

University of Vermont

ScholarWorks @ UVM

UVM College of Arts and Sciences College
Honors Theses

Undergraduate Theses

2017

Making Gamer Worlds in Mass Appeal Futuristic Online Games

Emma R. Tait

University of Vermont

Follow this and additional works at: <https://scholarworks.uvm.edu/castheses>

Recommended Citation

Tait, Emma R., "Making Gamer Worlds in Mass Appeal Futuristic Online Games" (2017). *UVM College of Arts and Sciences College Honors Theses*. 46.

<https://scholarworks.uvm.edu/castheses/46>

This Undergraduate Thesis is brought to you for free and open access by the Undergraduate Theses at ScholarWorks @ UVM. It has been accepted for inclusion in UVM College of Arts and Sciences College Honors Theses by an authorized administrator of ScholarWorks @ UVM. For more information, please contact donna.omalley@uvm.edu.

Making Gamer Worlds in Mass Appeal Futuristic Online Games

College Honors Thesis

Emma Tait

Department of Geography

College of Arts and Sciences

University of Vermont

Thesis Advisor: Dr. Ingrid L. Nelson

Committee Chair: Dr. Brandon Ogbunugafor

Committee Member: Dr. Lesley-Ann Dupigny-Giroux

Acknowledgments

This project was funded by the University of Vermont College of Arts and Sciences APLE Award and the Department of Geography. I am grateful to the six participants of this study for their time and insights without which I could not have written this paper. I would also like to thank Dr. Brandon Ogbunu for chairing my thesis committee and for his constant enthusiasm for this project.

A special thanks to my thesis advisor Dr. Ingrid L. Nelson for her time, her excellent feedback, her humor and her ever present support and words of encouragement. From the day last spring when I nervously asked her to be my advisor through the final stages of this project and beyond she has challenged me, laughed with me, followed my tangents and kept me focused. I could not have done this project without her.

Thank you to my academic advisor Dr. Lesley-Ann Dupigny-Giroux for not only being a member of my thesis committee but for her unfailing support and advice through this process and the last four years. I would not have gotten to this point without the many hours in her office and her guidance through all of my many projects, courses, crises and interests.

I would like to say a special thank you to Dr. Pablo Bose for helping to get me started on this project. Not only did he help to fund it, but it was Dr. Bose who introduced me to the game No Man's Sky last spring. He has continued to support me with his enthusiasm and through discussions about my project as well as other cool and interesting games, and attending my talk at AAG. This project wouldn't be what it is without his incredible support.

I would like to acknowledge the entire faculty and staff of the Department of Geography for their support, advice and words of encouragement. I would not have gotten here without all of their support and I am deeply grateful to all for their kindness, support, knowledge and confidence in me. I am so honored to be part of the Geography Department.

Finally, I cannot adequately express my gratitude to my family and friends for their emotional support and constant encouragement. I would not have made it this far without such excellent people. I would especially like to thank my parents who have always believed in me, encouraged me to pursue my desires and dreams, and reminded me to have fun along the way.

Abstract

Online games have become massively – and unevenly – distributed across human society. While most commonly played for leisure, online games also help to raise awareness about environmental degradation and promote conservation initiatives. My research explores the popular appeal of two futuristic online games, *No Man's Sky* (2016) and Sid Meiers *Civilization Beyond Earth* (2014). I examine gamer critiques of the visual and other spatial content—or ‘worlds’—encountered in these two games, in order to understand what kinds of ideas about nature are created, promoted and consumed in mass-appeal virtual spaces. This paper expands the study of nature 2.0—a new component of nature that exists in and through online social media—contributing to emerging research on what it means to engage with nature in the digital age. The environments in these two games are both fictional and alien, yet existing physical environments inspire virtual game spaces and are critical for a player’s successful immersion in the game. Gamers reinvent game spaces to perpetuate a game’s particular narrative or gaming objectives. Much of the imagery that gamers’ consume for other contexts, depicts a narrow or skewed framing of ‘nature’, which scholars have shown impacts real-world interventions and assumptions. I argue that gamers’ world making in virtual game spaces provides opportunities for complicating confronting and renegotiating human nature relationships.

Table of Contents

List of Tables and Figures	1
Chapter 1: Introduction	2
Chapter 2: Literature Review	5
2.1 Virtual Space	5
2.2 Virtual Reality, Physical Unreality and the Event of Place	8
Chapter 3: Futuristic Science Fiction Space	18
3.1 Civilization Beyond Earth	18
3.2 No Man’s Sky	24
Chapter 4: Methods	31
4.1 Participants	31
4.2 Game Play Documentation	32
4.3 Semi Structured Interviews	34
4.4 Analysis	33
Chapter 5: A ‘Natural’ Outer Space?	38
5.1 Nature as Science	38
5.2 What Makes Nature Alien	49
Chapter 6: What Makes a Game Worth Playing?	55
6.1 Colonial Narratives and Counter Narratives	56
6.2 Making the Frontier Boring	59
6.3 Bodies in Space	67
6.4 Cyborg Bodies	71
Chapter 7: Conclusion	75
References	81
Appendices	84

List of Figures

Figure 1	19
Figure 2	23
Figure 3	25
Figure 4	28
Figure 5	29
Figure 6	40
Figure 7	44
Figure 8	45
Figure 9	46
Figure 10	47
Figure 11	63

List of Tables

Table 1	58
---------------	----

Chapter One: Introduction

Strange how humanity now lives on an alien planet, yet still struggles to reclaim many of its past technological achievements. Having now regained Network capabilities, we move one-step closer to a completely unknown future. The shape of that future will be determined by how we utilize our current technologies. For example, the Network links all our systems, allowing us to disseminate our knowledge digitally, be it technological or cultural. Which of these is more beneficial, we do not know. – Civilization Beyond Earth (Firaxis Games 2014)

This thesis is about making worlds and natures in virtual space. Virtual space is everywhere. From the pictures we post on Facebook and the texts we exchange with friends to global trade networks and massive multiplayer online games, virtual spaces are part of everyday life. The scope of virtual space is too vast to discuss in one thesis. My research focuses on virtual game spaces. Billions of people play online games all over the world (Newzoo Games 2016, DaSilva 2015). Given the prevalence and appeal of online games, understanding gaming culture and the possibilities presented by games is vital for expanding theories of space, place, society and nature in an increasingly digital world. This thesis examines gamers' perspectives on the natures encountered in two online games to understand what kinds of ideas about nature are created, promoted, complicated and consumed in mass-appeal virtual space. I began my project with three research questions:

1. How do critiques of *No Man's Sky* and *Civilization Beyond Earth* illustrate important features of human interaction with game environments that are crucial to world making for gamers in virtual space?
2. What do gamers' expectations and critiques of these games reveal about their emotional, physical and social desires for virtual game spaces?
3. How do gamers' desires and expectations illustrate, expand or challenge gamer understandings of place and human nature relationships in the actual world?

I interviewed six self-identified gamers about their expectations and experiences of two recently released games that offer different approaches to making virtual natures: 1) Hello

Games' *No Man's Sky* (August 12, 2016) and 2) Firaxis Games' Sid Meier's *Civilization Beyond Earth* (October 23, 2014). I used a combination of narrative and visual analysis on the data from my participants. Two themes emerged from this analysis. The first theme was that games use specific tropes of nature in creating virtual environments. Gamers also have specific ideas about nature that they bring with them into games. The second theme was that strong narrative elements and the players' bodies in the game are critical to gamers' ability to understand their role in games. I argue that virtual worlds complicate, inform and are informed by actual world natures and relationships. Virtual spaces hold great possibilities for exploring uncertain futures and renegotiating human nature relationships. Virtual spaces also have great potential to help facilitate complex conversations about living with the current global ecological crisis and the messy relationships required to survive in uncertain futures.

The structure of this thesis begins with an overview of the literature on virtual space, gaming and nature and theories about how humans understand place. Chapter three provides examples of the premise and basic structure and play style of each game. Chapter four offers an overview of the literature on conducting research in virtual spaces and outlines my methodology for this project. Chapter five is the first of two results and discussion chapters. In this chapter I argue that games have great potential to complicate our understanding of nature in virtual outer space, yet gamers might not be ready for these complexities if they do not have a sense of the broader game storylines and an in-game body with which to explore such radical complexities. Chapter six includes the results of this study that pertain to colonial narratives and counter-narratives in these games. I also discuss the importance of narrative in virtual world building and the way that *No Man's Sky* in particular renders resource extraction boring with its lack of narrative structure. In this chapter I illustrate the importance of narratives and bodies in a

gamer's ability to make virtual worlds. I conclude this chapter with an examination of embodiment and cyborg bodies in game space. The final chapter briefly outlines the limits of this study and opportunities for future research. There is a variety of emerging literature about natures in virtual spaces. In the following chapter, I discuss this literature within a broader conversation on human understandings of place, ideas of nature and theories of virtual spaces.

Chapter Two: Literature Review

Virtual spaces are ubiquitous. Their pervasiveness, their capacity for variety, and their impact on human society make them unique sites of engagement and study. Much of the scholarship on virtual space pertains to online games: from science education, to military training, to patterns of violence, to conservation awareness. Exploring virtual spaces through online games requires putting a variety of problematic binaries into conversation: virtual/physical, real/unreal, nature/society. Human engagement in online games also complicates existing theories of place and world-building. In the following chapter I discuss current themes in geographical and anthropological literature on virtual spaces and online games. Through this literature I trace dominant theories about place, world-building and nature that impact virtual game spaces. Finally, I explore how engaging with/in virtual space complicates our understandings of nature, reality and world-building.

2.1 Virtual Space

The natures and environments created and employed in virtual spaces are a central theme in emerging research on human relations to natures and technology. For example, Bram Büscher (2014) introduces the idea of nature 2.0 as a new nature that exists in and through online social media. The co-production of place, or world making, is central to Büscher's (2014) concept of how a 'user' engages and thereby constructs nature 2.0. He argues that users both consume and are able to produce aspects of the virtual environments with which they engage in online media platforms (Büscher 2014). Nature 2.0 is at the crux of understanding world making in online games, as most online games are in some way efforts to make new worlds with varying levels of input from those who explore them. For instance, *Second Life* (Linden Lab 2002) is a virtual

reality platform that provides a basic “landscape with land, water, trees, and sky; [and] a set of building tools...Nearly everything else is the result of persons or groups of people spending millions of hours...in acts of creation” (Boellstorff 2008, 11). The freedom of the *Second Life* world allows its inhabitants to make worlds in a variety of ways. Inhabitants of *Second Life* can have virtual relationships, virtual families, buy virtual land, build virtual houses, make virtual gardens, take virtual university classes, open stores or restaurants for the other inhabitants and create clothing lines that they sell in *Second Life* for actual world money (Boellstorff 2008). Existing physical environments inspire virtual game spaces and are critical for a player’s successful immersion in the game. Games, however, also reinvent spaces to perpetuate a game’s particular narrative or gaming objectives (Bose and Rutherford 2013, Boellstorff 2008). Pablo Bose and Stephanie Rutherford (2013, 5) note:

It is important to recognize that this is not simply a one-way process of representation, where the gamer encounters and consumes a pre-ordained path. Rather, the player reads the narrative put forward in video games, and in that reading, changes the meaning ... while the game designer may intend a particular understanding of the world, the player might have oppositional, subversive or rogue readings.

This is an important aspect of gaming to consider in relation to existing discourses on place, nature and how nature and narrative combine in world-making practices.

One area of research on virtual natures focuses on games specifically designed with conservation aims (Fletcher 2017, Büscher 2014, Sandbrook et al. 2015). For example, environmental anthropologist Robert Fletcher (2017) argues that digital games are a key platform for understanding nature 2.0. He investigates two different digital games – *WilderQuest* and *Rainforest Survival Challenge* – designed to inspire engagement with “real nature” and to “empower users to contribute directly to offline conservation” initiatives (Fletcher 2017, 158). These games illustrate two patterns in conservation-focused gaming. First, hyper real images of

pristine environments become preferable replacements for the ‘real’ natures rife with biting insects, inclement weather and other discomforts. Second, the games Fletcher (2017) explored emphasized relatively limited solutions for addressing threats to conservation such as the ethical consumption of fair trade products.

Christopher Sandbrook and colleagues (2015) echo Fletcher’s (2017) concerns in their examination of digital games as used in three areas of conservation; education, fundraising and research. They investigate the target audience, intended impact, advantages, and risks associated with each of these areas. Educational games aim to influence the general public to change their behavior towards more sustainable practices. Games designed for fundraising are aimed specifically at “gamers with a disposable income” (Sandbrook et al. 2015, 120) while games designed for research provide specialist data and improve planning models and resource allocation. Sandbrook and colleagues (2015, 122) argue that although games can provide funding, education and a simulated environment for research purposes, “digital games... might distract players from the real world and its problems, like other technologies that mediate, augment, or simulate nature.” Similar to Fletcher (2017), Sandbrook and colleagues (2015, 122) are also concerned that “conservation games may mislead if their modeled or synthesized environments oversimplify or misrepresent real-world problems.”

In exploring games with conservation aims, Sandbrook and colleagues (2015) and Fletcher (2017) pose important questions about representations of nature, but they employ a problematic distinction between ‘real’ natures and those encountered in virtual space. In exploring virtual world making it is necessary to question how the complicated realities of virtual spaces challenge notions of place.

2.2 Virtual Reality, Physical Unreality and the Event of Place

The Event of Place

Place is socially, historically, temporally and spatially produced. Doreen Massey (2005, 140) describes place as an event, noting that “what is special about place is precisely that throwntogetherness, the unavoidable challenge of negotiating a here-and-now (itself drawing on a history and a geography of thens and theres); and a negotiation which must take place within and between both humans and the nonhuman... this is the event of place.” She explains that in an event of place,

There can be no assumptions of pre-given coherence, or of community or collective identity. Rather the throwntogetherness of place demands negotiation. In sharp contrast to the view of place as settled and pre-given, with a coherence not only to be disturbed by ‘external’ forces, places as presented here in a sense necessitate invention; they pose a challenge. They implicate us, perforce, in the lives of human others, and in our relations with nonhumans they ask how we shall respond to our temporary meeting-up with these particular rocks and stones and trees. They require that, in one way or another, we confront the challenge of the negotiation of multiplicity (Massey 2005, 141).

This understanding of place, as an event, contrasts with historical constructions of place as a static relationship to a single physical space, thus creating a rootedness that implies “stability and a source of unproblematical identity” (Massey, 1994, 151). This historical construction of space, Massey (1994) argues, is also a product of colonial expansion. In critiquing this idea of place, Massey (1994) illustrates how colonial ideas of space are used, while providing a dynamic and contingent idea of place that accounts for place as part of human and nonhuman social and ecological relationships.

In his critique of regions as a spatial unit, Anssi Paasi (2002, 806) also critiques this static understanding of place, arguing that the “significance of place becomes evident when places are conceived of not as locations in space but as being related to individual subjects, as processes

mediating between the particular and the universal.” Because experiences of meaning making in constitute place, an individual’s understanding of place is “not bound to any specific location but conceptualized from the perspective of personal and family/household histories and life stories” (Paasi 2002, 807). While Paasi (2002) and Massey (2005) both critique a static understanding of place, Paasi’s rearticulation centers on the individual and the systems and structures in which they relate as creating a sense of place. Paasi’s (2002) idea of place stems from the histories and realities of an individual and relates to the individuals understanding of themselves within those histories. Massey’s (1994) event of place is not centered on the individual, instead it is centered on the coming together of many different bodies, histories, and identities in a given moment in time. Massey (1994, 154) argues:

What gives a place its specificity is not some long internalized history but the fact that it is constructed out of a particular constellation of social relations, meeting and weaving together at a particular locus... each 'place' can be seen as a particular, unique, point of their intersection... [places] can be imagined as articulated moments in networks of social relations and understandings, but where a large proportion of those relations, experiences and understandings are constructed on a far larger scale than what we happen to define for that moment as the place itself...

This conception of place, allows for an external understanding of place but also of identity and relationship. It allows place to be dynamic, historically situated and entangled.

Both Massey’s (1994, 2005) and Paasi’s (2002) theories of place emphasize the importance of scale. Scale is critical to world making. Paasi (2004) argues that scale is also often conceived of as fixed boundaries between such levels as ‘global’ and ‘local’. Paasi (2004) critiques this understanding of scale arguing that it must be considered within the historical, social and political contexts within which it is defined. Massey (1994) theorizes scale as the scope of the trajectories of histories, experiences, relations and understandings that occur and intersect in a particular event of place. Thus, scale is intimately bound to events of place through

the different levels of space and time that influence that particular event. Theories of scale in relation to place must be put in relationship to scale as a verb; the action of zooming in and out. The act of scaling plays a central role in gamer interactions with landscapes in virtual space. Often in online games, players have the option to view their surroundings close up and from far away, in some games there are even a variety of levels at which a player can view a particular object, element or landscape. This is what Anna Tsing (2012) calls a pixelated zoom, which is part of a larger problem of scalability. Tsing (2012, 505) defines scalability as “the ability to expand—and expand, and expand—without rethinking basic elements”. Truly scalable objects are “uniform blocks ready for further expansion” (Tsing 2012, 505) such as the pixels that make up digital images. She argues, “in digital files, scalability is the ability to move across scales without changing the shapes of images, which is made possible by the stability of the pixel, the picture element. The digital image is made bigger or smaller by resizing the pixels. Of course, pixels must therefore remain uniform, separate, and autonomous; they cannot bleed into each other or transform each other” (Tsing 2012, 506-507). Both Tsing (2012) and Massey (2005) agree that this concept of scalability is problematic in relation to both place-events and real-world relationships. As Tsing (2012) notes “relationships are potential vectors of transformation. Only without the indeterminacy of transformation can you nest scales—that is, move from small to large without redoing the design” of how they come together (Tsing 2015, 507). Events of place are what Tsing (2012) calls non-scalable—they exist on a multiplicity of interrelated, entangled levels of engagement that cannot move between the local and global without creating new relationships, transformations and transgressions.

Online games scale space through the pixelated zoom. This creates a tension between the understanding of place that gamers create as they engage in world making and the way players

understand space and scale as they move between outer space and planet surfaces. This scalability of virtual space, Tsing (2012) argues, has impacts on ideas and understanding of scalability in actual space. In *No Man's Sky*, scaling is unavoidable, but it does provide a different sense of an event of place. In moving from the surface of a planet into the vastness of space, the player relates with a very different scope of place. I agree that scalability is problematic in both virtual and actual worlds. I argue, however, that scalability in virtual space offers new ways of problematizing scalability and world making in actual spaces.

What is Real about the Virtual?

Often when discussing elements of virtual space, scholars employ the terms 'real' or 'physical' to differentiate between belonging to the virtual and belonging to what anthropologist Tom Boellstorff (2008) terms 'the actual' world (though he still considers this inadequate). Boellstorff (2008, 20) argues, "such terms are imprecise antonyms for virtual worlds because they imply that technology makes life less real." Though the actual world and the virtual world are distinct spaces, human experiences, relationships and encounters are no less 'real' for being manifested in a virtual space. Reality is constituted differently in each of these spaces and the distinction between them is an important part of maintaining these realities. The permeability and thus transgression and contamination between these spaces is also a crucial aspect of virtual space. Because the origin of the world virtual means 'in essence', Boellstorff (2008, 19) argues:

Virtuality can thus be understood in terms of potentiality; it can be said to exist whenever there is a perceived gap between experience and the 'the actual.' This is now the most important meaning of 'virtual' with regard to virtual worlds; 'virtual' connotes approaching the actual without arriving there. This gap between virtual and actual is critical: were it to be filled in, there would be no virtual worlds, and in a sense no actual world either.

Donna Haraway (2004) also explores the idea of the virtual, through the virtual worlds of science fiction and cyborgs instead of online virtual spaces. She first explores virtuality in terms of images, noting, “the virtual image is formed by the apparent, but not actual, convergence of rays. The virtual seems to be the counterfeit of the real; the virtual has effects by seeming, not being” (Haraway 2004, 106). Haraway (2004) also notes that older meanings of virtue are also that of excellence and capacity. She questions the construction of the virtual as opposite or negation of the real, wondering if “perhaps this negation is an illusion” (Haraway 2004, 106).

There are several important aspects of Haraway’s (2004) and Boellstorff’s (2008) articulations of the virtual. The first is that divisions of ‘real’ and virtual space are problematic in understanding human interactions with representations of natures and environments. In utilizing the ‘real’ as the opposite of the ‘virtual’, human experience, emotion, interaction and relationships generated in virtual space – and their potentiality – are rendered less valid than experiences in actual space (Boellstorff 2008). Given the dangers, critiques and concerns expressed by Sandbrook and colleagues (2015) and Fletcher (2017) regarding how people interpret virtual natures, articulating the capacity for interactions and exchanges between the virtual and the actual is crucial.

Second, understanding virtuality as capacity or potentiality allows for a renegotiation of human relationships in both physical and actual worlds. Boellstorff (2008, 5) makes this clear in noting that, “in virtual worlds we are not quite human—our humanity is thrown off balance, considered anew, and reconfigured through transformed possibilities for place-making, subjectivity, and community.” Thus, virtual spaces allow for new methods of making and understanding selfhood in relation to different landscapes, bodies and desires.

Third, when virtual spaces are read with this understanding of virtuality, they significantly complicate understandings of place and processes of making virtual worlds within them. Within virtual game spaces the player is both character in and co-author of a science fiction scenario. They are not just being guided through a story, they are actively writing it. In this case, their other co-author is part human – the developers who designed the game – and part machine. Thus, Massey's event of place is now negotiating the multiplicities inherent in actual world assumptions, histories and understandings of both player, and their actual world context. But along with this, the event of place, and thus the players' world making, must now account for the relationships, histories, narratives and multiplicities of the virtual space in which they find themselves. Yet another component is that the virtual space has also been generated by human developers, with their own understandings, histories and assumptions of actual space, which are then manifested and mediated through the computer and code that creates the game. Virtual space enables new complexities in assumptions about and relationships to nature and place within the parameters of game algorithms.

Although he addresses virtuality as it relates to virtual worlds, Boellstorff (2008) does not analyze the problematic constructions of nature used in virtual worlds that Sandbrook and colleagues (2015) and Fletcher (2017) critique. The natures used to facilitate world making in virtual games are key facets of place-events and the co-production of narrative that players engage in any online game. Both game developers and gamers deploy particular ideas of nature in their creation of and engagement with virtual natures. These representations and assumptions of nature are a significant part of Sandbrook and colleagues (2015) and Fletcher's (2017) concern over the misrepresentation of actual natures in virtual spaces. In their critique of virtual natures, Sandbrook and colleagues (2015) and Fletcher (2017) discuss nature tropes employed by

the developers to create environments in online games as well as developers' assumptions as to what players will gain from the games. They do not, however, explicitly address the assumptions of nature that gamers themselves bring into the virtual space, which are a critical element of the construction of virtual natures.

The Nature of Virtual Space

Both gamers and developers conceptualize natures in a variety of different ways in virtual and actual space. Within Western social and political spheres nature and culture have often been treated as separate entities. This separation enables nature to be viewed as a static entity without agency that can be exploited for the benefit of human society, politics, economics and scientific knowledge production. Ingold (2002, 14) argues that, “to suggest that human beings inhabit discursive worlds of culturally constructed significance is to imply that they have already taken a step out of the world of nature within which the lives of all other creatures are confined.” This separation of nature and human society is false, but it enables a distancing that allows humans to pretend that their actions cannot impact nature. In her critique of this separation of nature and society Donna Haraway (1988, 592) notes:

It – the world – must, in short, be objectified as a thing, not as an agent; it must be matter for the self formation of the only social being in the productions of knowledge, the human knower... the structure of this mode of knowing in technoscience [is identified] as “resourcing” – as the second birthing of Man through the homogenization of all the worlds body into resource for his perverse projects. Nature is only the raw material of culture, appropriated, preserved, enslaved, exalted, or otherwise made flexible for disposal by culture in the logic of capitalist colonialism.

In this false separation, nature is rendered as an object, to be used and exploited at the behest of humans, but without agency. Nature can become a resource for extraction to fuel actual world capitalist economies but also to create particular natures and narratives in virtual spaces.

The idea of nature as separate from society is one of three that Noel Castree (2001) articulates: Nature as external to society, nature as something intrinsic to a being or object, as in “human nature” and the idea of universal nature, that nature encompasses everything. These ideas of nature are distinctly tied to processes of colonialism and imperialism, utilized in the subjugation and oppression in the colonial and imperialist projects of the West. In the United States, as William Cronon (1996) argues that, it also became incorporated into particular ideas of America and its destiny while Anna Tsing (2005) illustrates the ways in which this dichotomy was employed and has impacted western colonial spaces in Indonesia. The different places and ways in which these authors encounter these understandings of nature and society illustrates not only its pervasiveness but the variety of ways in which it has spread and impacted different spaces, livelihoods and worlds.

Anna Tsing (2005, 202) explains that, “colonial scientists concluded that this profitable-yet-fragile nature was transcendent, beyond the circumscribed knowledge of any given culture... they found that this universal nature was also global...” For example, Tsing (2005, 202) argues that according to this logic “if forests are being destroyed, it is society; if they aren’t it is nature: Everything can be explained by placing it somewhere in the dichotomy of social and natural.” This nature/society construction also leads to narratives of purity, the myth of the wilderness or first nature that must be protected and/or to which humans must return. Cronon (1996) locates this narrative within American westward expansion and manifest destiny, arguing that in this era, nature as sublime and as an escape from society gave rise to the frontier and a sense of rugged individualism that continues to pervade human relationships to diverse natures.

These tropes of nature are employed in specific ways within online game spaces to construct the physical environments, limitations and narratives of the game. Gamers also employ

elements of these constructions of nature in their efforts to co-construct their game experience and make virtual worlds. Because many games are science fiction narratives, developers are also presented with an opportunity to challenge the elements of these tropes that gamers bring into the game space. The success of a game in utilizing and challenging these narratives of nature is dependent on the player's ability to make virtual worlds and natures.

Why Virtual Natures Matter

Many experts are debating and declaring a new geologic epoch called the Anthropocene, in which humans are the major agents of change in the world's rapidly declining ecosystems (Zalasiewicz et al. 2014, Lewis and Maslin 2015, Smith and Zader 2013). The current climate crisis, which is central to discussions of the Anthropocene, is partly a product of centuries of structural interventions, from colonialism to the industrial revolution, in which Eurocentric cultures imposed a world-building project that separated nature and society (Tsing 2015, Castree 2001). In naming the Anthropocene, many scholars, scientists, activists and politicians hope to instill a sense of responsibility in humans to inspire a change in human habits, lifestyle and understanding of nature. There are other scholars, however, who find the term 'Anthropocene' problematic, noting that it is still centered on the human. Jason Moore (2017) prefers the Capitocene to call attention to the political-economic systems of extraction. Donna Haraway (2016) offers a different, less human centered term: the Chthulucene, which she defines as "a kind of timeplace for living and dying in response-ability on a damaged earth (Haraway 2016, 2) These scholars agree that humans have been part of the cause of this massive ecological change and loss. They argue for a more nuanced, messy, embodied and entangled understanding of the histories and possibilities of the current ecological crisis.

Nature and culture—or naturecultures—are inextricably entangled in continually emerging processes (Haraway 2003). The term naturecultures comes from Donna Haraway’s (2003) discussion of the co-constitution of human identity and evolution with other non-human species. It is a way to begin to articulate the messy relationships in and between humans and nonhumans and to situate humans in and of nature. As part of the struggle to restore and support diverse naturecultures in the world, scholars such as Haraway (2015) and Tsing (2015) realize that climate change and other factors are forcing humans into new and unknown relationships with various environments. In imagining ways to engage with rapidly changing environments and promoting multiple naturecultures, Haraway (2015), Tsing (2015) and others are asking about what other kinds of eco-social relationships are possible. One aim of my research is to explore the possibilities of naturecultures that are enacted in virtual space to contribute to world-building in the Anthropocene/Capitalocene/Chthulucene. In this thesis, I argue that the capacity of virtual spaces to facilitate world-making and complicate place-events presents possible ways to challenge existing ideas and assumptions about nature and to explore other ways of engaging with natures, futures and the more-than-human.

Chapter Three: Futuristic Science Fiction Space

The two games I explored in this study are futuristic science fiction outer space games. One offers infinite exploration and the other offers world domination. Though the play style of each game is different, both games place the player in an alien landscape in which the player must figure out how to survive. In creating futuristic space and space exploration, the developers of *Civilization Beyond Earth* and *No Man's Sky* created specific natural environments to facilitate game play. These environments employ particular tropes of nature as they guide the player through the game. In this chapter I use a series of vignettes (denoted in italics) that describe my gaming experience to illustrate the play style of each game. After each vignette, I explain the elements of the vignette to illustrate the foundations of the game and the particular natures that game developers created in each game environment.

3.1 No Man's Sky

I am hurtling through space. Stars, planets, galaxies, and universes fly by. Occasionally a typed word or name emerges out of the stars. Other players apparently gave these planets names before my journey. After about two minutes of passively observing hundreds of planets float by, my screen suddenly turns white. Just as suddenly my perspective shifts. No longer a passive observer from outer space, my screen provides me with a perspective from within a strange planet's atmosphere. The grass beneath me is orange and it stretches out as far as I can see (see Figure 1). Gazing at the sky above me I notice another planet floating just above the horizon. An electronic voice abruptly informs me that my repair systems are down and my launch thrusters and pulse engine are critically damaged. My ship has crashed on this planet and I must repair it before I can hope to leave this place. My landscape scanner system was also damaged in the crash. My only tool is a mining laser. I am looking at my new surroundings through what I can only assume is a face shield in my exosuit. In the lower left-hand corner is my life support system status and centered at the top is a thin line with a homing beacon for my ship.



Figure 1: My first view of the planet on which I crash landed. Screen capture by Emma Tait (March 9, 2017)

So begins my first experience with *No Man's Sky*, an open world, first-person, space exploration game in which the player has crash-landed their spaceship on an unknown planet. In order to repair my ship, I must discover and collect the correct resources on the unknown planet, encountering other living organisms and toxic environments in the process. Once I repair my ship, I launch myself back into space to explore some of the 18 quintillion other planets in this virtual universe (Duncan 2015, Hello Games 2016). Beyond this basic premise and the initial crash landing, every players' experience in *No Man's Sky* is unique. *No Man's Sky* was initially started by a small development team that comprised the game company Hello Games (Hello Games 2016, Cork 2014). During the game's development, the massive game development company Sony offered to support and help market the title, provided Hello Games also developed the title for the Sony's PlayStation 4 (Khatchadourian 2015, Parkin 2015). With Sony helping to promote the game in its main event at the Electronic Entertainment Expo

(Entertainment Software Association 2014) in 2014—the first time an independent game had ever been presented at this part of the event—the game generated incredible excitement and a huge following in the gaming community (Khatchadourian 2015, Parkin 2015). The result of the small team, the massive scope of the game and the incredible publicity and hype generated by the game placed considerable pressure on the development team. Upon its release, the gaming community was significantly disappointed by *No Man's Sky* and the failure of the development team to deliver on features that the gaming community felt that Hello Games had promised (Caldwell 2016). Leading up to its release for PC and PlayStation 4 in August 2016, *No Man's Sky* was showcased as the future of videogames due to the fact that the entire natural environment in the game is generated as the player encounters it by a set of algorithms instead of all of the scenes being pre-illustrated by human artists.

Creating game environments—whether buildings, spaceships, non-player characters (NPCs), plants, animals, or planets—in most games requires hundreds of hours of a programmer's time. The scope of the game and its environment depends on the amount of time and resources (read programmers and consultants) a game company can put into its development process. In the case of *No Man's Sky*, however, the game uses a set of algorithms to generate planets, flora, fauna, atmospheres, etc. This allows the game to generate nearly infinite environments for the player to explore. The use of algorithms to generate planets and the environment on the fly is called procedural generation. It allows the game to be immense—almost infinite—without putting too much strain on the operating systems of the machines the on which the player plays the game. With access to 18 quintillion planets, a single player could play the game their entire life without ever encountering another player. It would take 500 billion years for one player to visit each planet for one second (Warren 2015). A game of this

complexity is the first of its kind and it is limited by the repetitions inherent in the use of algorithms. The algorithms generate planets and ecosystems based on a fixed set of assumptions and components. These algorithms also create planets, planetary climates and place flora and fauna on each of these planets. The result of using procedural generation is that the algorithms are given a set of base templates for different plants and animal skeletons, that are then mathematically manipulated to create a much larger variety of species. With 18 quintillion planets, it is likely that there will be species that will repeat or be so similar that they are not discernably different to the gamers' eye.

The basic premise of *No Man's Sky* is fairly simple: Explore, collect resources, head towards the center of the galaxy. In creating the environments—the base archetypes and the algorithms that manipulated them and generated planets—in which players engaged in these tasks, the developers employed particular representations and understandings of actual world nature. Every planet in the game has a distinct climate. Though these climates and the life on them do not exist on earth, there are familiar biological categories. For example, the grass is recognizably grass. Trees and other plants are distinct from the creatures that move around the planet's surface. Similarly, rocks and minerals are a clearly separate category from flora and fauna.

The primary way in which the player interacts with these different natural systems is through resource extraction:

As I set out to find the materials necessary to repair my spaceship, I see trees a little way off. As I walk through them I see that some have large trunks with orange and blue feather-like leaves while others are shorter with blue woolly canopies. They do not appear to move and though I stop when I run into them, I have no hand that I can raise to touch them. I fire my mining laser at them to see what happens and discover that I can harvest them for carbon. As the thin blue-white beam of my laser blasts at the tree, small pieces of carbon fly towards me but, the tree itself shows no change, no movement, until suddenly it explodes into nothing. Beneath these trees I find many small plants, some of which I can also harvest for carbon. There are small, green and yellow cone-shaped flowers tipped with blue. Nearby are red leafy plants that grow out and up from a central point. I pass patches of grass that resemble blades of grass on earth, only wider

and taller and others that look like long stringy seaweed. As I walk along I harvest a few trees for carbon and discover accidentally that the rocks here contain iron as my mining laser catches one. I examine my inventory to find that I have the necessary materials to fix my scanner. My newly repaired scanner allows me to see the landscape around me with augmented information about the sources of uncommon materials such as thamium, plutonium, and platinum. Ahead of me is a large blue tower of rock that my scanner has identified as an important but unfamiliar material. As I head towards the blue tower, night falls and I happen upon a well-concealed depression in the ground. No grass grows here, instead the floor of the depression consists of purple rock with spires of the same rock jutting out like stalagmites. This depression appears to harbor a different ecosystem. Several of the plants here – one with a red bulb flower and yellow center and a four-leaf clover – emit a soft red-purple glow and scattered across the floor are blue rocks dotted with white that glow like constellations. I look up to the horizon and see the blue rock tower peaking over the edge of the depression.

A more subtle idea of nature in *No Man's Sky* is that of pure nature: A wilderness that exists only to be explored. As a game about first discovery and infinite exploration, this makes sense. Yet, several of the planets that I encountered in my game play contained remnants of structures built by other species. Some of these ruins had remains of technological systems and structures, while others had 'knowledge stones', from which I could learn a new word in an alien language. On other planets I encountered other space-faring species that had been flying in these galaxies long before I arrived. The premise of first discovery coupled with the existence of alien ruins and other space-faring alien species raises an interesting question of what is valid discovery, what is pure nature and who is discovering what and whom?

I continue on my way towards the tower of blue rock as the day dawns. As I walk, I hear the drone of an engine and look over to see a small, red, capsule shaped, flying sentinel drone with a single lens like a large eye. I stop and it scans me from top to bottom with white light. I hesitantly continue walking and after a moment it turns and moves away. In this encounter I have lost my reference points to the blue rock spire. I scan for it again and locate it. As I approach the spire, the ground changes again; I am now walking across green ground. Perhaps it is a type of moss. The blue spire rises straight out of it and trees dot the area around it (see Figure 2). As I begin to mine the blue rock, I discover that it is heridium – one of the resources required to repair my spaceship thrusters and pulse engine. As I mine the rock, I cut around one section until it is completely free of the rest of the tower. To my surprise, instead of falling to the ground it just floats in place, unaffected by the gravity that applies to me. When I jump—or step off the edge of a cliff—I fall to the ground and sustain injury. I have discovered that I have a jet pack that can suspend me for short periods of time but I cannot simply float in the air. After I have obtained enough heridium to repair my ship I start my trek back to begin the repair process. Not far from the heridium spire I see animals moving over the grassland ahead of me. One of them runs away from me on four hooved legs, its green and white stripes making it hard to see in the grass. It stops a little way off and looks back at me, its forked tail moving side to side. Its round ears stick out on either side of its massive nose, while two horns curve back from its head.

It does not seem to be aggressive and it allows me to get close to it and feed it. Once fed, it has a smiley face above it, seeming to indicate that it is somehow friendly with me. It runs off a little ways and a few moments later the smiley face turns into a magnifying glass. I go over to the creature to see what has happened and discover that it has led me to new rare mineral called coperite.

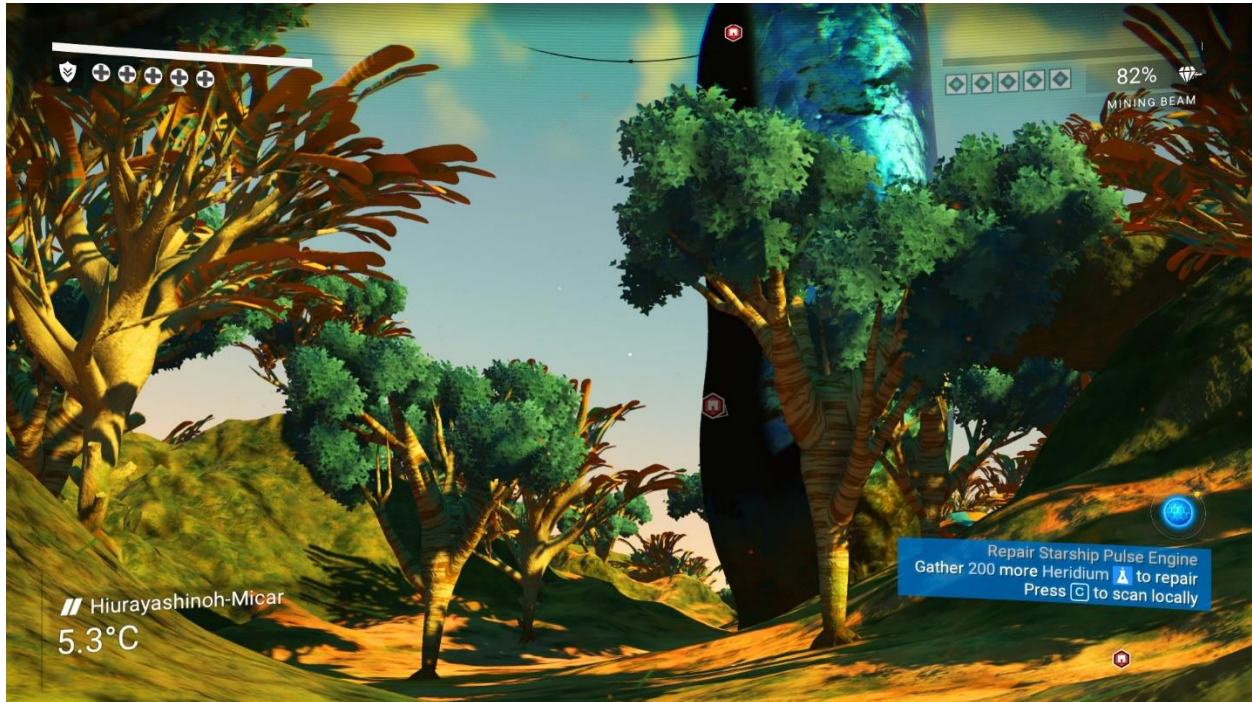


Figure 2: Tower of the mineral heridium before being mined. Screen capture by Emma Tait (March 9, 2017)

These tropes of nature employed in *No Man's Sky* constitute an 'alien world' understandable to gamers and in which the gamer locates themselves so that they might understand their position in, and relationships to the game and its objectives. *No Man's Sky* relies heavily on tropes of exploring nature; that nature is pure and awaiting discovery by humans or with the help of companion species (Cronon 1996, Tsing 2005). The idea of nature as pure and as a resource to be extracted are part of a western project of separating nature and society and subjugating nature to render it an object without agency (Walsh 2015).

Yet these tropes are contrasted with an infinite space in which it is not possible to explore every place or extract every resource. *No Man's Sky* alludes also to an understanding of nature as universal in as much as the player is affected by the atmosphere and environment of the planets.

If a planet is toxic or radioactive then the player is injured, as they are if an animal or sentinel drone attacks them. This, however, is the only indication that the player is part of the larger environment. Life support systems keep the player alive (the player uses carbon to recharge their life support), but at no point is the player required to nourish themselves with food or water, or bother with the messy disposal of human waste. Certain messy and fleshy labors are glaringly absent from the game. One possible reason for this is that the player never knows what they are, beyond that they require life support system. In leaving out particular fleshy labors and interactions the developers are leaving the physical and biological identity of the player a mystery, which I discuss further in chapter six. The biological ambiguity of the body in *No Man's Sky* is particularly apparent due to the fact that *No Man's Sky* is a first person game: It is as if the screen is the player's eyes. This vantage point gives the gamer a particular understanding of and relationship to the game environment that is distinctly different from the one encountered in *Civilization Beyond Earth*.

3.2 Civilization Beyond Earth

Prologue: Humans destroyed Earth. To save the human species we have been set adrift in space, with the hope that eventually we will find a planet hospitable enough to terraform and begin again. And finally, after years of searching, my ship has found such a planet. As the planet comes into view I look down on a desert-like terrain at the edge of water. I have a bird's-eye view of an alien landscape with light brown soil surrounded by water. Outcrops of rocks dot the landscape. I can also see the shoots of strange plants that are the same light brown color as the soil and a few bubbling blue-green quagmires. The land undulates in dunes and craters, punctuated by deep glowing fissures and drifting clouds of green-grey fog. In the water there are blue volcanic formations that seem to have bubbled up from the deep ocean long ago. Green plants grow from a shallow ocean floor that also contains dark pockets of deep ocean. Shelf plants grow along the edge of the ocean's abyss. I land my ship in the center of the visible area, at the edge of the water and set about the task of building a home for myself and my fellow passengers here. This is where the game begins (see Figure 3).



Figure 3: My initial city in Civilization Beyond Earth. Screen capture by Emma Tait (March 3, 2017)

Civilization Beyond Earth is the sixth installment in the Sid Meier *Civilization* franchise. The first *Civilization* game was released in 1991, with *Civilization II* following in 1996, *Civilization III* in 2001, *Civilization IV* in 2005, *Civilization V* in 2010, *Beyond Earth* in 2014 and *Civilization VI* in 2016 (Firaxis Games). As an extension of the *Civilization* franchise, *Civilization Beyond Earth* has a similar structure to the other games. It is a turn-based game with the primary goal of making a civilization successful through the ages, until it dominates the entire world. *Civilization Beyond Earth* is a deviation from the original series in that it launches humanity into the future and into space. *Civilization Beyond Earth* was as heavily criticized as *No Man's Sky*. It received many more mixed reviews than any of its predecessors (Steam 2016). Being part of a franchise, the game mechanics are more balanced than *No Man's Sky* and it is a more complete game overall. It also has a depth to it that *No Man's Sky* lacks.

My first task is to decide what to build while I send an explorer unit out to explore the unknown reaches of the planet. I also have a worker unit that I must deploy to begin generating food and energy for my people. To obtain food and energy I must have the worker construct either farms or generators on the areas of land that have no specialty resources. On the areas with specialty minerals and resources I will create plantations or mining apparatus to harvest those resources. In addition to the physical requirements necessary for the survival of my civilization I must keep my citizens healthy and work to cultivate culture and scientific advancement as well as generate diplomatic capital to negotiate with any future civilizations. Science, health, diplomatic capital and culture are influenced by certain buildings, military units, exploration missions and trade connections with other colonies.

As with other *Civilization* games, the player is the leader of a group of people seeking to build a civilization that will “stand the test of time” (Firaxis Games 2014). The player’s group of people are called a faction. They are from Earth and were set adrift to find a new planet to inhabit. The ship—a flat, hexagonal, grey metal container that the player sees only for a brief moment—is equipped to land on a planet and become a city. Once established as a city, it can generate anything that the player has researched, such as buildings that give the civilization science or health, worker units, military units or colonist units that can establish new cities. Anything that a city builds takes a number of turns, which is specified by the amount of production points a particular city has. Once a city finishes a unit, the player decides what that city produces next. Each turn the player controls how units move and what action they perform. To gain new buildings or units for a city to produce, the player must choose to research different technologies. The player researches the technology over a period of turns, gaining its benefit and selecting another technology upon its completion.

When I select a building or unit for my main city to produce it takes a certain number of ‘turns’ to complete. The number of turns depends on the production rate of the city producing the building or unit. I end my turn once I have moved all of my units and selected what I would like my city to build. Once I end my turn, I wait and watch while other players – in this case the computer AI – take their turns. In this particular game, there are five other civilizations also on this planet. The “indigenous sentient life forms” also take a turn. While I am waiting for my next turn a long, rust-colored creature swims up next to my city on six flippers, its two tentacle-like jaws full of sharp teeth slowly opening and closing.

The landscape in *Civilization Beyond Earth* is largely a backdrop to the player’s empire-building strategies and politics. The player interacts with the environment either through

resource extraction or by relating with the alien life. Resource extraction is the primary interaction between the player and the game landscape. The game landscape is divided into hexagonal tiles. Each tile in the game is classified by type. Most tiles are classified as grassland, forests or hills. Some tiles, however, have unique resources that give the city that owns them special benefits when extracted. There are also tiles that the player cannot interact with at all. These tiles contain deep fissures or high mountains that prevent the player from directing units across them or extracting their resources. The other way that players can interact with the environment is through the alien life on the planet. These aliens replace the ‘barbarians’ in prior *Civilization* games¹. The aliens do not initiate interaction with the player unless the player puts a unit on a tile that an alien unit occupies or a player (human or AI) attacks the aliens with a long range military unit. Once the aliens have been attacked, however, they will attack units from any player that gets too close. The aliens’ animosity towards the player increases the more that the player attacks them, until it reaches a level at which the aliens begin to go out of their way to attack the player’s units. The player can decrease this animosity by researching particular technologies or building trust by allowing an alien nest to exist undisturbed within their borders.

On my next turn, I send my explorer unit into a new area. As I wait for my turn to come around again, giant beetles with curved horns and red eyes scuttle into the tile next to my explorer on four crablike legs. On the other side, a slate blue armored mantis gracefully enters my explorer’s view, its triangular blue claws clicking, a line of sharp yellow-orange spikes running down its spine. These creatures do not attack me and on my next turn I move my explorers away as quickly as I can.

As my explorer unit discovers more of this planet, it encounters research pods that are leftovers from previous colonizing expeditions that were unsuccessful. These pods give me culture, science or other resources – and occasionally strange artifacts or machinery - when discovered. I can use the science generated by my civilization to research new technologies and the culture generated allows me to develop virtues. Virtues allow me to boost production of city buildings, units, health, science and other resources along four virtue categories of might, prosperity, knowledge and industry. Each virtue that I develop will enhance my city and its ability to adapt to the conditions of this new planet (see Figure 4).

¹ Another interesting study would look at problematic tropes of nature/society/other just within the *Civilization* franchise.

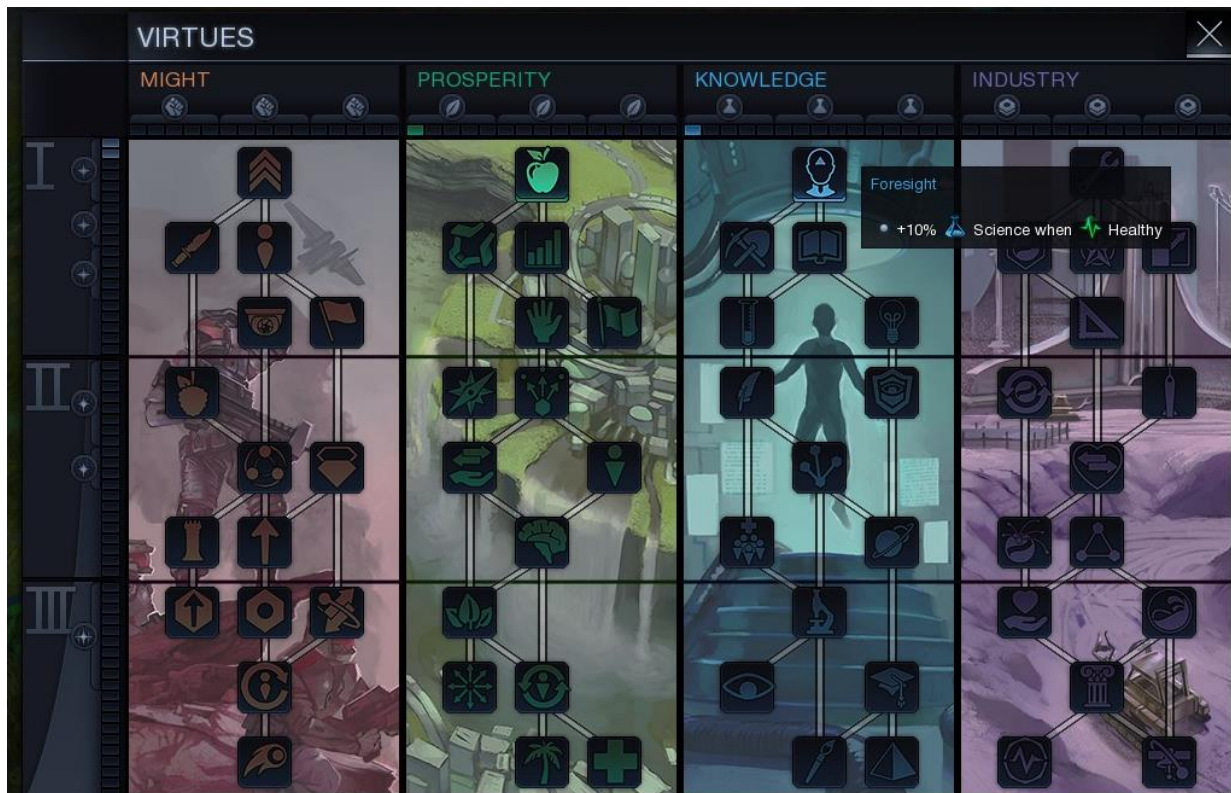


Figure 4: Virtue selection window in Civilization Beyond Earth. Screen capture by Julian²

Once the player begins to research technologies beyond an initial set, the player is introduced to the idea of affinities. Affinities are the different ideological routes that players can take to successfully survive on the planet. There are three affinities. These include harmony, purity and supremacy. A player's affinity develops through the player's choices regarding quests as well as which technologies they choose to develop and which buildings they instruct their city or cities to build.

As the game proceeds, I begin to receive quests. These quests often arrive in the form of decisions about what to do concerning a piece of research or an artifact discovered in a research pod. The decision I make regarding these quests influences my affinity level towards a particular path to victory along the themes of harmony, purity and supremacy. Harmony involves recognizing the other sentient lifeforms instead of

² Julian is a pseudonym for a participant in this study. To protect participant privacy, I use pseudonyms for all six participants. I will use the real names of people in the game industry who have been interviewed for news articles, spoken at conferences and written blogs or articles on topics related to these games.

seeking to conquer them. The harmony affinity involves studying ways to genetically alter their own DNA with that of the local species to adapt to or coexist with the new planet. Purity involves creating the planet as a new Earth in the image of the old erasing any other non earth-conforming life forms. Supremacy involves creating technology to adapt to the environment with the aim of releasing humans from their bodies and creating a digital consciousness to save mankind. It is possible to have hybrid affinities that take traits from two of the three affinities. Many quest decisions and research technologies are associated with a particular affinity. With every technical decision, I am shaping the path of my civilization along one of these routes. My affinity choice impacts my relationships to the other civilizations as well as the alien creatures (see Figure 5).

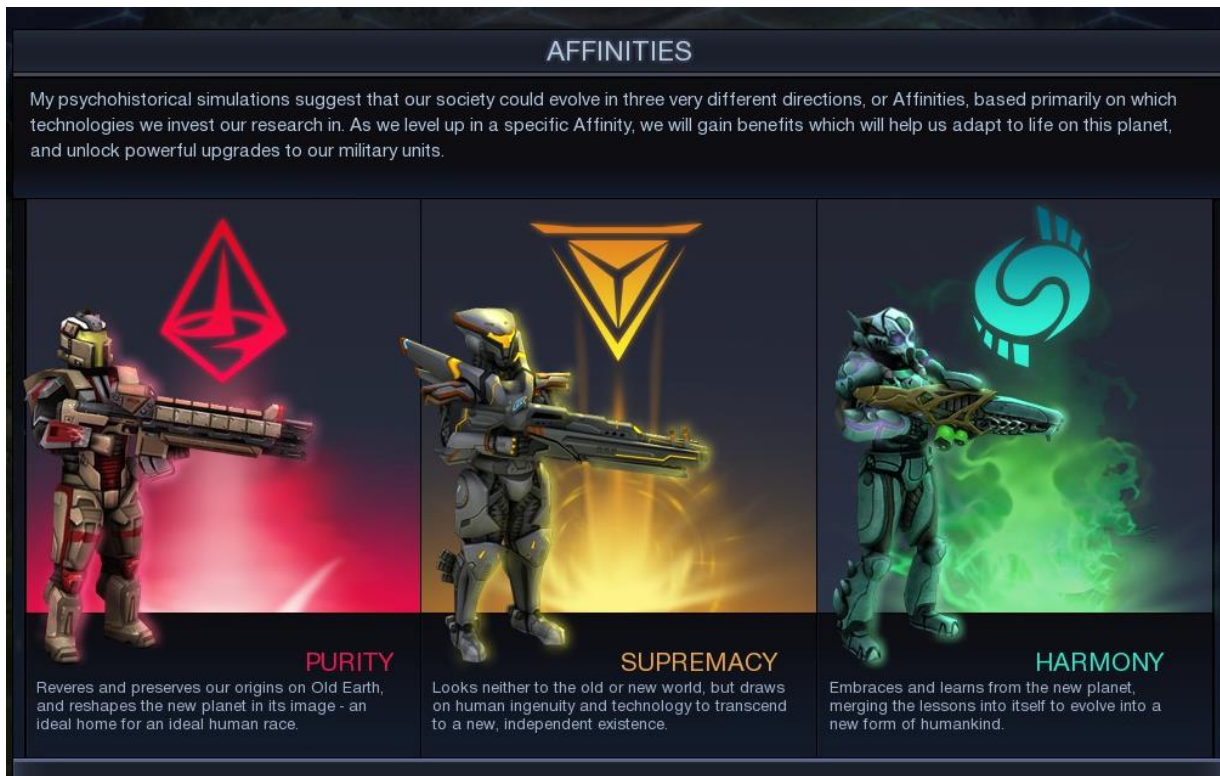


Figure 5: Affinity information and selection screen in Civilization Beyond Earth. Screen capture by Julian.

The developers of *Civilization Beyond Earth* employ some of the same nature tropes as those of *No Man's Sky*. Nature, in this game is primarily a backdrop to the action that happens in the game. The landscape exists to provide a context for the player to build a civilization and to hold resources that can be extracted. The only dynamic part of the natural environment in the game is the aliens, which are limited in their movement and actions. The player interacts with the

aliens only to either kill or tame and control them, creating a static relationship between the player and the natural environment. Nature as both the stage on which the game happens and as a resource to be extracted employs nature as something both separate and external from society, an “enduring backdrop to the conduct of human affairs” (Ingold 2000, 20). The developers of these games employ these natures to help the gamer situate themselves in the game and facilitate their world building practices. The success of these games depends partly on the notions of nature that developers employed in the game and partially on the understandings of nature that gamers bring with them into the game space. In order to explore the possibilities for re-inscribing, confronting or complicating dominant narratives and understandings of nature in this intersection of game and player, I analyzed gamer’s assumptions and experiences of playing of both *Civilization Beyond Earth* and *No Man’s Sky*.

Chapter Four: Methods

In this project I explore how gamers engage in world making within virtual spaces. I am also interested in online games and virtual spaces as research tools for understanding space and place in both actual and virtual realms. I employed qualitative research methods to understand gamers' expectations and experiences in online game spaces. Qualitative methods are, as noted by Clifford and colleagues (2016, 3), a "set of techniques ... that are used to explore subjective meanings, values and emotions." A quantitative survey or study of gamers would not provide the depth necessary to answer questions about personal experiences, opinions desires and expectations. I am interested in more than "how many", I am interested in the why, thus I employed qualitative research methods to answer my research questions. I paired qualitative methods with intensive research design to further enable a depth of exploration into these questions. Intensive research design focuses on "describing a single, or small number of case studies with the maximum amount of detail" (Clifford et al. 2016, 11). World-making is a process that is unique and subjective to the being or person doing it, thus I used a combination of in-depth interviews and participant diaries to understand different processes of world making and gamers' desires for virtual spaces.

4.1 Participants

The participants involved in this study were six self-identified gamers—they play computer games regularly and are involved in game communities—over the age of 18, half of whom were female and half male (see Appendix 1 for IRB approval document). I chose six as an adequate number of participants for this study due to its role as a 'pilot study'. With multiple forms of data, six participants are enough to have variation in game play styles and backgrounds

while still being manageable in terms of data collection and analysis for the scope of this project. The number of participants is also partly limited by access to funding due to game licenses for both games costing a total of \$100 for each participant.

As a qualitative study, I am primarily interested in in-depth facets of these games and less in universal claims about these games as applicable to a more generalized population. With the insights gained in this small thesis study, I can design a more thorough and broader-reaching study of a similar nature during my post-graduate studies. Given that this is a pilot study for testing a form of ethnographic methodology and that my n is so small, I did not anticipate having difficulty in recruiting an adequate number of participants. I personally recruited participants through my contacts in the gaming community—the large network of people who regularly play and interact through online games—in a snowball sampling approach (Longhurst 2016)³. In return for their participation, I gave each participant a free license to Sid Meier’s *Civilization Beyond Earth* and *No Man’s Sky*.

4.2 Game Play Documentation

I initially developed this study as a hybrid ethnography, a form of ethnography that involves “mixing interviews in real places with online data to think more about how these virtual elements may transform physical places” (Crang and Mohamad 2016). To do this, I had planned to collect gameplay data through an app that I developed with three fellow students as part of a CS 205 Mobile Apps and Embedded Devices course at UVM during the fall semester of 2016. We designed the app to be able to document gameplay; capturing audio, video and screenshots of a game and of the player during each play session. Upon completion of the course, however, the

³ Before conducting any of the research components involving human subjects I submitted and received approval for my qualitative research methods, consent forms and recruitment scripts from the Institutional Review Board (See Appendix 1 for the letter of approval).

app was not ready to distribute to participants, as it would have required many more hours to improve. I dropped the app as a methodological tool and replaced it with participant diaries.

The app would have had a private forum space accessible only to participants where they could share media and discuss game play. Because the data that I am interested in emerges in virtual spaces, I had wanted my data collection to engage the data in the virtual realm. As Tom Boellstorff (2008, 4) states “studying virtual worlds ‘in their own terms’ is not only feasible but crucial to developing research methods that keep up with the realities of technological change.” Though the app wouldn’t have been part of the game itself it would have linked myself and the other participants to one another’s game play as they experienced it. The app would only have collected data that the participants chose to share with each other as well as with me, and it required the player to consciously think about recording events while they were gaming. Thus, this virtual tool would not have seamlessly aligned with virtual temporalities. The app also would not collect information about the actual world situation of the gamer; where they were gaming, what times they gamed, for how long, in what frame of mind. Though I could not complete the app for this study, I am still interested in possible ways to examine gamers’ experiences using virtual tools and I would like to continue to examine and explore such methods in the future.

With the loss of the app as a tool for data collection, I decided to use both written and photographic diaries to record gameplay with the understanding that this would decrease my ability to study game play and that my analysis would rely more heavily on player’s memories and play recall as expressed during interviews. In these diaries, I asked participants to use a combination of screenshots and written text to document their major in-game decisions that they made. I also asked them to record events or landscapes that triggered a reaction; whether they

found a landscape beautiful or frightening, or whether an interaction pleased them or frustrated them. At the end of each play session I asked that participants spend five minutes to jot down notes on that session of play. I included photographic diaries along with written diaries because they are quicker and often easier for participants to record (Latham 2016). In this study, photographic diaries consisted of screenshots from game play, allowing the participants to capture a particular decision, event or scene with minimal interruption to their play.

Diaries, both photographic and textual, have their limitations. As Alan Latham (2016) notes “dairy keeping assumes a certain set of personal competencies ... the diary is in all sorts of ways a Western technique of self-reflection deeply embedded in Western traditions of self-hood. More prosaically, producing a diary requires certain basic skills” (Latham 2016, 166). I also recognize that there is a wide variety in how people record personal experience and how detailed people choose to be – thus there is great variety in the depth and breadth of the responses (Latham 2016). The aim of the diaries in this case is to get a sense of game play and gamer reactions as close as possible to the moment of the event, which can provide detail and context to each participant’s interview responses.

4.3 Semi Structured Interviews

The strength of semi structured interviews is that they are “useful for investigating complex behaviors, opinions, emotions and affects, and for collecting a diversity of experiences” (Longhurst 2016, 153), which is the primary goal of this study. Semi structured interviews were the primary mode of data collection used in this study. As with any research method, there are strengths and limitations to conducting interviews; the two most prominent limitations being in their scope and design. Interviews yield specific situated knowledge of the perspective and understanding of the interviewee. The data collected from interviews are not universally

applicable, instead they offer insight into the thoughts and actions of a particular person or group of people (Longhurst 2016). The design of interview questions is also crucial to the success of interviews. It is necessary to ask questions that are broad enough to provoke the participant to speak in depth about events and experiences relevant to the research, yet not so broad that the questions are overwhelming to answer or lead to extensive unrelated tangents (Longhurst 2016). A key element in question formation is for questions to be well thought out, clear and concise, which also helps avoid confusion for the interviewees (Dunn 2010).

I conducted two sets of semi structured interviews with each of the six participants in this study as the main form of data collection (see Appendix 2A and Appendix 2B for a full list of questions). I conducted the first round of interviews at the initial meeting with each participant. These interviews ranged from 15 to 30 minutes and covered the following topics:

- What did participants know about the games and where did they get their information about these games?
- How did other gamers' comments or the game advertisements influence participants' expectations of the games?
- What were participants' expectations of gameplay?
- What were participants expectations about the two game environments and possible interactions with them?

These interviews generated a baseline understanding of participant's knowledge of each game before they began gameplay. These interviews also illustrated preconceived ideas of what might or ought to be included in space environments.

I conducted the second set of interviews after the participants had played 8 hours each of *Civilization Beyond Earth* (2012) and *No Man's Sky* (2016). These interviews were 30 – 45 minutes long, covering the following topics:

- How did gameplay differed from participants' expectations?
- What features of the games did participants like and what features did they not like?

- What aspects of the game environment did participants find particularly intriguing or frustrating?
- What narratives did participants chose to follow/construct within the game?

These interviews provided a summary of participant's reactions to games and how their understanding of the games changed after game play and in relation to their initial expectations. These interviews also provided insight into players' desires for/practices of world-making in these two virtual spaces.

4.4 Analysis

To analyze the interview data and participant diaries I applied multiple qualitative methods, including narrative analysis and visual image analysis. To transcribe the twelve participant interviews, I used QuickTime 7 audio playback software because it allowed me to slow down audio playback, enabling me to hear the audio more clearly and minimizing transcription time and mistakes. I then analyzed these transcriptions using HyperRESEARCH software. There were three themes that I focused on coding in the data: narrative and exploration, expectations of and relationships with the natural environment and interactions with aliens. Kevin Dunn (2010) notes the value of the researcher transcribing their own interviews. In doing so I, as the researcher, am able to revisit the data and begin identifying key passages for further analysis as I am transcribing. I am also able to indicate non-auditory aspects of the interview, such as visual cues, that were not part of the recording. I used narrative analysis techniques to analyze these transcriptions as well as the textual information from the participant diaries (Latham 2016). Meghan Cope and Hilda Kurtz (2016, 658) argue that narrative analysis is useful for “research that concerns a series of events, a set of formal or informal processes, perhaps social movement struggles or protest...[and] can be used to understand how the author of the text

under analysis portrays...features of their narrative.” Thus, the data collected for this study made narrative analysis an excellent tool for understanding these data.

For the visual component of the participant diaries I utilized visual image analysis. Liz Roberts (2016, 242) argues that “images like movies and paintings have an expressive materiality, where the image ‘touches’ the viewer through how it calls into being the fleshiness of the world.” I analyzed these images to see how images reflected, augmented and enhanced participants’ descriptions of their experiences of world making in each of these games. Roberts (2016, 238) also explains that “interpreting landscape as text that can be decoded reflects the ways in which the cultural, symbolic and imaginative aspects of vision inform how we see not only landscapes but also any visual image. Visual images can help to reproduce unequal power relations and so studying them can help to reveal these.” In my analysis of the participants screenshots I looked for ways to understand the broader context of how my participants understood, related to and contextualized what they were experiencing in these games. The visual and textual analysis of the interviews and screenshots revealed two dominant themes; 1) gamers ideas of nature, and 2) their relationship to game storylines. I will discuss these two themes in the following chapters, beginning with how gamers think about and understand nature and environments in *No Man’s Sky* and *Civilization Beyond Earth*.

Chapter Five: A “Natural” Outer Space?

Online games employ specific representations of nature to draw gamers into world making. Players’ existing understandings of nature in the actual world also impact the ways that they interpret the ideas and representations of nature deployed in games. I argue that gamers’ understandings of nature, and their assumptions about its representation in game spaces, impacts their interest in the game and their ability to build worlds. In this chapter, I explore how gamer expectations of nature illustrate some of the dominant narratives of nature discussed in Chapter Two. There are two themes that arose among my participants in terms of their expectations of nature: The first theme is nature according to Newtonian physics. The second theme is a form of nature that adheres to Darwinian theories of evolution. I then discuss how these assumptions of nature impact gamer expectations of what “nature in outer space” might look like and how the nature encountered in each of these games reinforces or challenges these narratives and reveals particular gamer desires for world building.

5.1 Nature as Science

Laws of Nature

One of the most prevalent understandings of nature illustrated by participants in this study was that of a scientifically understood, rational nature. Writers, scientists, educators and others within the working assumptions of a Western cultural frame, analyze and categorize nature in terms of science in a variety ways. This includes nature as fundamentally quantifiable within a number of categories: Nature as a resource for extraction, nature as physics, nature as biology, nature as chemistry, nature as climate, nature as geology, etc. As Tim Ingold (2000, 19) notes:

Biology is – or at least is supposed to be the science of living organisms. Yet as biologists gaze into the mirror of nature, what they see – reflected back in the morphology and behavior of organisms – is their own reason ...they are inclined to impute the principles of their science to the organisms themselves, as though each embodied a formal specification... given independently and in advance of its development in the world...the possibility of such a context-independent specification is an essential condition for Darwinian theory.

Gamers articulate their interpretations of nature in two ways. The first is in terms of planetary laws of physics, and the second is in terms of Darwinian evolution, both of which are products of ideologies of Western culture that separate nature and society. In their assumptions and interpretations, gamers illustrate an understanding that nature can be defined by a set of ‘immutable’ laws.⁴ The misalignment created when players encounter virtual natures that do not conform to their expectations impacts their ability to engage in world building projects because they feel that the environment is incomplete, broken or illogical.

When *No Man’s Sky* was released in August 2016, gamers complained that the game environment did not operate according to their understanding of nature and the existing scientific logic in the actual world. They were specifically bothered by the game’s lack of universal applications of physics. One participant in my study—whom I will call Petra—noted, somewhat jokingly, that she hoped her “avatar won’t walk through a mountain” (February 5, 2017). The majority of my participants critiqued the fact that gravity was not universally applicable in *No Man’s Sky*. For example, Eddie explained that his “first experiment was, well ok did they put physics into this? And I was sadly disappointed. Because I cut the bottom off of things all the time just to see if they would fall over and they didn’t. You know, and I realize like, yeah ok, I wasn’t exactly expecting that level of realism, but you know, it would have been nice”. Julian discovered the lack of gravity accidentally. In his search for Heridium—the mineral necessary to

⁴ These assumptions may also be particular to Anglo-western cultures and societies. An avenue for further study would be to explore gamers’ reactions, expectations and assumptions in Asia or South America.

repair launch thrusters on the player’s spaceship—he discovered that “when there were big pillars of like the blue [heridium] or gold or copper, and then you cut just the bottom out, is the whole thing would just stay floating in the air. There was no gravity and yet if I jumped into the air with my jetpack, gravity would always bring me right back down. Sometimes it was a pain when it would bring me down, so it was a little janky with gravity” (see figure 6).



Figure 6: Heridium tower that has been mined, leaving a floating piece (upper center). Screen capture by Emma Tait (March 9, 2017)

Physics in online games are controlled by a set of mathematical equations and relationships that determine how objects interact with each other (Eberly 2004). The more complex the movement of objects in a game space the more complex the mathematics required to define how the objects relate to each other (ibid). This includes the physics of the actual landscape spaces such as how to make planets spherical and enable them to rotate on an axis. It also includes the physics of discrete objects—such as a plant, an animal or the player—called

rigid bodies that are “characterized by the region that its mass lives in” (Eberly 2004, 14). Most importantly the physics in a game govern how objects move and what happens when they collide. This includes gravity and friction as well as when the player walks into an object or picks an object up.

These interactions, particularly those of how objects collide and what happens when they do, are governed by what is called a physics engine (Millington 2007, Eberly 2004). The physics engine does the mathematics required to simulate the physics in the game. The physics engine must receive specific information from the game as to what object is being acted upon and the physics of that action (Millington 2007). For example, if a player in a game throws a ball, the physics engine will apply the correct physics for a projectile—such as gravity, force and velocity—only if it knows how to identify the object and its necessary attributes—its size, its mass etc. The mathematics required to represent actual world physics are immensely complex. Not only must the game control object interactions, these physics must also be mathematically translated into visual representations—images on the screen—using visual building blocks such as pixels (Morgan 2016, Millington 2007).⁵

In most games the physics are applied only within what is called a ‘skybox’: a cube that contains the illustration of the game (Morin 2016). The player moves between skyboxes to simulate changes such as day and night but they can never leave the box. Physics engines used in skyboxes require a significant part of the landscape to be pre-generated by the game in order to create certain landscape elements that perform calculations on landscape elevation to determine the flow of a river or the location of a body of water (Khatchadourian 2015). The physics of *No*

⁵ There are entire fields of study devoted to the mathematics of physics in games and the logic systems behind rendering objects in virtual space. For an introduction to game physics see *Game Physics Engine Development* (2007) by Ian Millington and *Game Physics* (2004) by David Eberly.

Man's Sky cannot behave this way due to the fact that the player must be able to move between billions of planets that are created as the player encounters them (Morin 2016). The player must also be able to interact with the environment of every planet. To have quintillions of planets that players can interact with means that pre-calculating landscapes to create terrain elements—as required by a physics engine—is not possible; this would place too much strain on the system. Thus, the physics in *No Man's Sky* are managed by algorithms. These algorithms are partially controlled by a physics engine, but primarily controlled by a set of rules that are specific to the game. These rules and algorithms had to be created to work around the problems that arose due to the procedural generation of the game elements (Morin 2016, Whittaker 2015, Khatchadourian 2015, Hall 2017).

The sheer scope of *No Man's Sky* required considerable time and effort for calculating and rendering physics within the game. Yet despite so much time and effort, players found particular aspects of these physics frustrating; sometimes because they thought the physics were lacking and other times because the physics were true to actual world Earth physics, but not what the player expected. An example of this latter point was not expressed by my participants but came up in an article by Roc Morin for *The Atlantic* (2016). Morin noted that the planets in *No Man's Sky* rotate on their axes. This creates a night and day cycle on planets and it also means that if a player flies down to the planet from a space station and then flies directly back up into space, they will not find the station because the planet will have rotated. On discovering this 'true to physics' feature, players complained that this was a bug in the system (Morin 2016, Wiltshire 2015). This example, and the critiques of the application of physics by participants in my study clearly illustrates players' assumptions that particular laws of planetary physics on Earth and in our solar system are universally applicable in all star systems and galaxies. The

planetary physics to which players are accustomed and have experienced are necessary in creating a believable, desirable outer space, even if that outer space is virtual. The inconsistency of physics in the game environment impacted the players' abilities to understand the physical boundaries and limitations of the world in which they played.

Darwinian Evolution and Speciation

The second major critique of *No Man's Sky* and a minor critique of *Civilization Beyond Earth* relates to Darwinian evolution and speciation. The Darwinian understanding of evolution is widely, though not universally, accepted as how species evolve on Earth through time in different spaces. The particular arguments of Darwin at work here are: 1) that individuals of a species will – through their reproductive selections – choose traits that will help the species adapt, survive and thrive in a given ecosystem and 2) that if a group of individuals from a particular species gets separated by a physical barrier from the rest of that species, the individuals of that group will select for traits that will help them survive in their new location, eventually evolving into a distinct species of their own (Darwin 1861). Thus, there is a general understanding among the participants of this study of such evolution; that if a species evolves in a distinct environment it will develop characteristics that are unique from any other species and will reflect the ecosystem in which it evolved. For example, polar bears have evolved to have white fur so that they might camouflage with the ice of their arctic habitat, which enables them to hunt more effectively. Underneath that white fur they have black skin, which better absorbs the heat from what little sun the arctic receives. Thus, polar bears would not appear (without human technology or intervention) in temperate or desert climates. Similarly, the participants of this study expected that if they went to two different planets, one an icy tundra and the other a jungle, they would see completely different species of flora and fauna. What they encountered, however,

was the same flora and fauna but with different names (see Figure 7 and Figure 8). Julian⁶ explained:

The jungle world was probably the best because there was the most teeming amounts of life everywhere. And yet, it still had caves and in the caves, there was still these pink or green or yellow flowers that gave off light and as you destroyed them they still gave you the same resource, atrium or something like that. [On] each planet I could survey the same stalagmites and stalactites and they'd have different names. There was this one bloody plant, that looked like this large fiddlehead that would always whip you as you walked by it on every single planet. It was always the same green, but it always had a different name. Even on the snowy Hoth world, there would still be this whip like thing that would just get you as you walked by ... The actual plant life, it was always the same. Everywhere I went. I got my platinum from the same blue flower, I got my [Thamium] from the same red flower. I got my plutonium in big red crystals, atrium, again, the same rare plant life [that] was always a flower that gave off glow.



Figure 7: Glowing flowers on a planet I discovered. Screen capture by Emma Tait (March 9, 2017)

⁶ I interviewed Julian on February 28, 2017.



Figure 8: Glowing flowers on planet discovered by Julian. Screen capture by Julian.

There is nothing in the game that indicates that this type of evolution is indeed intended or that each planet has unique species. Yet on encountering planets with different climates and ecosystems, players clearly anticipated a distinct and noticeable difference in the flora and fauna that they encountered (see Figure 9). Not only that, several participants lamented the fact that every planet contained only a single climate and a couple of ecosystems. Not one participant encountered a planet that had both frozen landscapes and humid jungles.



Figure 9: The same plant on a toxic and radioactive planet and on a ‘paradise’ planet. Left screen capture taken by Jake, right screen capture by Emma Tait (March 9, 2017).

Like everything else in *No Man's Sky*, the flora is procedurally generated. In order to ensure that the plants look like plants, however, the algorithms used to generate plants were based on existing biological plant structures in the actual world. In particular game developers used Astrid Lindenmayer's (1968a, 1968b) L-Systems theory as the fundamental structure in the algorithms that generate plants. Lindenmayer's L-Systems show the fairly simple biological structure of plant branching and leaf patterns (see Figure 10) (Warren 2015). From this algorithm, base templates were then created (Warren 2015, Khatchadourian 2015) to define structures of both flora and fauna; trees have trunks, branches and leaves and animals must have skeletons. The template was then run through a series of complex algorithms and mathematical functions that randomly mutated the structure to create a new creature or plant. This allowed the creatures to be created procedurally (Khatchadourian 2015, Tach 2015), though all would originate with the same few hundred ‘ancestors’—base archetypes (Duncan 2015). Though in theory every plant and creature is unique, they all have similarities derived from the same

template, which might—as is the case on Earth—lead to very subtle differences that are not apparent to the average player⁷.

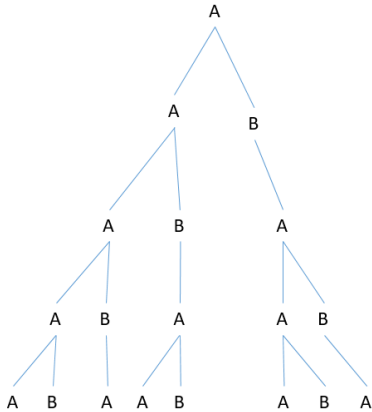


Figure 10: Lindenmayer’s (1968a, 1968b) L-Systems branching pattern. Diagram reproduced by Emma Tait from Lindenmayer (1968a, 1968b) and Warren (2015).

Actual world logic was also used in the algorithm that generates the planets themselves. Those that are closer to their sun are more desert-like while those further away are frozen, with the ones in the middle being most likely to support life (Wiltshire 2015). This even extends to the moisture present on the planet as well as the quality of light (color of the sky) depending on the particles in the atmosphere and the type of star at the center of each solar system. The animals placed on a particular planet were also tailored to the attributes of the planet. For example, if the planet was a desert planet that had a hostile environment the fauna on that planet would have features that were coded as hostile—such as spikes and horns (Duncan 2015).⁸ Though these attributes, and the fact that the procedural generation machine took such variables into account as entire planetary ecosystems when generating flora and fauna, this was not apparent to the players in my study.

⁷ I wonder what botanists, wildlife biologists, ecologists and such might see if they played *No Man’s Sky*. This may be an interesting group to study in the future.

⁸ There is a subfield of game art that is called environment art. Environment artists are responsible for creating the visual representation of nature in virtual game spaces.

Similar expectations and limitations were revealed in *Civilization Beyond Earth*. In this game, the difference between ecosystems is subtler due to the fact that the player looks down on a single planet instead of personally exploring many planets. Instead of entire planets being different ecosystems, several ecosystems may exist on the same planet, or the planet for a particular game may only have a single ecosystem. When setting up a game of civilization, the player can choose how many other AI players will be in the game, what kind of planet they will land on in terms of environment and land masses, and what starting bonuses they will receive, among other things. Julian noted that he “played a 2v2 map on a tundra and the tundra didn’t look like a tundra. It was the same, there was no snow or anything like that. It wasn’t like I could build any different buildings. I was able to build farms; they just had domes over them. There was nothing really different about the different tile sets.” This comment indicates the lack of distinction between ecosystems and the lack of niche evolution within *Civilization Beyond Earth*. It is possible in *Civilization Beyond Earth* to have a planet that has multiple ecosystem types (e.g. some desert tiles, some mountain tiles, some tundra tiles in the north and south (top and bottom) of the map) or an entire planet with only a single ecosystem. Regardless of whether or not the planet appears to have different ecosystems, the alien life and resources do not vary according to the ecosystems presented on the planet.

As Rutherford and Bose (2013) point out, a game is a collaboration between the actual game and the gamer. The gamer’s assumptions are important to note, as they illustrate preconceived understandings about how nature—both actual and virtual—should operate. The lack of evidence of Darwinian evolution compromised the players’ abilities to immerse themselves in the game on two accounts. First, players experienced difficulty in situating themselves in, and relating to, the environments they found themselves in after they left their

first planet. Second, when players continued to find the same species on planets with vastly different ecosystems in *No Man's Sky*, their connection to the game worlds, their world-making processes and their ability to engage with the premise of the game was compromised. They could no longer situate themselves and their actions within the narrative of stranded space explorers searching for new discoveries. This disconnect also occurred after the player left their initial planet, causing players' initial efforts at world-building to become disjointed with what they encountered in the rest of the game. Events of place became repetitious in a world building framework that proposes and promises infinite variety.

5.2 What Makes Nature Alien?

Critiques of game physics or laws of nature did not particularly influence participants' expectations or experiences of what kind of environments they expected to see in space. Alien natures and environments were discussed in terms of how player expectations or experiences of game environments compared to what they knew on Earth. These expectations tended to be described as either Earthlike or beyond the scope of Earth. What made a particular element beyond the scope of Earth, however, varied between participants. In some cases beyond the scope of Earth for one participant was Earthlike for another, or the same element was both Earthlike and alien for the same participant.

Human understandings of what kinds of natures are possible in space are formulated through images of space we encounter through actual world space expeditions, movies, and science fiction novels in addition to actual world natures. Thus, participants' expectations of what 'space nature' might be like—on planets that could support life—were grounded in what they know about space or what they had experienced on Earth. For example, Val noted that she was "picturing Mars or Jupiter." Another participant, Jake, initially started out by describing

landscapes with which he was familiar and that had seemed alien when he had experienced them, such as “on top of Camel’s Hump in the snow.”⁹ He then went on to reference the 2009, James Cameron film *Avatar* (Cameron 2009), saying “Pandora-esque...not normal, like futuristic or alien trees and different kinds of landscapes. Abnormal. Not something that you would walk outside and be like, oh yeah, there’s some trees and some houses and a river and a lake. It can be that stuff, but it should be different. The lake can be purple. The trees can have bright orange leaves”. For Jake, it was enough that he couldn’t walk out his door and see it.

These comments reveal the crossover between virtual and actual space. In some cases the virtual presents opportunities to see things that don’t exist in the actual world and in other cases could be a way for players to experience something that exists in the actual world but that they have not encountered—such as Mars or Jupiter. Players also recognize the capacity of virtual spaces to have elements and connections to actual space but go beyond what they know. The potentiality of virtuality allows players room to renegotiate what they consider natural or alien and how they relate to alien natures and environments. It allows players to entertain the possibility of being alien themselves. As Val noted, she would “probably play as an alien if I can...it’s just edgy and different” (February 13, 2017). Participants’ expectations themselves, before entering the game spaces, have already been shaped by a combination of actual worlds and virtual worlds.

The crossover between actual worlds and the virtual is also apparent in the development of *No Man’s Sky*. The algorithms in *No Man’s Sky* used to generate the colors of the planets and their environments rely on the actual world physics of light refraction. In developing the game, the artists and programmers considered what gases and particles reflect which wavelengths in

⁹ Camel’s Hump is part of Vermont’s Green Mountain range. At over 4000 feet, the top of the mountain is bare bedrock that gets covered in snow and ice each winter.

order to make planet atmospheres that would be different colors (Morin 2016, Perkins 2014). The planets and their flora and fauna are part of particular color palettes with allowable variations in hue, tint and shade (Duncan 2015). The algorithms that make them have been programmed with a set of rules to understand basic color theory so that when a planet is created the flora and fauna on it seem to be a cohesive environment as well as visually appealing (Duncan 2015, Tach 2015).

In several of my initial interviews, participants expressed doubts that manipulations of the physics of color would make alien natures all that different from actual natures on Earth.

Eddie expressed this doubt, saying

There's not a whole lot you can do beyond making weird creatures. I feel like plants are kind of like this universal thing. Like grass is grass, you can make grass purple, but it's still really its grass and there's trees. Beyond them being different colors and sort of uniqueness on that aspect, there's not a whole lot you can do. If a planet supports life, that's what we think life is going to look like.

According to Eddie, humans designed these games and so even in our wildest imaginations grass is still grass, it might just be a different color. This comment also reinforces which aspects of Earth's physics are negotiable: changing the colors of elements of the environment is fine, even expected, but not gravity. Without gravity there is no way for the player to understand how their body relates to, and can interact with what is around them. Whereas changing the physics of color does not fundamentally dislocate the players from orienting themselves—both figuratively and literally—within the game landscape. Whereas changing the color of something makes it both alien and exciting, even if it is reminiscent of Earth, yet it is still identifiable as within a category such as vegetation or rock or animal, maintaining a set of defined relationships with the player within known categories.

One of the most common ways in which players orient themselves within virtual game spaces is through avatars (Boellstorff 2008). Avatars are bodies that players can customize to be the representations of themselves in game spaces and through which they encounter and interact with the game (ibid). Even when playing first person games such as *World of Warcraft* or *Skyrim*, players can continually customize their appearance—initial selection of species/race, gender and appearance, buying clothes or armor, or even creating or becoming new species (Boellstorff)—as a way of personalizing the game.¹⁰

A second component of alien natures brought up in Eddie’s comment is the understanding that human minds designed these games. Petra expressed doubts about the scope, variety and alienness of environments in the game, noting that not only were they reliant on human imagination but the games are controlled and implemented through computer artificial intelligence (AI). Thus, the virtual environments encountered in game spaces are a product of how well humans can program computers to randomly generate and represent the spaces and natures that they imagine. This was both cause for doubt and possibility in Petra’s expectations of the game. On the one hand, the scope could be limited by the games’ random generation of the game environment, but on the other hand, Petra notes, there might be “worlds where the most ridiculous plants exist because some computer generation just went completely wrong” (February 5, 2017). Petra’s comment hints at the relationship between artificial intelligence used to run the game and the gamer. Not only is the environment created by a computer programmed to randomly generate environments based on a set of preconditions imagined by a human, but the interaction between the player and these environments is also mediated by a computer. These environments exist statically as images on a computer screen but they are given meaning by the

¹⁰ The screen represents what is seen when the player looks out through the avatar’s eyes.

interaction between the human gamer and the algorithms creating the computer's intelligence. Yet this recognition, that a computer generates the environments, does not stop players from expecting alien environments with components of Earth natures, such as gravity and evolution.

Whether or not the alienness of the natures that players encountered met their expectations had less of a negative impact on their world building ability. Participants noted that one of the things that they liked most about *No Man's Sky* was the imagery of the environments. Players' reaction to the environments of *Civilization Beyond Earth* were limited to a few comments about the lack of diversity of environments. The player's birds-eye-view of the game does not allow or require the player to interact directly with the landscape, making the environment primarily a backdrop on which and gaming action happens. Haraway (1991, 189) notes the effect of this 'gods-eye-view' positioning: "All perspective gives way to infinitely mobile vision, which no longer seems just mythically about the god-trick of seeing everything from nowhere, but to have put the myth into ordinary practice." This view became possible when we first had photos of Earth from spaces, rendering the earth as object (Haraway 1991). This nature-as-backdrop is, of course, a very neat example of nature as envisioned in the division of nature and society.

Yet this division is complicated by the ways that the player can choose to develop their civilization through technological and biological hybridity with the alien natures (as discussed in Chapter Six). Another aspect of both the environments in *Civilization Beyond Earth* and in *No Man's Sky* is that the base structures and divisions of natures and landscapes resembled those on Earth. There were enough features – nearly all – that resembled existing Earth structures and species that the environment had familiarity. This was done purposely. The developers of *No Man's Sky* specifically wanted the planets that players encountered be alien yet feel familiar

(Hall 2017, Tach 2015). They focused on actual world natures as models for the planets, landscapes, environments, flora and fauna that they designed. Thus all of the natural elements are “fundamentally grounded in reality” (Tach 2015). This familiarity did not challenge existing biological divisions and categorizations on Earth. There were no trees that spoke, no rocks that moved, or animals with root systems. It did however, aid the players in their world building in that it gave them a way to orient themselves in the game. Yet it also had mixed results in terms of meeting players’ expectations of alien natures or truly exploring the possibilities presented by the potentiality of virtual spaces. Though the developers followed meticulous rules in the game design, the results yielded mixed reactions from the participants in my study. Reactions to the game environments were mixed because embodiment and narrative in game spaces was a crucial and missing factor in players’ desires to have a role and impact in creating these game spaces.

Chapter Six: What Makes a Game Worth Playing?

“*I just realized that it was just monotonous exploration that never ended.*” – Julian (February 28, 2017)

One of the most important aspects of online games is the storyline. A game’s storyline attracts the gamer to the game, allows them to understand their actions and decisions within the context of the game and keeps them interested. The importance of game narratives, and the reliance of these narratives on particular tropes of nature, was one of the central themes that emerged from the participants in my study. In the following chapter I explore three different aspects of game narratives that players in this study articulated. The first of these subthemes is the use of colonial narratives and counter-narratives in each of these games. The second is the importance of resource extraction in the narratives of both games and the way that resource extraction influenced the colonial and counter colonial narratives. The third subtheme is gamer embodiment and natures in virtual game spaces.

Resource extraction is the primary way in which players enable their progression through the game narratives. Having particular resources allows players to craft new or better tools, ships, units or buildings. If the player understands how the extraction of resources and crafting tools and technology impacts their progress through the games narrative, then they feel that the game has a purpose and is thus worth playing. If, however, the player cannot see how their efforts in resource extraction and crafting progresses the storyline, the game loses its meaning. The relationship between resource extraction and narrative is particularly important in *Civilization Beyond Earth* and *No Man’s Sky* because neither of these games allow the player to create an avatar—the body that they use to move around and interact with the game space. Avatars are the primary way that the player engages with and situates themselves in the game.

Without an avatar, player relationships to the environment and their interactions with it become vital to their world building.

6.1 Colonial Narratives and Counter Narratives

Many of the dominant understandings of nature are products of a western ideological project that divided nature from society. This divide was a dominant force in western colonial and imperialist projects, utilized to categorize and subject particular environments and peoples. In the narratives—or lack thereof—presented in *Civilization Beyond Earth* and *No Man's Sky*, there are both reinscriptions of these narratives and relationships, and subversive attempts to dislodge and complicate those same narratives. This is particularly apparent in *Civilization Beyond Earth*. Through quests, research decisions and virtues that a player chooses to develop in *Civilization Beyond Earth*, the game offers domination through a fight to remain human or through the erasure of the human through biological mutation or the cyborg. The first option invokes imperialistic and colonial conquest with the subjugation and objectification of nature to make way for civilization. This narrative—enacted through the Purity affinity within the game—is predicated on the eradication of the other humans and nonhuman lifeforms and the domination of the planet for a particular set of humans' control and use. These tactics – the domination and subjugation of nature – were employed in the conquering, oppression and exploitation of indigenous cultures and natural landscapes during imperial conquest and colonization in the actual world and the legacies of these persist through dominations within current power dynamics (Walsh 2015, Lugones 2008/2015, de Lima Costa 2016).

I argue that in the supposed separation of nature from society in western ideological thought, both are given specific human properties and characteristics. In this discourse, society is framed as rational, civilized, intellectual, and masculine while nature is framed as emotional,

illogical, barbaric, and feminine (Walsh 2015, de Lima Costa 2016, Rose 1993). The attributes ascribed to each, not only allows nature to become a resource for extraction and a background for human affairs, but also enables the classification of diverse peoples, places, bodies, organisms and identities into one category or the other. Those that land in the category of nature are considered less than society and are thus subjugated, relegated and are viewed as a resource for extraction (da Costa et. al. 2015, Rocheleau 2015). The subjugation of nature and those pushed into that category is a violent process. This includes the violence to the environment and ecologies when resources are extracted from the landscape. It also includes social and cultural extraction by researchers and scientist as they use these ‘others’ as subjects of study for the production of western scientific knowledge (da Costa et. al. 2015). There are aspects of both *No Man’s Sky* and *Civilization Beyond Earth* that normalize this violence. In *Civilization Beyond Earth* these include the objective of global domination and the continual resource extraction needed for its achievement. In *No Man’s Sky*, continual resource extraction fuels exploration and ‘first’ discovery—even though there are other space-faring, ‘intelligent’ lifeforms on these planets.

Though resource extraction and planetary domination are strong narratives in *Civilization Beyond Earth*, there are also alternate narratives (see Table 1). The supremacy and harmony affinities facilitate the players’ ability to conquer the world, but the ultimate end goals of each of these affinities offers a different way to understand human futures and possibilities for new/alternate human-nature relationships. The player builds a supremacy route to victory through human technological advancement such that humans could survive on any planet because of their technology. Eventually, supremacist nations seek to leave behind the weakness of human organic bodies and exist immortally in their machines.

The harmony route relies on the biological mutation of human genes with the genetic material of the alien lifeforms on the planet. Harmonists ultimately desire for the planet to become a single organism through biotechnological mutation to create a single intelligence – or hive mind – across the planet. These two affinities rely on the same resource extraction as the purity affinity but with markedly different end goals. Both of these affinities also raise the possibility of the erasure of humans (as they are understood in the actual world) through technological and/or biological mutation.

Table 1: Civilization Beyond Earth affinities, the goal of each affinity and how they are achieved (Civilization Wiki)

Affinity	Methods	Goal
Purity	Purists focus on removing human and non-human adversaries to enable a particular groups' domination of the new planet.	make a new earth and keep humans pure.
Supremacy	Supremacists focus on becoming technologically and mechanically advanced enough that they can survive any conditions.	Leave behind the physical body and exist only in a cybernetic, technological, digital and mechanical mind, thus securing a technological immortality
Harmony	Harmonists focus on understanding the genetic makeup of the alien species to enable human genetic mutation so that humans can better adapt to the alien environment	Turn the planet into a single biotechnological organism in which all lifeforms are interconnected in a massive compound intelligence

Civilization Beyond Earth and *No Man's Sky* both utilize colonial narratives. In using the trope of nature as a resource to be extracted, and a space of categorization and subjugation of peoples and environments as less than human, both of these games reinforce these narratives and their violent histories. Alongside these colonial narratives, however, are subversive counter narratives. *Civilization Beyond Earth* offers a counter narrative in the possibility for the erasure of 'pure' humans through biological or technological mutation. *No Man's Sky* offers a different

counter to colonial projects through its lack of narrative. In the experiences of my participants, this renders infinite exploration and resource extraction boring. A crucial aspect to the counter colonial narrative in *No Man's Sky* is that it is constructed and illustrated by gamers' desires for game narratives.

6.2 Making the Frontier Boring

The desires expressed by gamers illustrate their understanding of themselves in the space of the game and in relation to the gaming environment. These desires are useful in understanding why people game and how the environment plays into their relationship to game spaces. Anthropologist Sharine Hafez (2011, 157) argues that “desire is not a reified object that can be captured as a unified theme. Instead, desire allows an analysis of subjectivity that gets at the core of subject production and also considers subjectivity as a fluid and discursive process.” Hafez (2011) discusses desire in relation to Islamic women activists in Egypt, but her theory of desire is applicable to the co-production of world building and narrative that takes place in virtual game spaces. Hafez (2011) argues that subjectivity is formed by desire. World building in online games is also a project of subject making through particular desires. What gamers' desire to do, to see, and to be in these game spaces informs how gamers relate to these spaces and their efforts to shape the game and themselves within it. The participants in my study desired narrative and nuance. Rutherford and Bose (2013, 6) note that “the focus on process—on the meaning-making dimensions of play—is central to how digital games generate narratives.”

The events of place that happen in these game spaces must contribute to the meaning making—and world building—abilities of the player. The process of co-creating narrative and meaning requires that the player's interactions with the game environment and natures not only allow players to situate themselves in the game world but also to facilitate this narrative

production. In *Civilization Beyond Earth* and *No Man's Sky*, resource extraction and the interactions with alien life were critical kinds of natures for world building strategies—leading either to positive narrative co-authorship or to feelings of insignificance as a result of the lack of ability to co-create the narrative.

Eddie, remarked that his biggest critique of *No Man's Sky* was that “there’s no sort of sense of linear progression” (March 1, 2017). Julian (February 28, 2017) expanded on this critique, noting that he felt that:

There also didn't seem to be any real point. I mean, they could have used the intro so much better, you click play, you log into the game and they could have used that loading screen to talk to you, to give you some kind of feedback to what you are or where you are or anything. Or even the little drone that you talk to initially, that could have been some kind of basic tutorial of, well you crash landed out exploring your stuff.

Without *No Man's Sky* initially establishing a narrative, it was difficult for participants to understand their actions and tasks—repairing launch thrusters, gathering Heridium to build carbide sheets, and so on—in relation to a bigger picture or goal. These tasks were not presented as a quest or significant goal. Players were left without any explanation of how to obtain resources, and once they were extracted, how the resources extracted and tools they built from them fit into a broader narrative.

By contrast, participants generally enjoyed *Civilization Beyond Earth* because of the narrative elements of the game. When asked about what he liked most about the game, Julian (February 28, 2017) remarked “I loved the tech trees, I loved the building of the like virtue points. I loved the little questions that they would give me... I realized that I could plan twenty moves or twenty turns ahead and I was able to focus on upgrades and my tech trees and what I was building in the main city as far as buildings.” Eddie (March 1, 2017) related, “I had a lot of fun with it. This is the kind of game where I sort of lose track of how much time I've spent

playing it. One of those games where I'm like, oh, I want to do this and once I've accomplished this I'm going to then do this. Which you know takes x amount of time. Or you know, I'm looking for these things, I'm looking for a specific resource, oh my enemy has it. Do I kill them, or do I trade them for it?". These comments indicate that what participants liked about *Civilization Beyond Earth* was that there was a purpose to everything that they chose to do. This provided the opposite structure to that of *No Man's Sky*. In *Civilization Beyond Earth* participants were able to choose how the story would play out through their decisions of what to research and what to build, but the bones of the narrative were clearly articulated at the beginning of the game. Upon entering a game of *Civilization Beyond Earth*, the opening sequence presents the player with the problem—humans adrift in space—and a clear task to make a new life for them on a new planet. The player then receives the tools to complete this task in a variety of ways.

By contrast, the lack of narrative in *No Man's Sky* combines with infinite exploration. This aspect is one of the game's main attractions, however, without any strong narrative elements to give it meaning or purpose, participants found that infinite exploration and continuous resource extraction became monotonous and boring. They enjoyed *No Man's Sky* for the initial hours but found that after six or seven hours it no longer held their interest due to the repetitive actions of discovery and resource extraction without any purpose. In the words of Julian (February, 28, 2017):

With *No Man's Sky*, you go to a planetary system you scan the planets. You see what has the mineral that you need. You go down and you get the mineral. Maybe there's other minerals or elements that will sell on the auction house but that's it. That's the entire game... You might not be able to do it in one planetary system, but when you do get to the center there's no ending. It just sticks you back on another world, somewhere else and says alright, start over. There's no point. There's no end game. Even in like [other]

MMOs, with WOW¹¹ or something along those lines, yes, you go out and you mine minerals and herbs or resources and then you're using it on a live economy and ... then you're trading your goods to specific players, it's not NPC¹² based. It's not purely AI. And so, you have the understanding that you are part of a bigger picture, whereas with *No Man's Sky* you're not part of a bigger picture. You're playing against AI only, and even the AI in it is like, if you provoke them then they're going to mess with you.

This monotony of exploration and resource extraction coupled with the lack of narrative left players feeling like “a bystander in a functioning system that would go on playing itself without you” (Julian, February 28, 2017). Players also noted that in other MMOs:

You can have a direct impact on what is going on around you even though the game itself is enormous and can take a ton of time. [*No Man's Sky* is] just too big and the player doesn't have enough impact on where they are or on the settings. I don't know, once I left a planet there was no point to ever go back to it even though I had named everything on there. There was no point to ever go back to that planet (Julian, February 28, 2017).

Julian, Eddie, Petra and Jessica all noted that the only thing the player could do was survive and play the continual “survival grind” indefinitely.¹³ It would take hours (in actual world time) to completely strip a planet of its resources, and even if the player did, all they could do was sell the resources for a little money and use that money to buy a bigger ship to hold more resources. Even then, because the player could travel through space indefinitely, there is never a limit to the resources available.

The premise of *No Man's Sky* utilizes visions of nature created during the enlightenment, American westward expansion and employed in the American Manifest Destiny narrative of the frontier. The game description on the *No Man's Sky* website (Hello Games 2016) invokes a frontier in space as it explains:

Whether a distant mountain or a planet hanging low on the horizon, you can go there ... every star in the sky is a sun that you can visit... It's yours for the taking. Explore

¹¹ Blizzard Entertainment released World of Warcraft is a Massive Multiplayer Online Game (MMO or MMOG) in 2004.

¹² An NPC is a Non-Player Character generated by the game and controlled by artificial Intelligence (AI).

¹³ Julian was interviewed on February 28, 2017, Eddie on March 1, 2017 and both Petra and Jessica on March 23, 2017.

uncharted solar systems and catalogue unique new forms of life... never before encountered. Find ancient artefacts that could reveal the secrets behind the universe... perhaps you'll make your mark on [other] worlds as well as your own. Every solar system, planet, ocean and cave is filled with danger, and you are vulnerable... every encounter can test your skills to the limit... Whether you want to explore and see things never before discovered or directly set course for the centre of the galaxy... you cannot take your voyage lightly. You'll need to prepare. Collect precious resources on the surfaces of planets and trade them for the ships, suits and equipment that will take you to your destiny in the stars (see Figure 11).

Alone in an infinite universe, the player can continue to survive and forge ahead without ever bumping up against the “confining, false and artificial” spaces of the “cities and factories of urban industrialized civilization (Cronon 1996, 77). The myth of the frontier was only made possible by the separation of nature from society; nature could only be an escape if it did not exist within everyday life.



Figure 11: Flying through space towards an undiscovered planet containing four resources. Screen capture by Jake.

Writers such as Ralph Waldo Emerson, Henry David Thoreau and John Muir articulated nature as a pure entity, the place of the sublime and the place to find God (Cronon

1996, Tsing 2005). The conceptualization of nature as sublime, and being in nature as closeness to God, influenced and emerged with the existence and exploration of the American Frontier, giving birth to what William Cronon (1996) calls rugged individualism. Cronon (1995, 76-77) describes this emergence by noting that “in moving to the wild unsettled lands of the frontier” men “shed the trappings of civilization, rediscovered their primitive racial energies, reinvented direct democratic institutions, and thereby reinfused themselves with a vigor, an independence, and a creativity”, making the wilderness the “last bastion of rugged individualism.” Though the American West as it was in the eyes of Emerson, Thoreau and Muir disappeared long ago (if it existed at all), the remnants of the idea of the frontier remain. Only the location of the frontier has changed, coined in the tag line of the 1966 television series Star Trek, “Space, the final frontier” (Roddenberry 1966).

These ideas and understandings of nature persist in the Star Trek (Roddenberry 1966) tagline and in the conceptual design of *No Man's Sky*. In the case of *No Man's Sky*, the frontier – and its nature – has been sent into outer space. Yet this version of outer space is entirely virtual—experienced on a computer screen in a room somewhere in actual space—bringing the frontier crashing back down into everyday life. This idea of space is also complexly bound up with human hopes, imaginings and desires for particular futures. As Haraway (2004, 92) argues, “the extraterrestrial is coded to be fully general; it is about escape from the bounded globe into an anti-ecosystem called, simply, space. Space is not about “man’s” origins on earth but about “his” future”. This future is enabled by “social and technical cybernetic communication systems, which permit postmodern man to escape the jungle and the city, in a thrust into the future made possible by the social-technical systems of the ‘information age’” (Haraway 2004, 94-95).

The frontier is all about escape into the unknown, which *No Man's Sky* more than adequately provides. And yet, *No Man's Sky* also challenges the ideas of the frontier by revealing that there is no end in sight, that endless exploration and discovery without purpose is pointless, that there is no destiny other than that of the lonely nomad wanderer. Framed in this way, resource extraction and upgrading technology is boring when no other option is available. Our quest for progress, for the future—in science, in medicine, in theory, in language, in food, in culture—is perhaps much more meaningless than it seems if we follow the structure of *No Man's Sky*.

The developers of *No Man's Sky* invoke the emotional and appealing aspects of the frontier to cater to particular, westernized desires of space and nature so that gamers will buy and play their game. They intentionally brand the game as a space exploration game in which the player can explore planets and discover species that no other human has ever seen. The game developers specifically use natural elements and organisms as 'things to be discovered' as well as resources for crafting and survival. All discoverable organisms and resources may not appear on a single planet but with four quintillion planets at the player's disposal they will find – and never run out of – the resources needed for survival or organisms to discover.

By contrast, in *Civilization Beyond Earth* the planet has a finite number of resource, but once a player controls a resource they can extract from it indefinitely. Due to the fact that there is only a single planet for players to explore, this way of incorporating resources also reinforces the theme of resource extraction as necessary for survival. Limited exploration and resource extraction hold an explicit purpose in this game. The player can see how those resources directly impact their ability to create and fulfill their chosen narrative; a narrative that was co-constructed by both player and game. Most of the decisions are up to the player, but the player makes each

choice an understanding of how that decision serves a bigger goal, and how it helps the player's civilization grow and prosper. *Civilization Beyond Earth* allows the player to move beyond mere survival into particular kinds of flourishing. The player's civilization has science, culture, energy and resources. The player has people for whom they are responsible, and they have plans for expansion. Instead of being adrift, alone in space with no clear understanding of where to go or what to do, the player in *Civilization Beyond Earth* is a leader of people, guiding humanity into an uncertain future.

Returning to the idea that both the games and gamers co-create a game experience, it makes sense that players find the added structure of the narrative in *Civilization Beyond Earth* more appealing. As Rutherford and Bose (2013, 6) argue, "it is not simply the telling of a story, but rather the interaction, which generates meaning through the inducement of all manner of desires, fears, hopes, proud moments, and anxieties, all of which may be encountered differently by different gamers." Gamers don't want to make up the story entirely. They want to create characters that become the protagonists in a story that already exists. In doing so, their agency influences how the story plays out but not the structure of the narrative itself. For example, the participants in my study often compared these games to the game *Skyrim* (Bethesda Game Studios 2011)—an open world, role-playing, action game—as an example of excellent game narrative. *Skyrim*, has a main storyline through which the player can progress by completing specific plot quests. The player, however, can choose to complete those quests on their own time or not at all, instead choosing to complete smaller side quests or just explore the world. If the player decides to pursue the main storyline, they can do so with a multitude of different skills, as part of a variety of different factions, and in whichever way they choose. *Skyrim* provides a game space in which the bones of the narrative are already written, but the way that the details of the

story plays out depends on the choices of the player. *Skyrim* is also distinctly different from *Civilization Beyond Earth* and *No Man's Sky* in that it allows the player to build an avatar.

6.3 Bodies in Space

Neither *Civilization Beyond Earth* nor *No Man's Sky* allows the player to build an avatar. In both games the body and identity of the player is ambiguous. The lack of an avatar and the ambiguity of the player's body makes player relationships to the environment significantly more important to world building and critical to gamers' understanding of how they co-create the game narrative. The players' point of view—or vantage point—is also a critical component of embodiment in these virtual game spaces.

Player vantage point is important to the establishment of narrative and the monotony of resource extraction in each of these games. In *No Man's Sky*, the player plays as themselves, in the first person. The scope of the game and the lack of narrative caused my participants to feel lost, alone and unable to make a difference in their surroundings or create a strategy for succeeding in what minimal goals they held. There was even ambiguity as to how the player was represented in the game, as Eddie (March 1, 2017) remarked, “I had no idea what I was supposed to be, going through this game. Like, am I a Robot? ... Am I an alien to these aliens?”. He then clarified that because of the life support systems, he was not a robot, but nor is there any explicit indication or understanding that the player is human. The player starts the game with no understanding of any of the alien languages, which seemingly indicates that the player – whatever they are – has never encountered these species before. Yet the other species do not seem surprised at the appearance of the player.

The first person perspective of *No Man's Sky* can be contrasted with *Civilization Beyond Earth*, where the player looks down on the game, with a bird's eye view. Though the player

interacts with the leaders of other factions in holographic encounters, they look down on the board and maneuver units across the landscape as if they were pieces in a game of RISK®. Despite the minimal interactions with the landscape or first persons encounters, the players have a purpose: to create a new life for their civilization on an alien planet. The way they choose to go about this is entirely up to them, but every choice that the player makes can be situated within a much larger set of goals and strategized ahead of time.

Regardless of perspective, neither of these games employs an avatar—a body that the player chooses or creates to represent them in the game space—as the representation of the player in the game space. In both games the player has an ambiguous body, though it is more apparent in *No Man's Sky* due to the first person perspective. In *No Man's Sky* the player does not know anything about their body other than that it requires life support. There is no way for the player to know or understand who and what they are in relation to the game. In an article in the *The Atlantic*, lead developer of *No Man's Sky* (Morin 2016) stated that “in most games, you begin by choosing a character... you're made to decide at the beginning who you are, but that might be before you decide how you really want to play. We want to let people have their imagination. They can be whoever they want to be. They might be an alien if that's what they want to believe. I quite like that.” Though the developers liked this idea, most of the participants in my study did not.

There are particular aspects of performance that are also tied to the body and to bodily labors in order to survive in particular spaces (Hoang 2015). Bodies, virtual and actual, are sites of selfhood and knowledge production of the self in relation to others and through desires. In his ethnography of the game *Second Life*, Tom Boellstorff (2008) notes that the avatars of *Second Life* inhabitants are crucial ways in which the players express themselves, articulate and perform

particular desires and form relationships. In game spaces in which the player constructs an avatar, there is embodied—both actual and virtual—labor that the player engages in order to generate a ‘virtual selfhood’ (Boellstorff 2008) and enact particular desires. For example, on entering *Second Life* for the first time, a person must create an avatar that can be “any age, gender, race, even species” (Boellstorff 2008, 131). After this first creation, however, the person can change anything about their avatar at any time. Boellstorff (2008, 121) notes that many participants in his study felt that “their online lives could make their actual-world self more “real” in that it could become closer to what they understood to be their true selfhood, unencumbered by social constraints or the particularities of physical embodiment.” This illustrates not only the importance of virtual selfhoods but the transgression of boundaries between virtual world and actual world selfhood.

The fact that both *Civilization Beyond Earth* and *No Man’s Sky* do not allow players to construct an avatar leaves the player without a distinct way of creating a ‘virtual selfhood’: of knowing themselves in the game. Boellstorff (2008, 129) argues that “avatars make virtual worlds real, not actual: they are a position from which the self encounters the virtual”. This also connects back to player’s abilities to build worlds. Without a known and identifiable self within these game spaces, players are left to situate themselves within these spaces through other available means, such as the landscape and interactions with other species.

There are particular cultural narratives and framings of nature that clash in these narratives, desires and (lack of) embodiment. *No Man’s Sky* brings into relief the insignificance of a single being within the scope of a massive galaxy. One single being can extract resources and build better technology to their heart’s content—and beyond—and still make no impact on the world around them. Players’ experiences in *Civilization Beyond Earth* show the satisfaction

that arises out of having a sense of purpose. This demonstrates what can be obtained when there is not just one being, but a being supported by many others, who work towards a common goal. This sense of community—implied even in the game’s title—is part of a particular conception of humans in space that is the basis for *Civilization Beyond Earth*. The game is centered on the premise that humans have to leave earth after what the game calls ‘the great mistake’ (Firaxis Games 2014). It is about finding a new home for the human species and thus saving them from extinction, which resonates with current, actual world endeavors to find other earthlike planets and to colonize Mars. The implication in the game—as well as in some of the actual world narratives it mimics—is that humans need a chance to start again, and succeed in creating a lasting empire. This is a colonial fantasy. This is also quite contrasted with the idea of space implied in *No Man’s Sky*, which doesn’t present space as a place of human salvation. In fact, the player does not even know if they are human. In *No Man’s Sky*, space is about discovery and exploration as well as about the insignificance of a single being in the vastness of the universe.

The lead developer of *No Man’s Sky*, Sean Murray, used his childhood in the Australian outback as the impetus for the game, specifically designing it so that players would feel alone and insignificant (Hall 2017). Implicit in these narratives of exploration are those of the frontier, of individuality, of first discovery and of legacy. The frontier is the edge of civilization, it promises both danger and discovery. The exploration of *No Man’s Sky*, and the vastness of the universe it contains, ensures that there is always a frontier, always something out there to discover. In the process of discovery, the player names the planet and the living things they contain. Those names remain in the game for as long as the game exists. This means that if the game is still running in two hundred years, those planets and names and creatures will still exist for others to discover. In this way, the game gives players a way to leave their mark in space so

to speak. This ability leaves a legacy and the idea of the frontier are about the survival of the individual. The idea of the frontier, as Cronon (1996) argues, is about the individual strength to survive in and to conquer nature. *Civilization Beyond Earth* offers a way to negotiate strange understandings of human-nonhuman relationships or human-technology relationships through human salvation in space while *No Man's Sky* literally offers the stars: A chance to name something that no one else has ever seen and have it last into the future, long after that player's own lifetime.

The lack of avatars in both of these games makes gamers' world building more difficult. It requires gamers to rely more heavily on their relationships to the environment to understand themselves and their place in the broader game narrative. The ambiguity of the player's body and the players' perspective in these games also provides a space of possibility. It allows for a potential renegotiation of the player's relationship to humanity and human-nature relationships. In *Civilization Beyond Earth*, this potential is generated in the affinities that players choose to pursue. In both the harmony and supremacy affinities there is the possibility of the biological or technological erasure or mutation of the human species.

6.4 Cyborg Bodies

This idea of technological erasure of humans brings to mind Haraway's (1991) work on cyborgs. Haraway (1991) argues that we are all cyborgs, whether we have actual technological body parts or we just participate in a world that has no clear boundaries between bodies, biota and technology. Haraway (1991, 149) defines a cyborg as "a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction. Social reality is lived social relations, our most important political construction, a world-changing fiction". She (1991, 150) goes on to say

We are all chimeras, theorized and fabricated hybrids of machine and organism; in short, we are cyborgs. The cyborg is our ontology; it gives us our politics. The cyborg is a condensed image of both imagination and material reality, the two joined centres structuring any possibility of historical transformation. In the traditions of 'Western' science and politics . . . the relation between organism and machine has been a border war. The stakes in the border war have been the territories of production, reproduction, and imagination.

Haraway's argument is about cyborgs that exist and are manifested in the actual world.

The Supremacy and Harmony affinities in *Civilization Beyond Earth* also utilize a particular idea of the cyborg; one that makes the transgression of boundaries between human and machine essential for a possible future for humanity. This idea of the cyborg is made more complex when placed in conversation with existences that are lived solely in virtual space, such as those studied by Tom Boellstorff (2008) in his ethnography of *Second Life* (Linden Lab, 2002). How does a human consciousness manifested in a body in virtual space complicate Haraway's conception of the cyborg? Boellstorff (2008, 139) argues that "virtual embodiment is predicated on discontinuity, the gap between the virtual and actual" and thus virtual embodiment is part of the idea of the cyborg. He argues that Haraway's (1991) cyborg is "predicated on a prosthetic continuity between human and machine" (Boellstorff 2008, 139). I would argue that virtual embodiment complicates Haraway's cyborg but is not separate from it. Though there is no physical continuity between the virtual body and the actual body in this case there is—as the concept of virtual selfhood suggests—a continuity of selfhood. There is also a transgression of boundaries, both in-between body and machine and between virtual and actual space. These transgressions complicate human social relationships, politics and experiences in actual space. Virtual spaces provide spaces in which to push the idea of the cyborg into complex and virtually embodied futures.

The cyborg is also useful in thinking through the biotechnical genetic mutation of humans in the Harmony affinity. This particular manifestation of the cyborg is reminiscent of the

way that cyborgs and their messy entanglements are explored in feminist science/speculative fiction. One example of this is Octavia Butler's trilogy *Lilith's Brood* (1989). In this set of stories, humans have destroyed themselves and the Earth and are rescued by an alien species, the Oankali. The Oankali's biological imperative is to collect genetic material from other species and to modify those species to better enable both species' survival. To do this with the humans, the Oankali's third gender—the Ooloi—take genetic material from humans and Oankali to create new species that fix the genetic faults in humanity. This leads to a struggle over the purity of a species versus the survival of a species and at what cost. In this example, as in *Civilization Beyond Earth*, the alien is the source of the genetic material (both the Oankali as the alien to the human and vice versa). In both cases, as in much of science/speculative fiction and actual world understanding, biological mutation occurs between distinct, visible, knowable and intelligent species. This too is predicated on assumptions of who or what is considered intelligent or knowable and distinct. Humans are hosts of a vast array of 'alien' cells and species in the actual world, some of which are critical to our survival.¹⁴ Yet these are not considered intelligent alien lifeforms capable or worthy of a genetic trade.

Although there are subversive narratives and possible human-nature relationships in the game spaces that I studied, there is much that is problematic in these narratives and relationships that is reinforced or not addressed. For example, not broached in these games is the violence done to the native species—even with these 'alternative' approaches to survival in an alien world. This violence is an outcome of using nature as a backdrop to human affairs. Though not confronted in either of these games, the acknowledgement of this violence and its origins are a

¹⁴ Most of these are on the microscopic level or bacteria or cells such as our gut bacteria or cancer cells. Interestingly, in Octavia Butler's trilogy, it is cancer cells that the Oankali find most useful: it is these cells that allow them to discover how to regrow limbs and repair brain damage.

crucial part of the work done by the idea of the biological or technological (perhaps they are the same) cyborg in feminist science and speculative fiction. In *Civilization Beyond Earth*, some gamers want to be aliens; they opt for biotechnical mutation. How do these choices and desires generate openings for complicating incursions into existing human-nature relationships? Though these complex relationships are only hinted at within *Civilization Beyond Earth* and *No Man's Sky*, these games can provide a context from which to launch into broader, more complex conversations of multispecies muddles, contamination, entanglements and what it means to be human in the Anthropocene/Capitalocene/Chthulucene (Haraway 2016, Moore 2017).

Chapter Seven: Conclusion

In a recent trip to the 2017 annual meeting of the American Association of Geographers in Boston, Massachusetts, I was reminded of why I began this project. During the conference, I attended a paper session on robotic futures, and two others on animal geographies and engaging with the Anthropocene. Though all three sessions were excellent, I couldn't help wanting all of the scholarship and ideas in these separate sessions to be put in conversation with one another. My desire for this project was to begin to explore how the technology of virtual space reinforces, confronts and complicates human-nature relationships and the possibilities of virtual space to provide new and provocative ways of engaging with nature 2.0. I began this project with three questions.

1. How do critiques of *No Man's Sky* and *Civilization Beyond Earth* illustrate important features of human interaction with game environments that are crucial to world making for gamers in virtual space?
2. What do gamers' expectations and critiques of these games reveal about their emotional, physical and social desires for virtual game spaces?
3. How do gamers' desires and expectations illustrate, expand or challenge gamer understandings of place and human nature relationships in the actual world?

To answer these questions, I interviewed gamers about their reactions to these two games. Upon analyzing their responses as well as my own exploration and assessment of these games and the related promotional reviews, two major themes emerged from this data. The first was that gamers hold particular assumptions of what nature is and how it should operate according to actual world physics and evolutionary theory. These assumptions informed how participants in my study understood what nature in space might look like and how it might behave. The second was that gamers' desire narratives in virtual games in which they feel that they have agency and impact.

Game developers, environment artists and programmers labored over many hours to create the virtual natures in these games. In the case of *No Man's Sky*, the development team meticulously created and applied rules to the algorithms generating the game space in order to have nature that was aesthetically pleasing and fundamentally based in actual world natures. Despite these efforts, the participants in my study critiqued the game for a lack of evidence of Darwinian evolution and the uneven application of gravity. These missing components of actual world natures made it difficult for gamers to understand how they and their actions fit into the game environment and narrative. Though players critiqued the physics of gravity, the manipulation of the physics of color in the game environment was acceptable and desirable. This illustration of which aspects of actual world natures and physics are negotiable suggests that gravity is more vital to a gamer's ability to make virtual worlds. I argue that this is due to the player's ambiguous body and identity. Without knowledge of their body, the player's interaction with the game environment becomes the dominant way that they define their relationships with and engagement in the game. The uneven application of physics caused players a sense of dislocation that the manipulation of color did not.

The ambiguous body of the player was also an important part of players' relationship to the game's narratives. The main narratives in *Civilization Beyond Earth* and *No Man's Sky* employed particular colonial narratives such as conquering alien others, colonizing new worlds, and exploring the frontier. Yet each game also had subversive counter-narratives. In *Civilization Beyond Earth* the harmony and supremacy affinities offered the player different ways to think about the future of humanity—and its possible erasure—through human biological or technological mutation. In *No Man's Sky*, the lack of narrative coupled with infinite exploration rendered resource extraction and the frontier monotonous. The game narrative is a crucial co-

created aspect of the game. Gamers want to be able to influence the details of how the narrative plays out, but they want clear goals that indicate their role in the fundamental structure of the narrative. Gamers lose interest in a game when they do not understand how their efforts to make virtual worlds fits into the context of the game or impacts the game's narrative.

The embodiment of the player in the game space is one of the most common ways in which players engage with game narratives. In most online games, players create an avatar as a representation of their virtual selfhood within virtual spaces. *No Man's Sky* and *Civilization Beyond Earth* do not allow players to build avatars, thus in both games the player's body is ambiguous leaving players without a clear way of creating a virtual selfhood or knowing themselves within the context of the game. Though this lack of embodiment presents a challenge to gamers' world making efforts, it also provides an opportunity for players to question their relationship to humanity and human-nature relationships. Players' lack of knowledge about their body in *No Man's Sky* causes them to question how processes of relation and communication occur in their interactions with the other alien species. In *Civilization Beyond Earth* the lack of embodiment allows the player to engage in creating the cyborg bodies generated by the harmony and supremacy affinities.

These games provide spaces to renegotiate and complicate human nature relationships through making virtual worlds with ambiguous bodies, constructing virtual selfhoods through relationships to virtual environments and exploring human biological and technological mutation. Though these games provide possibility, they also reinforce colonial narratives and do not address the violence within these narratives. Addressing this violence is a crucial aspect of renegotiating human nature relations if we follow the arguments of decolonial and feminist scholars (Walsh 2015 da Costa 2015).

Gamers' frustration at the lack of narrative coupled with the players' ambiguous body supports feminist geographers' arguments that geographers need to take actual world and virtual world embodiment seriously, beyond the body as an object in space. The critiques of gamers in my study illustrated that some form of embodiment is critical to relating in virtual worlds. This partially supports Haraway's argument of the importance of bodies and the necessity to take them seriously. Yet a body full of radical possibility that Haraway might envision—like the ambiguous body of the player in *No Man's Sky*—is confusing to players. Players' ability to navigate game worlds and game narratives in a virtual body with identifiable markers and signifiers is a critical part of virtual worldmaking.

I argue that virtual space also complicates Haraway's (1991) idea of the cyborg. Tom Boellstorff (2008) argues that humans' engagements in virtual worlds are not part of the cyborg because virtual spaces are not technology that is physically attached to the body. I argue that though virtual worlds are not physically attached—like prosthetic limbs—to actual world bodies, the constructions of virtual selfhoods and the realities created in virtual spaces that impact peoples' actual world identities make human relationships to virtual spaces an expansion of the cyborg. Haraway's (1991) theory of the cyborg is also complicated by the biological mutation, hybridization and possibility of the player's alienness in these games.

While I agree with Sandbrook and colleagues (2015) and Fletcher (2017) that online games and other virtual spaces reinforce problematic nature tropes, I argue that there are also subversive narratives that create possibilities for new understandings of human-nature relationships. These games also deploy these tropes at the expense of (unintentionally) rendering them meaningless, as in *No Man's Sky* where colonial narratives of the frontier and nature as a

resource become boring in the repetitive acts of exploration and resource extraction without purpose.

With the release of mass market Virtual Reality technology virtual spaces are only going to become more prevalent. It is important to understand how these virtual spaces impact and inform the actual world. This project is a glimpse at the magnitude of virtual game spaces and the ways in which they complicate, inform and are informed by actual world natures and relationships. In the face of the global ecological crisis it is critical to engage in broader and more complex conversations of human-nature-technology relationships, contamination, multispecies muddles and what it means to be human in the Anthropocene/Capitalocene/Chthulucene.

In this project, I reveal some of the ways in which virtual spaces and virtuality can help facilitate these conversations or provide a unique space to explore possible futures. This research only begins to explore the potentiality of virtual spaces and their creation. There are a multitude of diverse possibilities for future research on virtual game spaces. One direction would be to look further into the development process of games. How do developers decide what the environment will be in a game? How do they create those environments through computer code, art and mathematics? I have explored some of the relationships between gamers and what developers create. I am curious about the developers' relationship to virtual spaces and actual natures in terms of the translation of physics, mathematics and art into computer code and artificial intelligence. These games take place in futuristic science fiction spaces, yet they employ actual world scientific logic. Despite the efforts of developers, however, the participants in this study struggled with what they felt was a lack of evolutionary logic. Future research could explore how natural scientists perceive the natures in these games, particularly in *No Man's Sky*.

This study focuses on particular western ideas of nature and gamers within western culture. How might the types of nature employed in games to create game environments and the conceptions and understandings of nature brought into game spaces by players be different in different cultures and worldviews? Future research in this direction could explore other games and gamers with different cultural understandings, experiences and worldviews of gaming, world building and natures.

A last avenue for future research would be to explore the media and stories that inspire the creation and perception of virtual spaces. Movies and science fiction novels also influence gamers' perception of virtual natures. How might these narratives along with remote sensing technologies inform ideas of natures in game spaces? How do virtual worlds contribute to existing literature on human futures?

These are only some of the ways that future research could continue to explore virtuality and human relationships to virtual space. I think that there are fascinating ways in which gamers' world making projects and the ideas of nature employed by both games and gamers can offer possible ways of complicating existing human-nature relationships as well as giving a space to explore the possibilities of uncertain, messy, entangled futures. The tension between the dislocation that occurs when gamers encounter virtual natures that do not align with their expectations and gamers' and players' ability to make virtual worlds within game narratives forces players to confront the question "how do I relate to space/environment/natures/place/nonhuman others and what constitutes these relations?" For me, these questions are critical not only to relations in virtual space but to the uncertain futures we face in the actual world.

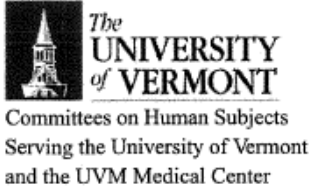
References

- Bethesda Game Studios. 2011. *Elder Scrolls V: Skyrim*. Windows, PlayStation, and Xbox Game. Bethesda Softworks. <https://elderscrolls.bethesda.net/Skyrim/>.
- Boellstorff, T. 2008. *Coming of Age in Second Life*. Princeton and Oxford: Princeton University Press.
- Büscher, B. 2014. 'Nature 2.0: Exploring and theorizing the links between new media and nature conservation.' *New Media and Society*, 18, 726-743.
- Butler, O. 1989. *Lilith's Brood*. New York: Warner Books.
- Caldwell, B. 'The Broken Promise Of No Man's Sky And Why It Matters'. *Rock Paper Shotgun*. 17 August 2017. <https://www.rockpapershotgun.com/2016/08/17/broken-promises-of-no-mans-sky/>. (last accessed 26 May 2017).
- Castree, N. 2001. 'Socializing Nature: Theory, Practice and Politics.' In *Social Nature: Theory, Practice, and Politics*, eds. N. Castree & B. Braun, p.1-21. Massachusetts, Oxford: Blackwell Publishers Inc.
- Civilization Wiki. 'Affinities CBE'. Website. Fandom Games Community. [http://civilization.wikia.com/wiki/Affinities_\(CivBE\)](http://civilization.wikia.com/wiki/Affinities_(CivBE)). (last accessed 23 April 2017).
- Cork, J. 'The Secret Story Behind No Man's Sky'. *Game Informer*. 19 December 2014. <http://www.gameinformer.com/b/features/archive/2014/12/19/the-secret-story-behind-no-man-s-sky.aspx>. (last accessed 26 May 2017).
- Cronon, W. 1996. 'The Trouble with Wilderness; or, Getting Back to the Wrong Nature.' *Uncommon Ground: Rethinking the Human Place in Nature*. p. 69-90. New York: Norton.
- da Costa, L.B, R. Icaza and A. M. Ocampo Talero. 2015. 'Knowledge about, knowledge with: Dilemmas of researching lives, nature and gender otherwise.' In W. Harcourt and I. L. Nelson (eds.) *Practicing Feminist Political Ecologies: Moving Beyond the 'Green Economy'*, p. 260-285. London: Zed Books.
- DaSilva, A. 2015. '2015 Top Markets Report Media and Entertainment.' International Trade Administration.
- de Lima Costa, C. 2016. 'Gender and Equivocation: Notes on Decolonial Feminist Translations.' In W. Harcourt (ed.) *The Palgrave Handbook of Gender and Development*, p.48-61. New York and London: Palgrave Macmillan.
- Duncan, G. 'No Man's Sky: How I Learned to Love Procedural Art.' *Game Developers Conference 2015*. 2 March 2015. YouTube video. Game Developers Conference. <https://www.youtube.com/watch?v=vcEA41eBOGs>. (last accessed 18 April 2017).
- Eberly, D.H. 2004. *Game Physics*. Amsterdam: Elsevier.
- Entertainment Software Association. Electronic Entertainment Expo 2014. 10 June 2014. Los Angeles, California.
- Firaxis Games, Sid Meiers Civilization, Take-Two Interactive Software & 2K Games. 2014. *Sid Meier's Civilization Beyond Earth*. In *Sid Meier's Civilization*, PC and Mac game. <https://civilization.com/civilization-beyond-earth>: Firaxis Games.
- Fletcher, R. 2017. 'Gaming conservation: Nature 2.0 confronts nature-deficit disorder.' *Geoforum*. 79, 153-162.
- Hafez, S. 2011. *An Islam of Her Own: Reconsidering Religion and Secularism in Women's Islamic Movements*. New York: New York University Press.
- Hall, C. 'In the beginning, No Man's Sky was flat.' *Polygon*. 2 March 2017. <http://www.polygon.com/2017/3/2/14790028/no-mans-sky-was-flat-procedural-world-generation-maths>. (last accessed 18 April 2017).
- Haraway, D. 1988. 'Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective.' *Feminist Studies*, 14(3): 575-599.
- . 1991. *Simians, cyborgs and women: the reinvention of nature*. New York: Routledge.

- . 1992. 'The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others.' In *Cultural Studies*, ed. C. N. Lawrence Grossberg, Paula A. Treichler, 295-337. New York: Routledge.
- . 2003. *The Companion Species Manifesto: Dogs, people and significant otherness*. Chicago: Prickly Paradigm Press.
- . 2004. *The Haraway Reader*. London and New York: Routledge
- . 2016. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham and London: Duke University Press.
- Hello Games. 2016. *No Man's Sky*. Console and PC game. <http://www.no-mans-sky.com/>: Hello Games.
- Hoang, K. 2015. *Dealing in Desire: Asian Ascendancy, Western Decline, and the Hidden Currencies of Global Sex Work*. Oakland, CA: University of California Press.
- Ingold, T. 2000. 'Culture, nature, environment: Steps to an ecology of life.' In *Perception of the Environment: Essays in livelihood, dwelling and skill*. p.13-26. London, New York: Routledge.
- Khatchadourian, R. 'World Without End: Creating a full-scale digital cosmos.' *The New Yorker*. 18 May 2015. <http://www.newyorker.com/magazine/2015/05/18/world-without-end-raffi-khatchadourian>. (last accessed 17 April 2017).
- Lewis, S. L. & M. A. Maslin 2015. 'Defining the Anthropocene.' *Nature*. 519, 170-180.
- Linden Lab. 2002. *Second Life*. Online game for Mac and PC. Linden Lab.
- Lindenmayer, A. 1968a. 'Mathematical Models for Cellular Interactions in Development I: Filaments with one-sided inputs.' *Journal of Theoretical Biology*. 18(3): 280-299.
- . 1968b. 'Mathematical Models for Cellular Interactions in Development II: Simple and branching filaments with two-sided inputs.' *Journal of Theoretical Biology*. 18(3): 300-315.
- Lugones, M. 2008/2016. 'The coloniality of gender.' In W. Harcourt (ed.) *The Palgrave Handbook of Gender and Development*, p.13-33. New York and London: Palgrave Macmillan.
- Massey, D. 1994. *Space, Place, and Gender*. Minneapolis: University of Minnesota Press.
- . 2005. *For Space*. London: Sage Publications.
- Millington, I. 2007. *Game Physics Engine Development*. San Francisco: Elsevier.
- Moore, J. W. 2017. 'The Capitalocene Part I: On the Nature & Origins of Our Ecological Crisis.' *The Journal of Peasant Studies*. 44(3), 594-630.
- Morgan, T. "Tech Analysis: *No Man's Sky*". *Eurogamer*. 8 November 2016. <http://www.eurogamer.net/articles/digitalfoundry-2016-no-mans-sky-tech-analysis>. (last accessed 18 April 2017)
- Morin, R. 'Inside the Artificial Universe That Creates Itself.' *The Atlantic*. 18 February 2016. <https://www.theatlantic.com/technology/archive/2016/02/artificial-universe-no-mans-sky/463308>. (last accessed 19 April 2017)
- Newzoo Games. 2016. '2016 Global Games Market Report: An Overview of Trends & Insights.' newzoo.com/globalreportpremium/: Newzoo
- Paasi, A. 2002. 'Place and region: regional worlds and words.' *Progress in Human Geography*. 26, 802-811.
- . A. 2004. 'Place and region: looking through the prism of scale.' *Progress in Human Geography* 28(4): 536-546
- Parkin, S. 'No Man's Sky: A Vast Game Crafted by Algorithms.' *MIT Technology Review*. 22 July 2014. <https://www.technologyreview.com/s/529136/no-mans-sky-a-vast-game-crafted-by-algorithms>. (last accessed 19 April 2017)
- . 'No Man's Sky: the game where you can explore 18 quintillion planets'. *The Observer*. 12 July 2015. <https://www.theguardian.com/technology/2015/jul/12/no-mans-sky-18-quintillion-planets-hello-games>. (last accessed 26 May 26, 2017).
- Rocheleau, D. 2015. 'A situated view of feminist political ecology from my networks, roots and territories.' In W. Harcourt and I. L. Nelson (eds.) *Practicing Feminist Political Ecologies: Moving Beyond the 'Green Economy'*, p. 29-66. London: Zed Books.
- Roddenberry, G. 1966. *Star Trek*. Los Angeles, CA. Columbia Broadcasting Systems.

- Rutherford, S. & Bose, P. 2013. 'Biopower and Play: Bodies, Spaces, and Nature in Digital Games.' *Aether*. 8, 1-29
- Sandbrook, C., W. M. Adams & B. Monteferri. 2015. Digital Games and Biodiversity Conservation. *Conservation Letters*. 8, 118-124.
- Smith, B. D. & M. A. Zader. 2013. 'The onset of the Anthropocene.' *Anthropocene*. 4, 8-13.
- Steam. 2017. Valve Corporation. <http://store.steampowered.com/app/65980/>
- Tach, D. 'No Man's Sky is so big, the developers built space probes to explore it for them.' *Polygon*. 3 March 2015. <http://www.polygon.com/2015/3/3/8140343/no-mans-sky-space-probes-gdc-quintillion-worlds>. (last accessed 19 April 2017)
- Tsing, A. 2005. 'A History of Weediness.' In *Friction: An Ethnography of Global Connection*. p. 171-204. Princeton: Princeton University Press.,
- . 2012. 'On Nonscalability: The Living World Is Not Amenable to Precision-Nested Scales.' *Common Knowledge*. 18(3): 505-524.
- . 2015. *The Mushroom at the End of the World*. Princeton, Oxford: Princeton University Press.
- Walsh, C. 2015. 'Life, nature and gender otherwise: Feminist reflections and provocations from the Andes.' In W. Harcourt and I. L. Nelson (eds.) *Practicing Feminist Political Ecologies: Moving Beyond the 'Green Economy'*, p. 101-128. London: Zed Books.
- Warren, J. 'How No Man's Sky Creates A Universe!.' PBS Game/Show. 14 July 2015. YouTube video. PBS Digital Studios. <https://www.youtube.com/watch?v=2KlmY7zxAp0&feature=youtu.be>. (last accessed 20 April 2017).
- Whittaker, C. 'No Man's Sky Treads New Ground In Game Design.' *Popular Science*. 20 October 2015. <http://www.popsoci.com/No-man%E2%80%99s-sky-treads-new-ground-in-game-design>. (last accessed 16 April 2017).
- Wiltshire. A. '41 Amazing Things About No Man's Sky.' PlayStation Blog. 3 August 2015. <http://blog.us.playstation.com/2015/08/03/35-amazing-things-about-no-mans-sky>. (last accessed 17 April 2017).
- Zalasiewicz, J., M. Williams, C. N. Waters, A. D. Barnosky & P. Haff (2014) 'The technofossil record of humans.' *The Anthropocene Review*, 1, 34-43.

Appendix 1 – IRB Approval Documentation



RESEARCH PROTECTIONS OFFICE
213 Waterman Building
85 South Prospect Street
Burlington, Vermont 05405
(802)656-5040 ph
www.uvm.edu/irb/

CHRBS: 17-0230

Protection of Human Subjects Assurance

Title: Making Gamer Worlds in Mass Appeal Futuristic Online Games
Principal Investigator: Emma Tait,
Institution: University of Vermont and State Agricultural College, Burlington, VT 05405

This institution has an approved assurance of compliance on file with the Department of Health and Human Services which covers this activity.

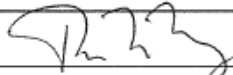
University of Vermont and State Agricultural College: FWA 00000723 Expiration Date: June 29, 2021
The UVM Medical Center: FWA 00000727 Expiration Date: November 12, 2019
IRB number 00000486

Certification of IRB Review

This activity has been reviewed and approved by an IRB in accordance with the requirements of 45 CFR 46, including its relevant Subparts; and, when applicable, with the requirements of 21 CFR 50 and 21 CFR 56.

Date of approval 12-22-16 Date of expiration 12-21-17

IRB Review Type: Expedited review

Institutional Signature/Date:  12/22/2016
Name and Title of Official: Theodore W. Marcy, MD, MPH, Chair,
Committee on Human Research in the Behavioral and Social Sciences

Appendix 2A: Interview Questions – Pre Gameplay

1. Where have you gotten information about this game?
2. How have other people's comments about this game affected your expectations?
3. Where did you encounter these comments?
4. What advertised features of this game interest you?
5. What advertised features make you hesitant to play this game?
6. What do you expect to see in this game?
7. What do you expect to be able to do in this game?
8. What do you anticipate the environment to be like in each game?
9. What do you expect to be able to do with the environment?
10. How do you expect to be able to interact with other people, plant life, animals, or other 'living' aspects of the game environment? Non living elements?
11. What/where do you plan to explore first in this game?

Appendix 2B: Interview Questions – Post Gameplay

1. What was your overall impression of the game?
2. How did game play differ from your expectations?
3. What did you decide to do in the game?
4. Did you find the advertised features that interested you?
5. Were you able to engage with the game environment in the way you anticipated?
6. What made you upset or frustrated during game play? Why?
7. What unexpected discoveries did you make, if any?
8. What did you enjoy most about the game?
9. What did you expect to see that didn't exist in the game?
10. What is your biggest critique of the game?
11. What is your biggest critique of the game environment (Animals, plant life, atmosphere etc.)?
12. What was the greatest asset to the game?
13. What would make you come back to this game and play it again?