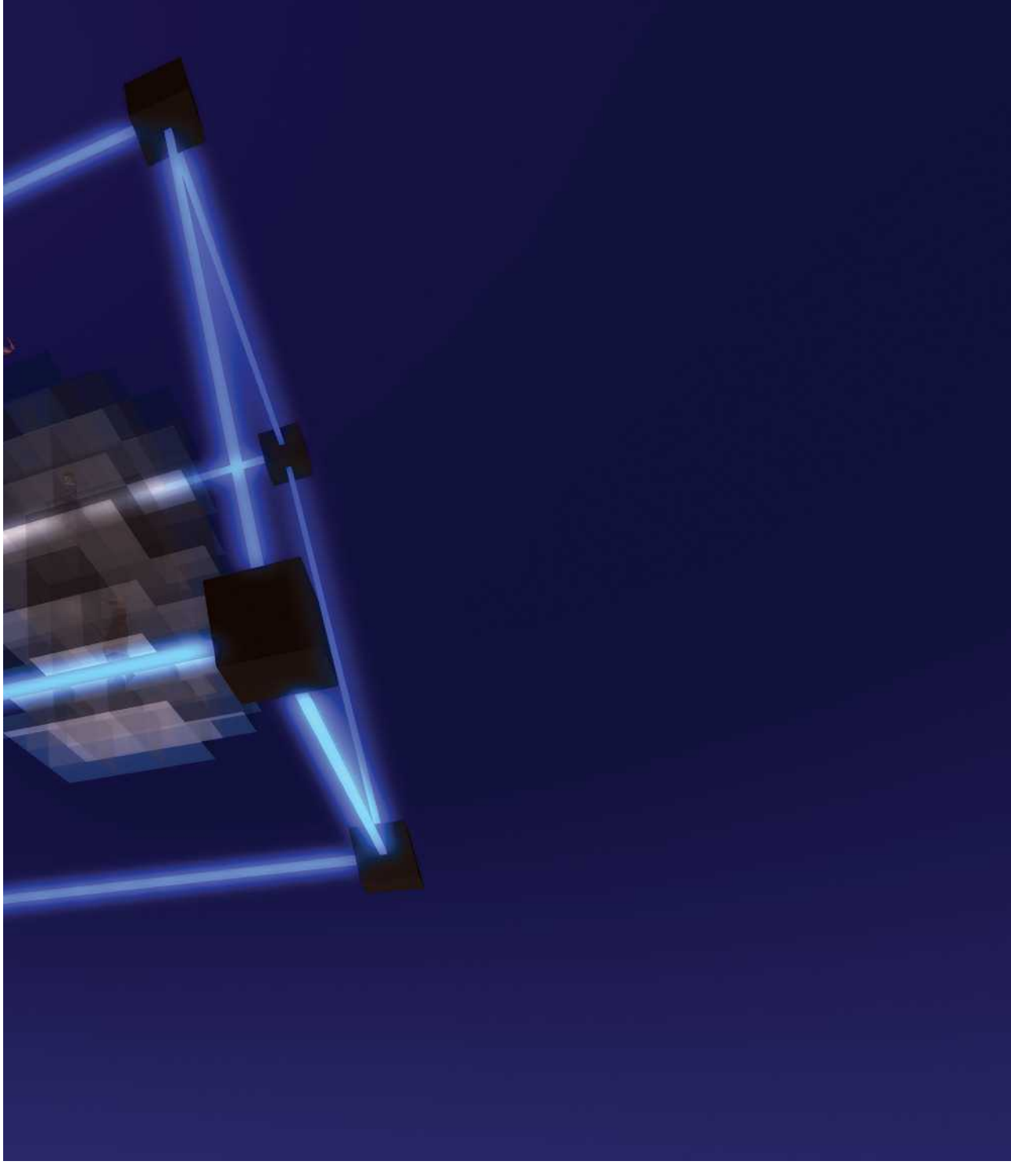


FIGURE 7.4: Annabeth Robinson, *Gestalt Cloud* as the cloud has formed (2009). Photo: courtesy of the artist.



discovery of mirror neurons in the 1990s, already discussed in Chapter 1, may explain the efficacy of virtual world experiences, most particularly those mediated through avatar presence. Since 2010, there has been a range of works that focus on augmenting the 'cybrid' category that Lichty references (2009) in the *Second Life* space (often creating a strange virtual aesthetic). This can be seen in Charlotte Gould and Paul Sermon's *Mirror on the Screen* (2012) in Figure 7.5.

In this project, Gould and Sermon explore the concepts of presence and performance in *Second Life* and 'first life' and attempt to 'bridge these two spaces through mixed reality techniques and interfaces' (Gould and Sermon 2012: n.pag.). The installation was presented at the '*Dual*' exhibition at the Nottingham Playhouse, UK and explored ideas of the multiple identities embedded in new digital technologies. The gallery visitor and their virtual avatar coexist in the same enchanted forest environment in the video installation. As Gould and Sermon explain:

> As you move around and explore this virtual forest scene you will discover that it is not only your *Second Life* avatar that exists in this space but through surprise

FIGURE 7.5: A screenshot of *Mirror on the Screen* (2012). © Charlotte Gould and Paul Sermon. Photo: courtesy of the artists.

> encounters your virtual avatar will come face to face with its physical 'first life' counterpart.
>
> (Gould and Sermon 2012: n.pag.)

The continued augmentation of the *Second Life* space is explored through blended reality performance by Joff Chafer in projects such as *Extract Insert* (2012) in collaboration with Stelarc. The installation is an exploration of identity, space, and reality, where a physical audience can engage and interact with a virtual audience. Visitors in the art gallery setting and the avatars in the *Second Life* space can be 'extracted' and 'inserted' into each other's alternative realities. The project was installed for a month at the Herbert Art Gallery in the United Kingdom and received over 6000 visitors in the gallery space and online. In the previous year, Stelarc presented *Yellow Avatar Blue Sky* (2011) at the Tate Modern, London. Using the Kinect sensor Stelarc actuates and animates his avatar in a performance in *Second Life*. He explains that the 'right arm and body gestures navigate the avatar through its virtual environment whilst left arm gestures generate sounds' (Stelarc 2011: n.pag.). In an interview in 2002, almost a decade earlier, Stelarc commented:

> What's interesting for me is not simply going more and more virtual but rather exploring the interface between the actual and the virtual. I'm trying to investigate whether a physical body can function in a virtual immersive environment and whether an intelligent avatar might be able to perform in the real world by possessing a physical body.
>
> (Stelarc in Hatziyiannaki 2002: n.pag.)

Collaborative practices and immersive avatar-based narratives

There are a number of projects that rely on the use of collaborative creative processes in *Second Life* and in the context of the term produsage (a portmanteau created by Axel Bruns in 2008). Elif Ayiter and Eupalinos Ugajin explain the terms produsage and produser:

> Bring together the idea of both the producer and the user into novel hybrid configurations that describe the creative undertakings of collaborative, electronically based communities where the productive act takes place in a networked, participatory environment [and] enables all participants to be users as well as producers of information, artifacts and knowledge.
>
> (Ayiter and Ugajin in Doyle 2015: 165)

The *Meta-Body* (2011–ongoing)[7] developed by CapCat Ragu (aka Catarina de Sousa), already discussed in Chapter 5, takes collaborative practice a stage further

through her 'shared creativity' model (Sousa and Eustaquio 2015: 233). A further collaborative, evolving art project called *Moving Islands [Rafts]*, was developed in *Second Life* in 2013 and continued until the summer of 2014 curated by SL artist Eupalinos Ugajin. The project brought together over 30 content creators each having different approaches to building, and differing artistic priorities, outlooks and philosophies which they visualise in ways that are quite different from one another. Having been granted the use of 30 full-size Sims for the project from the LEA Ugajin removed all of the landmass to effectively create a seascape for the artists to develop their island rafts in. What was created, according to Ugajin, was a 'cosmology of rafts and other improbable floating beings' (Ugajin in Doyle 2015: n.pag.).

Elif Ayiter (aka avatar Alpha Auer) developed a work relating to Roy Ascott's *LPDT*[8] that was later presented at ISEA in 2011. In *LPDT2* (2010), alongside Ascott she developed the *Second Life* incarnation of the project that relies on generative text that is harvested from the online Gutenberg Project rather than on individuals. In 2012, Ayiter's project *Asemia* was developed as part of the collaborative installation *Further Along the Path* (2012), an immersive project sponsored by the Linden Endowment for the Arts. As Bryn Oh, the curator of the project notes, the installation's focus was based on the exquisite corpse concept that the Surrealists sometimes used (Oh 2012). Eight virtual world artists were invited to add to an immersive composition in sequence. The artist who begins composes the start of the narrative passing this segment on to the next artist until each has made their contribution, each building on the last part of the narrative.

Bryn Oh[9] is perhaps currently the most well-known virtual world artist working in *Second Life*. Selecting only a few of their projects to discuss, *Imogen and the Pigeons* (2013) is an immersive interactive environment presenting a multi-layered story told through a series of poems; a still from the end of the interactive and immersive story is seen in Figure 7.6 Writing about the closing stages of this project, SL artist Bryn Oh notes that:

> The story for Imogen is intended to be slightly vague as to allow the viewer to interpret the narrative with more freedom. I feel that it may be more engaging for the viewer if they are not told a definitive story that can make the viewer passive, but rather to live and interact within a story which requires them to activate their imagination.
>
> (Oh 2013: n.pag.)

Supported by a grant from the Ontario Arts Council, *The Singularity of Kumiko* (2014) was an immersive environment based on the mysterious world of Kumiko. As Oh explains:

> The story of *The Singularity of Kumiko* was told through 14 letters shared between Kumiko and her love Iktomi. They represented two distinct views on life. The name Kumiko means endless beauty, while Iktomi is the spider God of technology and invention.
> (Oh 2014: n.pag.)

Through a series of bottles found inWorld, the story unfolds in a very controlled environment. Sousa explains that 'the environment's windlight is pitch black, except in laminated areas, and the visitor's avatar is equipped with a head-mounted torch to light the way'[10] (Sousa and Eustaquio 2015: 228). Other more recent projects such as *Daughter* of *Gears* (2019), *Part 2: The Rabbicorn* (2019), and *Part 3: Standby* (2020) find characters in common with previous projects. Their latest project *Lobby Cam* (2022) is produced with the support of the Canada Council for Arts and is a story of an eccentric man who discovers an impossible channel on his TV, where the visitor determines the ending. Commenting on the way each of Oh's narratives is connected, Sousa and Eustaquio note that: 'This is indeed a demonstration of the specific characteristics of the virtual environment, which encourage rhizomatic relationships between various projects, forms of expression, and even platforms' (Sousa and Eustaquio 2015: 230).

Conclusion

There can be no doubt that the use of virtual worlds by artists has been to an extent transitory – at best no more than a decade in the case of *Second Life*. Curiosity brought in a range of artists into *Second Life*, but the truth is not many stayed. Established artists such as Hershman, Sermon, and Stelarc, and those who have established themselves through the platform itself such as Nash, Robinson, Ayiter, and Oh have each explored and pushed the boundaries of the space as a place for creative practice and many have moved on to other virtual platforms. Those that remain will continue to further articulate the experience of virtual space, the experience of the avatar interaction, and the benefits of the space for creative collaborations.

The client/browser experience proposed by Lichty cannot be underestimated as this is related to the fabric of the space itself (Lichty 2009) – what can be done in an avatar-mediated virtual world that cannot be done elsewhere. The cybrids and client/browser projects have dominated, but the collaborative aspects of *Second Life* could be added as a new modality to Lichty's 2009 modalities of more than a decade ago. Again, there is an emphasis on the fabric of *Second Life* (community, shared space, and shared building worlds) – this concept is certainly dominating other virtual worlds at this point in time (e.g., Roblox and Minecraft).

In 2016, Bryn Oh won monies to make her *Singularity of Kumiko* 'VR ready'. Perhaps this year or 2015 can be pinpointed as a point of change when new

FIGURE 7.6: A still from *Imogen and the Pigeons* (2013). © Bryn Oh. Photo: courtesy of the artist.

explorations could be made in VR and beyond virtual worlds. Perhaps this is why many artists turned to VR, as already explored in Chapter 6. And finally, in Chapter 8, we focus on the conflations of realities through what is termed MR – mixed realities, and XR – extended realities.

NOTES

1. For example in the 1980s in *Habitat*, a graphical and text-based domain (launched on Commodore) where the user could create their own artefacts, and in *Active Worlds* (1995) and *There* (1998) users could build additional content.
2. Users are unable to use their real names and often the 'naming' of your own avatar became a creative act in itself. You were free to choose a first name but had to select from a predetermined set of second names.
3. This was my favourite place to visit in *Second Life* in 2007. I would spend hours on Nash's Sim and particularly spent time in this installation sculpture.
4. Odyssey Island for Art and Performance hosted many art events and performances.
5. The website for the collective is still available: https://www.secondfront.org/.
6. Bots are avatars who are pre-programmed and do not have a real person controlling them.
7. The *Meta-Body* project has already been discussed in Chapter 5 in the context of hybrid bodies. Here, this fascinating project is explored in the context of collaborative practices.
8. *LA PLISSURE DU TEXTE: A Planetary Fairytale* (*LPDT*) is a work of distributed authorship created by Roy Ascott in 1984, using the early computer conferencing protocol of the time. It involved players assuming the identity of fairytale characters and developing, from that character's point of view, a rolling narrative online, over a three-week period.
9. She has been active in *Second Life* since 2008 and works in her Immersiva Sim. In 2014, Oh worked with the renowned filmmaker and artist Peter Greenaway to create a series of interactive works for an exhibition the *Golden Age of the Russian Avant-Garde* curated by the multimedia artist Saskia Boddeke (aka avatar Rose Borchovski) and held in Moscow that year.
10. Windlight is *Second Life*'s atmospheric rendering system that enhances skies, lighting, and other graphical aspects of the environment.

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8

Augmented, Mixed, and Extended Realities

Introduction

As we come to the third and final chapter in this section, this grouping would usually include virtual reality (VR), but I have separated this technology out and discussed this specifically in Chapter 6 where distinct waves of VR can be distinguished and with a further focus on the concept of immersion. It also may seem strange that this chapter is not directly following the VR chapter. The virtual worlds chapter is included chronologically given its initial impact – certainly within the arts and creative practice community – following the inception of *Second Life* in the first part of the twenty-first century. Of course, the idea of mixing realities or 'mixed realities' or 'extended realities' technologically can be traced back to at least the early 1990s and conceptually back even further. For the purposes of this chapter, the focus is on the exploration of what the nuances of the mixing and extending of realities bring to artistic practice through new technologies, and at the same time to consider how technological advancements are consistently explored and incorporated into artistic practice. The chapter will look at the relationship between digital embodiment and mixed reality spaces through a range of art forms including the use of new technologies in theatre, contemporary art, immersive art installations, and other forms such as documentary experience, where the mixed reality medium has been taken up by filmmakers looking to break away from the screen and a passive audience.

'Different' realities: Augmented, mixed, virtual, extended

In 2024, the technology required to create immersive mixed-reality environments is now becoming mature enough for real-world applications to provide a more satisfying user experience. Whereas previous solutions suffered from low frame rates, high latencies, and exorbitant costs, current head-mounted displays (VR Oculus Rift, HTC Vive, META Quest) and smartglasses (Microsoft HoloLens) are already

'good enough' for many applications and have improved in the last few years. I am going to focus on three types of 'realities': that of mixed reality and extended reality, although some projects and artworks that fit these categories have already been discussed in previous chapters where they may have been a better 'fit' to the discussion. I will include a brief discussion of augmented reality although when discussing digital embodiment per se there is less to consider beyond the visual and aesthetic experience of space, but it does however include a response to the material and virtual overlay and the impact this has on our sense of embodied experience. Initial applications of mixed and augmented realities are being applied to the cultural, economic, and political experiences of global audiences in live performances and other cultural contexts (*Golem*, 1927 Group, 2015; *Theatre for Robots Only*, 2015; *Björk Digital*, 2016; *The Tempest*, Royal Shakespeare Company, 2017) and virtual museum contexts (*At Home in the Cosmos*, 2007; *Microscopia*, 2014; *Viking*, 2015; *Thresholds*, 2017) amongst many others, and continue to be applied in more contexts.

Augmented reality

Augmented reality seeks to add to our perception of reality with an exact virtual overlay onto a physical space in a way that the augmentation is embedded in physical reality. It applies digital objects to physical environments, providing a composite view of the virtual and physical environment together. Jay Bolter comments that 'AR and VR were twins at birth, beginning as variations of the same technological idea' (Bolter et al. 2021: 3) although they did not develop in the same way, mainly due to the importance of accurate mapping that was required in augmented reality (Bolter et al. 2021). Author of *The Wizard of Oz* (1900), L. Frank Baum had already imagined glasses that could reveal certain characteristics of a person that was invisible to the naked eye in his 1901 book *The Master Key: An Electrical Fairytale*, suggested by some to be an early version of augmented reality (Carmichael in Gannis 2017: 320). However, artist Will Pappenheimer claims that in fact rather than an entirely new invention:

> *Reality is always already augmented*. Consider for example, that every experience is augmented by memory, by identity or by imagination. A site on a mountainside is potent with stories, the collective grid of human mapping, or the possible presence of gods. In other words, any investigation of how we perceive or represent 'reality' reveals the many ways in which we personally and socially augment the world around us, with or without media.
>
> (Pappenheimer in Gannis 2017: 320, original emphasis)

He further notes that 'the AR experience is, in fact, a step towards the embodiment of the virtual' (Pappenheimer in Gannis 2017: 320). According to Mark Billinghurst et al., augmented reality is a way to 'enhance reality with digital content in a non-immersive way' (Billinghurst et al. 2014: 79). From popular culture the most prevailing augmented reality game has been *Pokemon GO* but there are many others. There have been early interventions in art gallery spaces such as in the alternative New York Gallery. Here I am going to briefly discuss two projects that integrate AR technologies in effective and sometimes surprising ways, *52 Card Psycho: Deconstructing Cinema through Mixed Reality* (2009), an installation by Australian artist Geoffrey Allen Rhodes, and *The Selfie Drawings* (2015), an augmented reality book by Carla Gannis.

I first encountered *52 Card Psycho* at ISEA in Belfast on the island of Ireland in 2009 and I will admit to returning more than a few times to this installation over the period of the symposium, fascinated by its effect. A deck of 52 cards, each printed with a unique identifier, plays 52 individual video clips from the infamous shower scene in Alfred Hitchcock's film *Psycho* from 1960. Writing in his artist's statement Rhodes notes:

> The *52 Card Cinema* project is an exemplar of the unique architecture of cinematic pieces mapped on to the real world, made possible by Augmented Reality technology. The concept is simple: 52 cards, each printed with a unique identifier, are replaced in the subject's view by the individual shots that make up a movie scene. The cards can be stacked, dealt, arranged in their original order or re-composed in different configurations, creating spreads of time.
>
> (Rhodes 2009: n.pag.)

The joy of this piece is in its interaction. On a classic card-playing table with a low light (that hosts the camera that is feeding back to the marker-based augmented reality application), the viewer can 'play' with the 52 cards. After a while, there is the compulsion to reorganise the cards into their original linear timeline, recreating the original shower scene from start to end. At the same time, the magical qualities of the markers suddenly catching the video signal and feeding a display signal overlaying the video clips of each shot that then plays a handful of frames on an individual card is mesmerising. In reality, there needs to be a continual mapping and remapping of the card table in order for each marker to be read when moved around updating their position and orientation, but the technology in the installation experience is almost invisible. In addition, the materiality of the cards and their display of an immaterial image adds to the lure of this table experience.

The New York-based artist Carla Gannis produced a compelling body of work entitled *The Selfie Drawings* in 2015. The following year she published

an augmented reality book of the same name that contained 52 selfie drawings that could be augmented through a reader's phone.[1] The year-long project (from January to December 2015) of 'performing the self' culminated in the 52 drawings presented in the book. Writer Natasha Chuk discusses the selfie drawings in her article entitled 'Self-made: Constructing identity at the threshold between virtual and physical realms' (2016) and in particular notes the hybrid elements that Gannis uses are 'like the conversational nature of selfies, [and] augmented realities encourage audiences to think relationally, rather than exclusively aesthetically or visually' (Chuk 2016: 13). Gannis herself states that 'hybridity is the hallmark of my artistic practice' (Gannis 2017: 323).

Drawing from the many versions of herself that she imagined herself as a young girl, such as dressing up as Princess Leia inspired by her holographic message to Obi-One Kenobi or her 8-year-old self-portrait as a composite mix of Jane Eyre and Wonder Woman (Gannis 2017: 320–21), the eclectic use of cultural references and appropriations is compelling. On discussing the aims of her AR selfie drawings, Gannis notes that:

> There are key differences between static or moving images locked to the rectangle of a two-dimensional page or screen, and the three-dimensional augments that can perceptually explode out of these bounds. In the drawings and videos I'm grappling with and ultimately describing a state of existing in virtual and physical domains simultaneously; however in the augments I am providing a platform where one can actually experience this simultaneity.
>
> (Gannis 2017: 324)

Gannis continues to be highly engaged with new technologies in her practice having developed projects incorporating artificial intelligence (AI), virtual worlds, and VR.

MR: Mixed reality

The use of mixed reality (MR) is certainly not new, and is more of a late twentieth-century development rather than a twenty-first-century concept. In fact, a work that defines the early exploration of telepresence in telematic spaces by artists engaged with technology is that of UK-based artist, Paul Sermon, and his work *Telematic Dreaming* (1992), which Steve Dixon (2007: 220) describes as a 'wonderful, exquisitely simple and ground-breaking installation [that] creates a type of magic, a sort of lucid dream'. Sermon's work has already been briefly discussed in the previous chapter outlining some of his projects in virtual worlds.

However, I have chosen to wait to discuss this seminal piece at this point in the text as it sits squarely in the realm of mixed realities as does any work that incorporates more than one physical space and/or virtual space.

Over the last three decades, Sermon has built upon this very simple concept of two geographically remote spaces being connected in time. In *Telematic Dreaming* (see Figure 8.1) images of two beds, one in Finland and the other in England, are projected onto each other, enabling a real-time interaction with the performer in one space and the visitor in the other (Sermon 1992). This new form of telematic experience enabled the participant to be 'present' in another space through the use of technology. Kozel, already discussed in previous chapters, writes an interesting account of her experience of being the performer in this piece in *Spacemaking: Experiences of a Virtual Body* (1994) noting that 'telepresence has been called an out-of-body experience, yet what intrigues me is the return to the body which is implied by any voyage beyond it' (Kozel 1994: n.pag.). In her text she discusses the claim of artists such as Krueger that virtual technology changes what it means to be human and alters human perception but suggests also that it does not 'simply refer to the voyage out, but the inevitable return and the lasting effect that the outward motion leaves on the reunited body' (Kozel 1994: n.pag.).

FIGURE 8.1: Paul Sermon, *Telematic Dreaming* (1992). Photo: courtesy of the artist.

Sermon has created many other works that have been developed over the last three decades using a similar concept, including *Telematic Encounter* (1996), *Picnic on the Screen* (2009), *All the Worlds a Screen* (2011), and *3 × 4* (2014), a project that links two geographic spaces, one in London, the other in New Delhi in India, and engages with the notion of megacities (where since 2015 more people globally now live in an urban environment than in the countryside) and the requirement that the standard amount of space a person needs to live in is a 3 × 4 metres space. I want to discuss some of Sermon's more recent work in direct response to the pandemic.

Pandemic Encounters (2020–21)

Of course, during Spring 2020, the world did indeed turn on its head and many of us were forced to live, work, and socialise online for many months and a handful of years to come.[2] Following a successful application to the UK's Arts and Humanities Research Council, Sermon began a number of global collaborations under the project name *Pandemic Encounters*. In May 2020, Sermon presented his networked performance installation in collaboration with Randall Packer, Gregory Kuhn, and the Third Space Network entitled *Being [Together] in the Deep Third Space*. Sermon writes that the pandemic 'turned our reality and social behaviour on its head' (Sermon 2020a: n.pag.), retreating to the isolation of our homes with a new-found interest in meeting platforms such as Zoom and Teams and a number of other online meeting platforms. But, as Sermon notes, we are in fact restrained by our webcams and appear 'stacked up like contestants on a TV show' (Sermon 2020a: n.pag.).

In the work, Sermon performs as a live chroma-key figure from a green-screen installation in his own home in what he terms a deep third-space audiovisual environment. Alongside his collaborators Sermon invited a group of what he terms 'action-performer' participants from around the world – artists, musicians, dancers, media practitioners, and scientists to create a 'collective response to a global pandemic that has triggered an unfolding metamorphosis of the human condition' (Sermon 2020a: n.pag.). Further to this the performance, Sermon suggests, 'provides a radical alternative to this online video-chat phenomenon, one where we are free to coexist and experience a new sense of togetherness' (Sermon 2020a: n.pag.).

In November 2020, Sermon staged a further live telematics video performance *Telematic Quarantine: Telepresent Stories of [Self] Isolation* (2020) for the International Limestone Coast Video Art Festival in Australia. Lasting for 2.5 hours, again Sermon invited performers from all over the world to participate, including Steve Dixon in Singapore and Birgitta Hosea in London. The contributing

performers were provided with background information and online support on how to prepare their Skype connection, studio spaces, and green-screen setup. Again, Sermon invited people (virtually) into his home where they could share time (and virtual space) together.

In the invitation to participate Sermon writes that in *Telematic Quarantine*, a layered video environment and experience of domesticity, fantasy and dream in COVID-19 times: 'Together we will share a space to perform, play and improvise, telling our stories of self-isolation in a new-found telematic intimacy that breaks free from the constraints of our video chat windows we have become accustomed to' (Sermon 2020c: n.pag.).

Perhaps the invitation over promises a little here but Sermon's work has certainly found it's time during the constraints of the pandemic.

Mixed reality and performance

The use of mixed reality in a performance context has already been discussed in previous chapters, such as the work of Björk in Chapter 5. However, here I want to discuss a performance that I attended specifically because of its attempt to incorporate a range of new technologies at a time when the technologies were only just becoming available.[3] I went to see a production of *The Tempest* (2016–17) at the Royal Shakespeare Company (RSC) in Stratford-upon-Avon at the end of 2016 after hearing that the theatre had been working with Imaginarium Studios in London which was already renowned for their development and use of the latest performance capture technologies, most notably to create the character Gollum in the *Lord of the Rings* film trilogy (2001–03). Supported by a new department of digital engagement at that time the decision to experiment with new technologies in a theatrical context with *The Tempest*, regarded as one of Shakespeare's most magical of plays, is perhaps no surprise. As Vice President of Intel Penny Baldwin notes, since its first performance in 1610, *The Tempest* 'has been a vehicle for delivering the greatest spectacle that live theatre could create. Shipwrecks, storms, fantastical creatures and magical masques have challenged the most ambitious companies to deliver their most ground-breaking stagecraft' (Baldwin in RSC 2016: n.pag.). As previously noted in the introduction, the play had already inspired filmmaker Peter Greenaway to push the boundaries of new technologies with an early use of mixed reality techniques in the 1990s in his film *Prospero's Books* (1993).

In staging *The Tempest* as part of the 400th anniversary year of Shakespeare, the artistic director of the RSC Gregory Doran wrote that he was inspired by the masques of the 1600s and he thought about:

> the kind of theatre Shakespeare might have wanted to create if he were alive today, […] working to create a truly unique theatre experience, which marries our distinctive theatre skills with cutting edge technology, to give our audiences something out of the ordinary to […] bring his work to a whole new generation.
>
> (Doran in RSC 2016: n.pag.)

In watching *The Tempest* a range of techniques including live performance capture were employed to attempt to integrate new technologies in a live performance context. The 'digital character seen on stage is not a recording but a live performance' (RSC 2016: n.pag.). The character Ariel is played by actor Mark Quartley who wears a costume that captures his movements as 'live performance capture' (see Figure 8.2).

The data describing his movements is processed and rendered into a computer-generated character in real time and sent through to the video servers to be projected live on stage (RSC 2016). The live performance capture also registers the actor's facial expressions, with a series of animated characters, or different forms of Ariel, having already been designed around the actor's body and facial scans. He notes that in fact, the head-mounted camera is 'only use[d] once in the show – for Ariel's appearance as a harpy. The head-mounted camera captures my facial expressions to the harpy's face can move simultaneously with mine' (Quarterly 2017: n.pag.).

Whilst watching the performance it was intriguing to view the relationship between the actor and the digital character, as Ariel was both physical and virtual in real time. Sometimes the technology really enhanced the theatre experience such as the views of Ariel, other times less so[4] – but again the experience has never left me as a highly experimental form of mixed reality.

XR: Extended reality

The final theme of this chapter is that of extended reality or XR. This could have been the very first theme of the chapter as extended reality is in fact a catch-all term encompassing augmented reality, virtual reality, and mixed reality, although as Patrick Kiger notes:

> Extended Reality is an idea that's been around for a long time. Science fiction writer Stanley G. Weinbaum may have been the first to envision it back in 1935, when he wrote a story, *Pygmalion's Spectacles*, in which a professor invents a pair of goggles that allow moviegoers to taste, smell and touch imaginary things, talk to

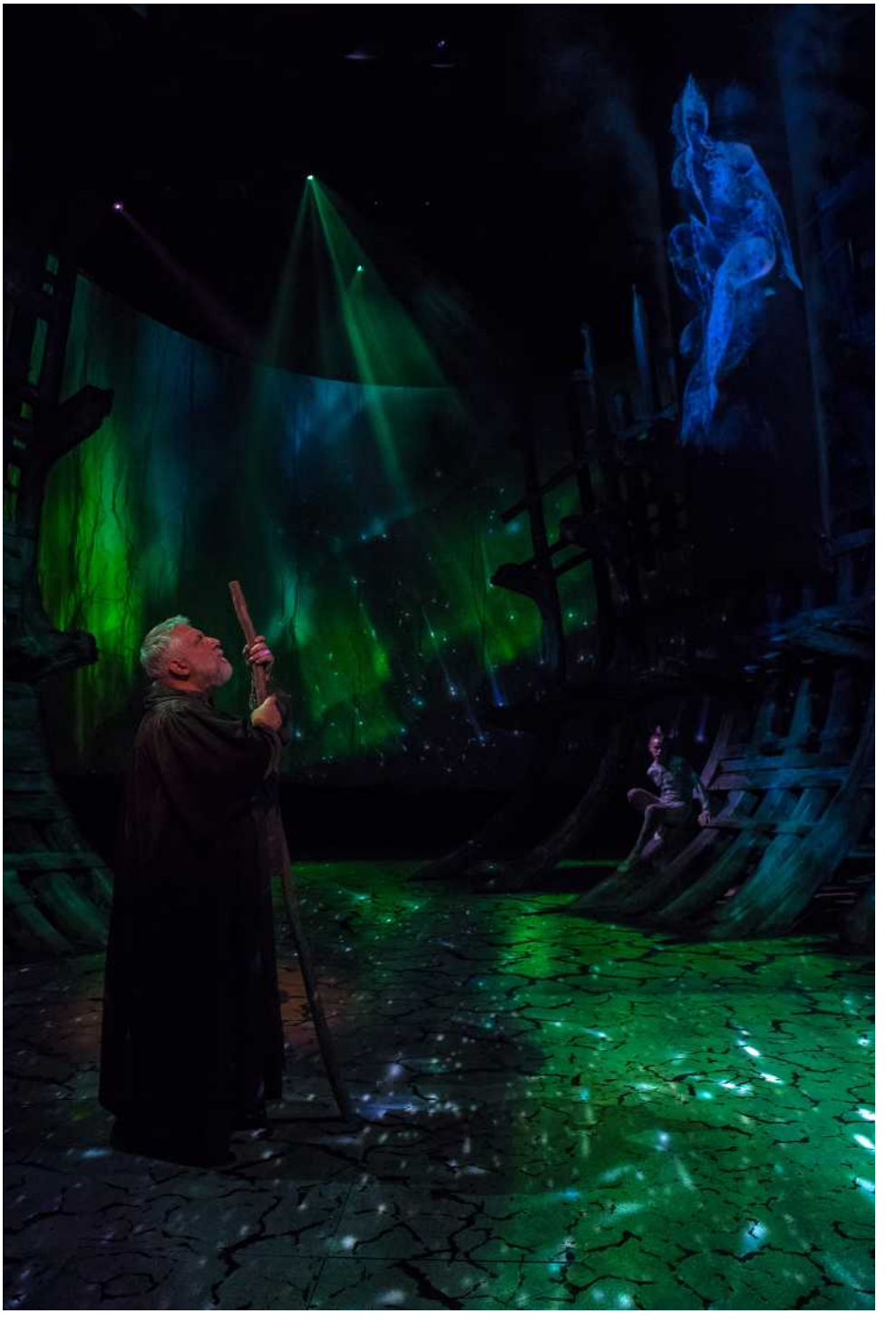

FIGURE 8.2: *The Tempest*, Royal Shakespeare Company Theatre, Stratford-upon-Avon (2016). Photo: Royal Shakespeare Company.

> fictional characters and immerse themselves in a story that happens around them, instead of on a screen.
>
> (Kiger 2020: n.pag.)

In truth, there is a blurring at this point between this section in Chapter 8 and aspects of Chapter 6 on VR: many of the earlier and indeed later works that are defined as VR incorporate methods of extending and/or mixing reality. As previously noted in Chapter 6, the Lumen Prize amalgamated its VR prize into the XR prize in 2018, with Carla Rappaport noting that it became difficult to make distinctions between the technologies that encompass this set of mixed and extended realities. The first three years of the XR award went to Kristina Buozyte and Vitalijus Zukas for *Trail of Angels* in 2019, Elyne Legarnisson for *(Un)Balance* in 2020, and *Dust* by Slovakian artists Mária Júdová and Andrej Boleslavský in 2021. I will discuss the middle project awarded the prize below in 2020.

(Un)Balance *(2020)*

(Un)Balance was developed as a final project at the Interactive Architecture Lab at the University College London by Masters student Elyne Legarnisson. She argues that, in the western world, we are beginning to embrace the idea that body awareness and body movement play an important role in our physical and emotional health. Legarnisson highlights the fact that most interactive experiences in VR are no exception to this, as they primarily work with the visual sensory system, disengaging a participant from their own bodies. She notes that: '*(Un)Balance* is an interactive experience in XR inviting participants to play on the edge of stability. It rethinks immersive interactions by foregrounding the notion of embodiment. It imagines a world where human-space interactions aim at training curiosity and awareness' (Legarnisson 2020: n.pag.).

Inspired by Somaesthetic theory that highlights the links between bodyawareness, unusual movements, and perception of the world, the participants are invited to play during the 10-minute solo experience. Legarnisson explains that the VR technology is combined with two analogue tools: a wearable and a tilting platform. The wearable augments sensations of shifting weights and the VR headset and six motion trackers enable a virtual avatar and a virtual world to respond to the wearer's movements (Legarnisson 2020). The result is a merging of 'visual, touch and sound stimuli, augmenting the participant's perception of her body and environment' (Legarnisson 2020: n.pag.).

Aerobanquets RMX *(2017)*

The project that is perhaps the closest to the dreams of Weinbaum is that of *Aerobanquets RMX* by Mattia Casalegno, winner of the Lumen Prize People's Choice Award in 2018. The project is a series of immersive, augmented sensorial experiences focused on taste and perception and are loosely based on the *Futurist Cookbook*, the (in)famous Italian book of surreal dinners and recipes first published in 1932.

> Part-manifesto, part-artistic joke, the *Futurist Cookbook* is a collection of recipes, experiments, declamations and allegorical tales: here are recipes for ice cream on the moon; candied atmospheric electricities; nocturnal love feasts; sculpted meats […]. The *Aerobanquets RMX* are multi-sensorial journeys encompassing all of the senses: sight, smell, hearing, taste, and touch.
>
> (Lumen Prize 2020: n.pag.)

This complex piece uses a range of technologies including 3D modelling, CGI, augmented reality, VR, and motion tracking. Thirteen dishes were created in collaboration with chef Flavio Ghignoni Carestia inspired by the *Futurist Cookbook* such as '*Dashi Broth Gelatine with Flourescin*', with a corresponding set of 3D models. These models were used as a virtual counterpart to the food. With some additional components such as virtual utensils, the result is a shared virtual, interactive space for the participants with real-time hand tracking and natural gesture haptics. The artists were able to assess relative positions between hands and utensils, and the utensils and the mouth of the participant and in that way they were able to track when the participant would savour the food.

Other recent mixed reality projects that incorporate the use of taste include the *Journey of the Tongue*, by three Japanese artists Ayako Suwa, Evala, and Yasuaki Kakehi, which was nominated for the STARTS Prize 2019.[5] This multi-sensory sound journey explores the multiple sensations of sound, touch, and flavour. A final project is by South Korean artist Pei-Ying Ling, *Viriphilia* (2018–20), which includes the creation of a cookbook written for the twenty-second century where humans have learnt to live with and accept viruses as part of a greater ecosystem.

We Live in an Ocean of Air *(2018–21)*

We Live in an Ocean of Air by London-based immersive art collective Marshmallow Laser Feast is a multi-sensory immersive installation that 'illuminates the invisible – but fundamental – connection that ties animals and plants,

the human and natural worlds, into a wondrous rhythm that underpins life on Earth' (PHI Centre 2021: n.pag.).

During the work exhibited at the Saatchi Gallery in London they note that 'the work explores the invisible connection between plant and human through breath, allowing the viewer to interact with an entire ecosystem around a giant sequoia tree – the largest living individual organism on the planet' (Saatchi Gallery 2019: n.pag.). The 'experience' was filmed at the Sequoia National Park, California amongst the Giant Sequoia trees reaching as high as 275 feet tall and a diameter of 25 feet. Giulia Segreto notes of the work of Marshmallow Laser Feast, 'the *fil rouge* of their work is to show the invisible and materialise our own symbiosis with nature' (Segreto 2019: n.pag.) (Figure 8.3). She writes that the purpose behind the project is to reconnect humans with nature, to re-establish the lost role of each individual. She further notes that 'the idea is challenging and intricate, virtual reality to rediscover reality, technology to let humanity recover its place in the natural world' (Segreto 2019: n.pag.), a notion that I will expand upon later in the chapter. Each performance is limited to the experience of 5 persons supported by untethered virtual reality, heart rate monitors, breath sensors, and body tracking. There are certainly echoes of *Osmose* (1993) here from 30 years earlier.

The Cosmos Within Us *(2020)*

There are two further pieces of work that warrant discussion in the context of XR, the first being *The Cosmos Within Us*, winner of the Lumen Prize Global South award in 2020. *The Cosmos Within Us* is a storytelling experiment that crosses the boundaries between VR and performance and combines immersive soundscapes with scent and touch to explore the connection between them. Directed by British Mexican multimedia artist Tupac Martir, the performance is in real time and is driven by an interactor wearing a headset and driving the entire VR show and is further described below:

> The narrative surrounding this VR experience revolves around the main character Aiken, a 60-year-old man who is suffering from Alzheimer's disease, whose mind the headset wearer (interactor) and audience are drawn inside. Throughout the story, the audience sees how Aiken struggles with his deteriorating mind, against time and against final loss of his past.
>
> (Lumen Prize 2020: n.pag.)

Martir describes the work as a performance that happens in two different realities. There is the performance space where the interactor is, and then there is the

FIGURE 8.3: Marshmallow Laser Feast, *We Live in an Ocean of Air* at the Saatchi Gallery London (2018). Photo: courtesy of Marshmallow Laser Feast.

audience watching the performance unfold in real time. Martir directs the piece controlling the visuals, music, two dancers who are referred to as the 'shadow men' who are in charge of taste, smell and touch during the performance, a camera director, a sound designer, and various other creative contributors to the piece (*Future of Storytelling* 2020). Again, we see the expanded use of the senses to develop this extended reality space.

Carne y Arena (Virtually Present, Physically Invisible) *(2017)*

The final piece I want to discuss in this section of the chapter is *Carne y Arena*, a mixed reality installation by Mexican Director Alejandro G. Innaritu. It was premiered at the 70th Cannes Film Festival as the first virtual reality project to be featured in the festival's history and was awarded a special Oscar in the same year for providing an exceptional storytelling experience. Based on true accounts of Mexican and Central American refugees, Innaritu notes that after meeting and interviewing many of the refugees 'their life stories haunted me' (Innaritu 2017: n.pag.). Subsequently, he invited some of them to collaborate with him on the project explaining that he wanted the visitor to 'go through a direct experience walking in the immigrants feet, under their skin, and into their hearts' (Innaritu 2017: n.pag.). Innaritu explains that at the Fondazione Prada in Milan, the first institution that hosted the full experience of the piece, 'there are no actors here. These are true stories re-enacted by the people who experienced them' (Innaritu in Raessens 2019: 636). Innaritu explains the power of the relationship between the virtual realm and our lived experience:

> Using technology to express human ideas and reality is very contradictory; to talk about reality, we have to create a virtual reality. We are so […] desensitized that we don't see reality anymore, or it does not even change us, doesn't impact us.
>
> (Innaratu in Raessens 2019: 640)

For the visitor of *Carne y Arena*, the experience lasts for twenty minutes (with six and a half minutes of those spent in VR), and is composed of three rooms: a waiting room, the room where you experience the VR whilst walking on sand, and finally a third room where you are invited to reflect upon your experience. The following is a description of the experience of Dutch academic Joost Raessens who visited the installation three times in Washington in 2018:

> Sunset. You are walking barefoot across the Arizona desert sand. All alone in the Mexican-U.S. border area. Until a group of migrants emerges from the dark, led by

> two 'coyotes' or 'jackals', that is, human smugglers. Suddenly everyone is blinded by a helicopter searchlight. Despair reigns supreme. Armed border patrol agents with a menacing barking dog detain the group. At first you are a silent witness, but later you yourself become a migrant […]. Then all of a sudden, a magical-realist dream world is conjured up lyrically. A long table appears in the desert, upon which floats the specter of a boat full of migrants capsizing at sea. You realise that it makes no difference whether you die as a migrant in the Arizona desert or in the Mediterranean.
>
> (Raessens 2019: 635)

Raessens explains that by replicating the real environment of the Arizona desert, *Carne y Arena*, translated as 'Flesh and Sand' refers 'to the feeling you get of the sand slowly taking over your entire body when you walk through the desert' (Raessens 2019: 636). Through both the positional tracking system and the fixed sequentiality of the VR experience, the viewer can explore the three-dimensional space choosing to hide behind the bushes, or help a migrant mother or child or even side with the border police (Raessens 2019: 639), and pushes it closer to what might be termed a multi-narrative experience. As with many of the other mixed/extended reality pieces discussed in this chapter, the addition of a range of sensorial elements such as the sound, the sand, and the wind points to the fact that 'the body never lies […] the senses are always true […] the body knows much better the truth' (Innaratu in Raessens 2019: 639). Raessens explains that, in this mixed reality piece, Innaritu positions the viewer both as a visitor and a participant. At the start of the VR experience, the viewer is a bystander unnoticed by the migrants or the border police. The viewer is slowly turned into a participant – for example when their own shadow is cast on a migrant's body, or when they feel the desert wind on their skin. The idea that VR brings us closer to reality, given that we have become used to being positioned as the spectator and now we are placed as the participant, the one who is experiencing the event, the situation for example, can be termed 'the immediacy effect'. As a film director, Innaritu explains how different film and VR are:

> While both are audiovisual, VR is all that cinema is not, and vice versa; the frame is gone and the two-dimensional limits are dissolved [...]. During this realistically unreal experience, our brain wires and most of our senses were tested.
>
> (Innaritu 2017: n.pag.)

There are echoes here of the work of BeAnotherLab described in Chapter 1. The empathy-driven experiences created by the collective also play with this idea of the immediacy effect. Returning for a moment to the four aspects of 4E Cognition

as a potential to understand the power of this experience, a focus at least on three of the cognitive approaches is useful. The embodied, embedded, and to an extent enactive cognitive elements of 'Flesh and Sand' combine in a way that is also reminiscent of the power of Davies's *Osmose*, although the narrative elements of this encounter serve to provide a sense of social immediacy beyond anything experienced in *Osmose* which is given over to a much more internally focused world. But to return to Henley once more, there is a resonance with his description of the enactivist view that, 'cognition does not simply provide us with information about the world, cognition is the mode by which we transform, and are transformed by, the world' (2021: 130).

Robotic encounters in extended reality

In the last section, I am going to briefly discuss a final form of digital embodiment, that of the embodied representation of the digital through a robot form only really alluding to the future in terms of extended reality and the development of robotics and AI. An artistic example is that of *Child in the Wild* (2017), an interactive installation by Wild System (aka Adam Nash and John McGormick) that enables human participants and a child robot to 'co-create an immersive audiovisual artwork through the use of the robot's artificial neural networks to enable object and image recognition' (Wild System 2017: n.pag.). Nash and McGormick collaborated on works in *Second Life* as discussed in Chapter 7 being recipients of the first Australian Council for the Arts award for a *Second Life* Residency in 2009. Comprising of a child robot sitting in a child's stroller, the visitor to the gallery shows the robot objects or images on their mobile, and the child robot tries to guess what the object is. As Wild System explains, the robot's perception of the material world is audiovisually displayed on the projections on the gallery wall and through the surround sound system. The *Child in the Wild* system uses deep learning artificial neural networks in order for it to recognise its surroundings. When a gallery visitor shows the child robot an image, it then trawls through the internet to learn about it and the real-time computational displays this form of machine learning. In the artwork, they explain it: 'Dissolves the boundaries between computational and physical phenomena, displaying an aesthetic that is a real hybrid of the physical and the digital, of human and machine learning, of natural and artificial intelligence, and of real and synthetic evolution' (Wild System 2017: n.pag.).

As Nash and McGormick note, 'the disintegration of the resultant images into colour fields from which the sound is generated harks to the changeability and fragility of memory and perception, perhaps even to its unreliability' (Wild System

2017: n.pag.). The project was presented at the ArtScience Museum in Singapore as part of the ACM *Creativity and Cognition Conference* in 2017.

A final project that I will end with has been undertaken by AI researchers at Oxford University and initiated by Oxford-based gallery director Aidan Meller. The project has created the world's first female artist robot named Ai-Da. Named after Ada Lovelace, the first female computer programmer, Ai-Da is the world's first humanoid AI robot artist. As a machine, with AI capabilities, her artist persona is the artwork, along with her drawings, performance art, and collaborative paintings and sculptures. On her dedicated website, the project is further explained:

> In the time of online avatars, AI chatbots, Alexa and Siri, Ai-Da as a robotic artist is acutely relevant. She is not alive, but she is a persona that we relate and respond to. This surreal situation of confusing realities is already part of our daily lives […]. Extraordinarily complex, our online worlds are pushed and pulled by forces and personalities that are sometimes apparent but largely oblique […]. All these options bring powerfully to the forefront the complexity of our interacting digital and physical worlds and the masked identities we can assume in them.
>
> (Ai-Da 2019: n.pag.)

Developing further as a persona in her own right, Ai-Da was invited to be an artist in residence at the 2022 Glastonbury Festival in the United Kingdom, painting some of the headline acts and further staged a solo exhibition at the 59th Venice Biennale that same year.

Conclusion

As Bolter describes reality media as AR, VR, and MR, there are new levels of perception available to be explored within this realm. I am not so sure about the term 'reality media'; however, the way in which reality is changed and experienced is of interest here, particularly with the ways in which artists and creative practitioners have chosen and continue to choose to explore within their practices. From the way that augmented reality has been creatively explored by artists such as Carla Gannis through her exploration of her selfies within her augmented book, there is certainly a magical quality to the way in which some artists have incorporated the visual aspects of AR, in examples such as the *24 Card Psycho*. There was a joyful surprise in handling cards that come 'alive' with short film sequences and plays with the audience's visual expectations. There are certainly echoes here

of that same darkened cinema projecting Greenaway's *Prospero's Books* for that very small audience, that same magic on the screen.

When we come to see the experiments in theatre at the Royal Shakespeare Company, *The Tempest* was certainly the most apt of Shakespeare's plays to experiment with these new mediums. So too in *The Cosmos Within Us* again the blurring of boundaries between mixed reality and performance pushes the medium further. Mixed realities extend the immersive experience in works created during what has been termed the second wave of virtual reality in Chapter 6. In fact, virtual reality is now so much so merged with extended reality and mixed reality and is seen more as an immersive strategy rather than an end in and of itself in many of the works reviewed in this chapter. When VR technology is involved, it invariably creates this sense of immediacy and a set of potential experiences that is significantly different from passive screen-based interactions. In *Carne y Arena* (2017) the power of the moment to be both the viewer and the actor in this retelling of a real-life situation pushes that immediacy to the edge of reality.

Mixed reality is not new. In fact, Paul Sermon was one of the first artists to establish a mixed reality protocol in his artworks from the early 1990s with *Telematic Embrace* (1991) and in most of his subsequent works there has always been an engagement with the 'mixing' of realities rather than the movement to virtual space or physical space or vice versa. VR will persist within the mixed reality and extended reality experience. The complexity of the experiments incorporating AI as in the example of *Child in the Wild* and others is compelling and is sure to continue as a post-hybrid form of practice. What this means for our understanding of the broader significance of digital embodiment will be addressed in the final section of the book in the conclusion that follows.

NOTES

1. I saw a talk by Carla Gannis and interacted with her *The Selfie Drawings* book at a symposium in London organised by the Computer Arts Society in 2016.
2. At the time of writing the COVID-19 pandemic is by no means over, however restrictions in the United Kingdom have been lifted in an attempt to 'live with COVID-19' supported by the NHS vaccination programme.
3. Despite this it was within the last seven years at the time of writing, the technologies are being more and more integrated into our cultural lives.
4. My guide for when mixed reality is working is when the technology becomes invisible, and the moments it becomes visible the 'magic' disappears.
5. The STARTS Prize is a funded by the European Commission as part of the Horizon 2020 scheme and celebrates projects that work across the fields of arts, science, and technology; each year two prizes are awarded alongside ten honorary mentions given.

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Conclusion

As we, like the proverbial angels, keep being blown backwards by rapid winds into the future, how can we be sure where we are going?

(Morie 2007: v)

Writing in 2007, Morie was commenting on the uncertainty of the future of new technologies when she wrote this between the two waves of virtual reality (VR). It somehow seems fitting to begin the conclusion with this quotation for although, as we have seen in these chapters, we have come a long way in our understanding of digital media technologies, and some way in understanding its impact on us as individuals, on culture, and on our society, we still do not quite know where we are heading. Blowing backwards into the future, yes, and those rapid winds are created by us, as we continue to be seduced by all that new technology offers us. The tension is great. Technology has the potential to realise the greatest and most magnificent parts of our imagination and this is why, in my view, it is the artists and creative practitioners working with scientists and technologists who are holding up the digital light that we should follow. They should be the guides through the years of this post-human epoch, rummaging, foraging, testing the technologies, dreaming with them, and applying them to solving our most pressing human problems. Perhaps an Avatar XPrize should be offered to the artists as well as the scientists and technologists, as we have seen continuously within this book the experimental and creative approaches of artists certainly forge new paths, and I would argue, create more human-centred experiences with new technologies.

Time and again in the pages of this book the nature of reality is pushed by the boundaries (real or imagined) exposed by new technologies. In truth, there are few boundaries there as we have seen, but rather perhaps it is the spaces created in-between in new technologies that offer the liminalities that shape our responses to the digital. Here we are again reflecting on reality and the nature of the physical in relation to the virtual. The argument often returns to the virtual simply being a

mirror to the experience of our lived reality as a continual mix of memory, physicality, virtuality, and imagination, and the reason that technology has taken such a hold (after all humans are the creators and imaginators of that very technology) is that it momentarily takes us away from our persistent everyday reality. It allows us to reconnect and resurface in a slightly different way each time, in a similar way to Kozel's notion of the return being as significant as the departure itself (Kozel 1994). It would also fulfil the enactivist view of the world.

In **Chapter 1: Digital Embodiment, Hybridity, and the Arts**, I argued that the privileging of the body over the eye becomes a key concept in understanding digital embodied experience. Despite the early visual, or rather ocular-centric, focus of many new technologies each quickly highlights the ways in which the body sits at the centre of any digital experience whether it be through the navigation of space through the body or through the nature of the space and the environment generated through the digital. An approach that looks to both the art and the science of embodiment offers up many new avenues of exploration, and in turn a further understanding of human embodied experience. It also points towards future research – and this is urgently needed – to enable us to really begin to understand the impacts of technology on humans before we follow paths that might endanger or even irreparably hurt humanity (let alone the drain on the physical and natural resources of the planet[1]). The chapter highlights current research in the field of cognitive neuroscience where the way the brain responds to the illusion of 'body ownership' in virtual space has been examined. However, there is also caution amongst some researchers about the 'neurological turn' as a way of explaining a person's response to media stimuli. In the field of philosophy, Chalmers argues that virtual worlds and virtual space, and more particularly VR still offer the chance to understand non-illusory perceptions of 'real virtual reality' (Chalmers 2022: 205–06). The chapter introduced the concept of the hybrid and its significance for understanding how the digitally embodied experience forms a many-layered set of experiences. Perhaps our desire is to move beyond the hybrid – where the distinctions between the human and technology are clearly still visible – to a place where a post-hybrid environment or something entirely different emerges. Are we really ready for this? The chapter argues that we must entrust artists and creatives working with scientists and technologists to inform this journey, iterating more and more to understand and influence our technological futures, avoiding being 'blown backwards' into it. It is in the work of the BeAnotherLab Collective and their approach to embodiment studies, and indeed to interdisciplinary practices across the arts and sciences, that we can see the potential blueprint for a post-hybrid practice that could inform this technological journey. So too the work of further defining the cognitive experiences within digitally embodied spaces may inform the building of those experiences further.

In **Chapter 2: Imagination, Space, and Immersive Technologies**, I charted the links and relationships between digital embodiment and the imagination through

a theoretical investigation of the virtual in phenomenological thought. Discussions around the nature of the virtual by a host of philosophers reiterate the complexity of any notions of it, particularly in relation to the physical and indeed the 'real'. Grosz's observations of Bergson being the great thinker of the inbetween and this in turn defines the space of a certain kind of virtuality further aids us with a useful approach to the virtual in relation to technology (Grosz 2001). So too is Kozel's notion of the body as a weave of the tangible and intangible and as a weave of flesh and shadows where the shadows are the sense of virtuality within us (Kozel 2007) and enables us to reconsider the body as being a different kind of materiality. In fact, Steeves argues that the virtual body provides an imaginative basis for embodied experience and becomes what he terms the imagining body (Steeves 2007). If we take on Kozel's idea that the material and immaterial are intertwined and begin to see the digital experience as both material and immaterial at the same time, we can start to grasp the affordances of such a virtual immersive space, particularly when we begin to think of the body that we occupy be it physical or virtual in a similar way. Morie suggests that by 2007 there was a paradigm shift in what humans were able to experience through immersive digital environments and this has only continued since then. Bachelard and Sartre were certainly at odds with each other when they spoke of the imagination. However, I remain intrigued by Merleau-Ponty's working notes where he tantalisingly considers that Bachelard argued that each sense has its own 'imaginary' (Merleau-Ponty 1968). What this refers to in Bachelard's writing is not entirely known but this notion of different 'sense imaginaries' is of significance when considering immersive experiences that are designed to enhance the participant's senses, be they tactile, visual, smell, or even taste-based. Further work on bringing together the imagination, sensation, and 4E cognition may bring a deeper understanding of cognition in relation to the senses. The chapter concludes with a discussion of the geographies of virtual space, Massey's view of time and space relationships, and the third space of Lefebvre, each concept contributing to the understanding of virtual space as hybrid and as a rich ground for the study of the imagination itself.

In Section II, three aspects of embodied experience in and outside of the digital were explored: that of the gravitational body, the virtual body, and the hybrid body. In the context of digital embodiment, there may be multiple influences on the way we negotiate and experience virtual and immersive environments not least the way we engage with virtual space or mixed reality environments through our (multiple) bodies.

However, in **Chapter 3: The Gravitational Body**, I began with a philosophical discussion of the body in relation to gravity and in particular what impact (physically, emotionally, spiritually, and even psychically) the force of gravity has upon us, on our sense of embodied self, and in turn on our own conscious and unconscious experience. Perhaps the 'gravitational body' is a little awkwardly expressed; however, it is a constant presence in our lives, like a silent body that

we experience every waking (and sleeping) second although we are almost entirely unaware of it. The chapter focused on artistic practices that engage with the gravitational body or the zero-gravity body (the body outside of gravity) including the enduring embodiment work of French choreographer Kitsou Dubois, the more recent work of artist-astronaut Sarah Jane Pell, and others whose work developed during a series of organised art-science zero-gravity flights. Particularly striking is Dubois's experience of a sense of merging with the empty space around the body in zero gravity, and so too the changing states of consciousness experienced by many including Ryklin and, equally striking, is how we might understand ourselves as being intimately conditioned and connected to the flow of time itself (Ryklin 2005). Kozel argues that 'in artistic experiments with gravity corporeal states are even more entwined with states of consciousness' (Kozel in Doyle 2017: n.pag.). Her sisters of gravity: that of dropping, falling, rising, floating, sinking, and spiralling contrasts vividly with Wilson's brutal physical reaction to double gravity. The work of the artists and scientists engaged in the effects of gravity – often seen through the absence of gravity for those lucky (or unlucky enough) to experience it – provides a foundation for our understanding of what it really means to have a body that our consciousness inhabits, and indeed the implications when the balance between our body, gravity, and our consciousness shifts. This shift in consciousness points to a similar potential shift in digital space of the relationship between our bodies, our virtual bodies, and where our consciousness really resides.

In **Chapter 4: The Virtual Body**, the relationship between the body and the imagination and the significance of the bodily representation in virtual space is further explored. Here I focused on the avatar experience and Boellstorff's 'invirtualisation' of the avatar (as opposed to the incarnation of the avatar form from virtual to real) which is a playful take and an interesting one. In turn, the Dalai Lama, when visiting MIT talked of the relationship between the body and the mind and argued that even in extremely subtle states of consciousness the mental state must have a physical base, that there is an embodied or material base for them. I remain fascinated by his indication that advanced yogis can gain mastery over physiological elements and that their sensory facilities can be co-opted or transferred. In the chapter, I explored the concept of the virtual body and how we 'imagine' ourselves to be both 'present' in a virtual space by way of a virtual or avatar body and what part our imagination plays in this process. When we embody an avatar there is a phenomenal experience registered actually or by proxy, and those experiences can have a profound effect on the person who has experienced them. The 'here' body and the 'image' body of Ihde can assist us in understanding the multi-dimensional experience of identifying with an avatar in virtual space, echoing the work of Slater and Sanchez-Vives already discussed in Chapter 1 (Ihde 2002). There is no doubt that the idea of looking at 'ourselves' represented in a

virtual space (be it in avatar form or something else) does rely on mirror neurons to an extent and in a way that echoes our understanding of empathic responses in VR when experienced from a first-person perspective. However, recent studies in 4E Cognition point to something that Zahavi considers to be beyond mirroring whereby he argues that our experience of empathy is built in more complex ways that are not currently agreed upon within the field of the cognitive sciences (2018). The next part of the chapter focused on two projects, one by Joseph DeLappe, and the other undertaken by myself to explore the virtual space of *Second Life* and my relationship to my own avatar Wanderingfictions Story. For DeLappe the focus was on his relationship with his avatar *MGandhi Chakrabarti*, who was created as an accurate avatar representation of the late Mahatma Gandhi to enable him to virtually re-enact Gandhi's protest march to Dandi as a form of protest against the British in the 1930s. What came out of DeLappe's experience was his sense of becoming something 'other' by durationally embodying Gandhi's avatar and the physicality of the experience of walking on the treadmill in the gallery space echoed in the virtual space of *Second Life*. Both the *Meta-Dreamer* (2009) project and the early explorations of 'being' my avatar brought out a sense of an embodied narrative that I could creatively explore, alongside an early example of reversing Boellstorff's invirtualisation through the materialisation of my avatar into physical form.

In **Chapter 5: The Hybrid Body**, we see the play of the hybrid in its fully colourful form. It is hard not to underestimate the impact of Haraway's writing in the *Cyborg Manifesto* in 1991 (and still to this day). An acknowledgement should be made to the boundary-pushing cyber-feminists, looking to renegotiate the body in relation to gender in the 1990s and beyond hoping that the loosening of the body to the physical might enable new visions to emerge. The truth is new visions have emerged quite outside of narrow binaries; in fact, the hybrid body has literally exploded onto the scene. An embodiment of hybridity can be seen in Björk and her recent immersive and interactive work. In his work, Stelarc is also eager to burst from his genetic confinement as he hovers between what he terms gravity and fantasy (Stelarc 1982). His concepts are in such contrast to Virilio at that time as he writes that the body is neither all-here or all-there, it is partly already here and partly elsewhere. The body has indeed become a contemporary chimera described by Haraway as the emergence of hybrids of machine and organism. Again, we see the discussion of the inbetween emerge and exemplified in what Bryld sees as the creature of the inbetween, and the creature of the interface – the dolphin (Bryld 1996). Equally as connected is the notion of Squier's bio-cultural body and the same hybrid connection between biology and technology as is Morton's argument about nature as a master network in which humans are totally entwined, with, not without, their tools and technologies. The chapter explored the post-gendered

body and Cardenas's enduring project *Becoming Dragon* from 2009. Striking is her concept of 'a million genders for a million people' and virtual space as a space of becoming. This links closely to the work of Sousa and the avatar as a carrier of the multiple, of the collective as well as the individual. So too, as a post-feminist space, in challenging normative expectations and representations, the work of Heller brings out a curious sense of ancestry that is echoed in Björk's.

In the final Section III of this book, I examined digital embodiment in the context of artistic practices in VR, in virtual worlds, and finally augmented, mixed, and extended realities, discussing in three broad ways how artists and creative practitioners have set themselves the task of exploring, creating, and pushing the boundaries of digital technologies in the last 30 years. In **Chapter 6: The Two Waves of Virtual Reality**, the work undertaken in the first wave was critical to the developments in the current second wave. Indeed, the role played by artists during this first period in pushing the boundaries of this new technology should not be underestimated. The chapter introduced a brief overview of the historical developments of the technologies that made immersive VR technology possible. The early pioneers including Heilig and his multi-sensory 'entertainment system' *Sensorama* built in 1962, and Krueger's *Videoplace* in the 1970s, advanced concepts of virtual space, artificial reality, and interactive responses within virtual environments. The invention of the CAVE (Cave Automatic Virtual Environment) by Carolina Cruz-Neira and her colleagues at the University of Illinois in the early 1990s, all laid the foundations for what was to come. The influence and importance of the arts and virtual environments project at Banff in the first half of the 1990s should also be acknowledged and the projects realised there by artists such as Laurel and Strickland, Dove and Mackenzie, and Gromala and Sharir, made advances in the contemporary understanding of virtual environments, and the ways in which an audience could interact with them, to experience virtual environments through what Laurel, Strickland, and Tow termed the pleasure of the embodied imagination (1994: 123). The fact that Char Davies helped develop the *SoftImage* software[2] specifically to enable the creation of her artistic imagination is a testament to the contribution she made to the technological developments of 3D immersive space, and indeed advancing the understanding of what contributes to a fully 'immersant' experience. Lanier's data glove helped artists to further explore and extend the sense of 'being there' through the stimulation of other senses through haptics and Morie's scent collar took a step closer to extending sense stimulation in virtual environments further. Artists working in the second wave of VR such as Björk and those whose artworks were celebrated by the Lumen Prize VR Prize have begun to develop the language of VR further and, with the help of more advanced and more accessible apparatus, are creating new spatial experiences for their audiences. The work of the New Reality Company in developing *Tree* (2017) and Baker's

womb-like experience in *InterHER* (2021) are pushing the multi-sensory stimulation of the senses further. Slater argues that VR should be seen as a medium within its own right and should have its own conventions acknowledged; perhaps over time, these will become further articulated.

The focus of **Chapter 7: Artistic Practices in Virtual Worlds** was on the articulation of what an avatar-mediated online world could contribute to artistic practice in particular. While the interest in online platforms such as *Second Life* had waned by the second decade of this century, the use of games-based online worlds has only accelerated, and as previously noted most certainly has become firmly embedded in young people's lives. The work of the early pioneers in *Second Life* such as Robbie Dingo, Adam Nash, and Angrybeth Shortbread and the community of what I term 'artist avatars' (those known primarily through virtual world platforms rather than as already established real-world artists) meant that the affordances of the virtual world space quickly emerged. Nash's sound and interactive work (and in other work with his collaborators Dodds and Clemens) and Angrybeth Shortbread's interactive work, which was subtly structured to encourage a shared experience, pushed the boundaries of what was possible for the artist and for the audience as an avatar within the *Second Life* space. The two *Kritical Works in SL* exhibitions that I curated in 2008 and 2009 had two quite different aims and were hosted at an exciting time within the virtual world. In the first exhibition in 2008, the work presented was entirely virtual, following what Lichty termed the client/browser modality, works that are particular to the virtual world itself, such as Morie's *Remembrance and Remains* (2008) and Naumova's *Autonomical Grid* (2008). The second exhibition in 2009 brought together established artists who were exploring the space such as Lynn Hershmann with *Dante Hotel* and Paul Sermon's *Liberate your Avatar* and the modalities of the work presented tended to be Lichty's evergent, those physically realised from virtual origins and the cybrid, those existing concurrently in different modalities. The works since 2010 include works that have a collaborative focus and those that focused on creating immersive avatar-based narratives, such as probably the most well-known 'artist avatar' Bryn Oh, based in Toronto, Canada. In *Imogen and the Pigeons* (2013) and her recent work *Lobby Cam* (2022), Oh develops a particular kind of immersive narrative experience where the spatial language developed in VR can also be seen in virtual worlds but with an additional aspect: that of the relationship of the audience participating to the avatar they are inhabiting, who can sometimes be used as part of the narrative constructed by the artist. In terms of what virtual worlds are as an artistic medium, it was most notably the user-created worlds such as *Second Life* that have offered the most in terms of understanding digital and virtual space, and how indeed it was possible to inhabit and create in such a space.

Chapter 8: Augmented, Mixed, and Extended Realities examined the development of a range of new realities and the ways in which the work of contemporary artists and practitioners have extended, expanded, augmented, and engaged with more recently emerging technologies. The chapter began with a discussion about augmented reality (AR) which emerged as a variation of the same technological idea as VR. Some beautiful artistic projects have been produced using AR such as *52 Card Psycho* (2009) by Rhodes or Gannis's *Selfie Drawings* (2015) presented as an AR book. It seemed appropriate to wait to discuss the work of Paul Sermon in the mixed reality section of this chapter given his earlier ground-breaking telematic project *Telematic Dreaming* (1992), and his more recent pandemic encounters projects. His work playfully highlights the charged space of telepresence. The Artistic Director of the Royal Shakespeare Company suggested that the work undertaken with Imaginarium Studios in their 2016 production of *The Tempest* would be just the kind of cutting-edge production Shakespeare would have wanted to create if he were alive today. In the section on extended reality again, the work of the Lumen Prize has been important in celebrating works such as *Aerobanquets RMX* (2017) and *Carne y Arena* (2017) for their innovative use of mixed reality technologies. Both projects, or rather performances, challenge the audience through their experience of digital embodiment and the challenge to their senses. In the final section where robotics and AI are introduced into mixed reality artworks, the two projects discussed *Child in the Wild* (2017) and the artist robot *Ai-Da* point towards another step change in artistic engagement with new technologies and only really touches the surface of developments in this arena. For example, the ANA Avatar XPRIZE promoted the development of an avatar system that transports human senses, actions, and presence to a remote location in real time. I wonder what artistically creative projects may come from the development of robot avatar experiences – I will be interested to see them over the coming years.

I have argued throughout this book that we must start with the body when begin our negotiations with the digital world, focusing on our embodied experience when in relation to new technologies. Far from a sense of disembodiment the space of the digital is a constant reminder of the bodies we occupy. Taking the concept of hybridity was productive as a way of exploring the spaces of digital embodiment and in turn, my argument for a form of post-hybridity is a subtle one. It is more than a call for inter-disciplinarity, but a new way of thinking about the hybrid itself. The ubiquitous experience of digital embodiment through people's sense of identity and social experience through digital platforms has become so prevalent in an alarmingly short space of time and has become completely embedded in the psyche of young people. Whilst research undertaken in the last two decades has taken us some way in understanding the societal and cultural changes that the digital era has created, it is important to acknowledge what art has done and continues

to do to further understand the digital experience. The words of Cristina Varvia, former deputy director of the research agency Forensic Architecture, resonate here:

> We think that artists also have a claim to truth. We understand that evidence doesn't speak for itself, we understand that we need to have interpretation, we understand that we need to represent. We need to make visible and explicit.
>
> (Varvia in Doyle et al. 2022: 237)

Further than this though, I would argue that support should be given to bring artists, cognitive scientists, and technologists together to share their unique views of, and research approaches towards, digital embodiment. They should work together to investigate how digital embodiment, post-hybridity, and the arts are becoming a research toolkit to cast light on our understanding of the reality of the physical world, on the potential of the virtual in relation to it, and on the array of human experience within it. The future is here, let's take care of our imaginations within it.

NOTES

1. The project *An Anatomy of an AI System* (2018) by Kate Crawford and Vladan Joler creates an anatomical map of the human labour, data, and the planetary resources used to create an Amazon Echo and is a sobering project to reflect on. The map exposes the extent to which our desire for new technology has both a human cost and a planetary cost.
2. *SoftImage*™ was founded in 1986 by filmmaker Daniel Langlois and was joined by Char Davies in 1988 as founding director. It was still widely available until 2014 when the company announced that no new licenses would be available beyond 2016. Langlois was tragically killed in 2023 on the Caribbean nation island of Dominica alongside his partner Dominique Marchand.

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DIGITAL EMBODIMENT AND THE ARTS

Exploring Hybrid Spaces through Emerging Technologies

A timely examination of the use of emerging technologies in the arts in recent decades, from the first wave of Virtual Reality through to the current use of Mixed, Augmented and Extended Realities. It highlights the necessity of understanding technological experiences through the assumption that all experience is embodied.

The book explores the notion of embodied experience through a study of space and virtuality, imagination, and technology, preparing the ground for a more explicit understanding of the role the body has in our engagement with the digital technologies.

An explosion of digital culture and experience has given artists and creative practitioners new ways of exploring a hybridisation of creative practices with access to technological tools only previously dreamt of.

Denise Doyle has over 20 years of experience researching the impact of emerging technologies on practices across a diverse range of creative fields. As a practitioner and a theorist her research interests focus on virtual worlds, embodied experience, virtual reality, phenomenology, digital narratives and gravity, outer space, and artistic practice. She is principal editor of the *Journal of Virtual Creativity* published by Intellect and Visiting Professor at Ontario College of Art and Design University, Canada.

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