

UNIVERSITY OF CALIFORNIA

Santa Barbara

*Gone Beyond: Exploration of Mixed Reality through Toys Using Video Game  
Technology*

A Thesis submitted in partial satisfaction of the  
requirements for the degree Master of Fine Arts

in Digital Media

by

Anna M. Knos

Committee in charge:

Professor Lisa Jevbratt, Chair

Professor George Legrady

Professor Marcos Novak

June 2008





*Gone Beyond: Exploration of Mixed Reality through Toys Using Video Game*  
Technology

Copyright © 2008

by

Anna M. Knos

## ACKNOWLEDGEMENTS

This thesis would not be where it is today without the support and inspiration from the following individuals: Lisa Jevbratt, Marcos Novak, George Legrady, Jenova Chen, Nancy Bautista, Mike Arias, and my family.

## ABSTRACT

*Gone Beyond: Exploration of Mixed Reality through Toys Using Video Game  
Technology*

by

Anna M. Knos

This thesis researches the creation of mixed reality through toys using video game technology. The goal of this gaming environment is to remove the user from reality while simultaneously reflecting on it. By presenting the real alongside the hyperreal, this thesis will allow the user to feel and see both realities and have them exist together through experiential learning.

The contributions of this thesis include:

- a recap of toys and games as art;
- an overview of the current trend in teaching through games;
- an original game which embodies the translation between reality and virtual; and,
- an overview of uncultivated directions for future game design research/creation.

## TABLE OF CONTENTS

I. Praxis .....	1
A. Introduction: Motivation, Inspiration, Contemporary Reality.....	1
B. Hyperreality and Elements of the Hyperreal .....	3
C. Art: Games and Interactive Projections.....	4
D. Thesis Strategy for Reality Blending.....	5
E. Applications in Other Mediums.....	6
II. Implementation of Reality Blending in Games .....	6
A. Overview-Interface/Interaction-Result.....	6
B. Thesis Art: Game Presented as Installation.....	8
III. Theory: Perceived Existence, the Digital Age, and Mixed Reality.....	10
A. Perceived Existence.....	10
B. The Digital Age.....	13
C. Digital Art within Contemporary Society.....	15
D. Mixed Reality.....	18
E. The Hyperreal.....	21
IV. Mixed Reality: My Project.....	22
A. The Hyperreal in Games.....	22
B. From Praxis to Game Presented as Installation.....	24
C. <i>Gone Beyond: Aspects of Hyperreality</i> .....	28
D. Conclusion.....	29
References.....	30-31

## LIST OF FIGURES

Figure 1. <i>Suction</i> , 2007, interactive installation.....	18
Figure 2. <i>Gone Beyond</i> , 2008, interactive virtual environment created in Maya and MAX/MSP Jitter.....	23
Figure 3. <i>Gone Beyond</i> , 2008, interactive virtual environment created in Maya and MAX/MSP Jitter.....	24
Figure 4. <i>Gone Beyond</i> , 2008, interactive virtual environment created in Maya and MAX/MSP Jitter.....	26
Figure 5. <i>Gone Beyond</i> , 2008, interactive virtual environment created in Maya and MAX/MSP Jitter.....	27

## I. Praxis

### ***A. Introduction: Motivation, Inspiration, Contemporary Reality***

Through Zhuangzi's writing<sup>1</sup>, "Butterfly Dream," I experienced a lifting, or removal, of the constraints of space and time, and the emergence of multiple states of reality coexisting together (Buber, Page, Zhuangzi, and Pu 1991). Zhuangzi's work served as my primary motivation for undertaking an exploration of mixed reality through play.

My project is titled *Gone Beyond* and seeks to immerse us in the child-like discovery achieved through play and the power that is intrinsically linked with toys. A technical description of how I created *Gone Beyond* appears in chapter IV, including how I chose the look and feel of each model, their texture, motion, and placement.

A toy is simply an object(s) used for play, free from structure thus allowing unbridled interaction and liberating the player from everyday rules and realities. Considering most mammals will play with whatever they find, I speculate that toys have been around since prehistoric times. They must be understood as a major shaping factor in our selves, our cultures, and our species. Toys can act as both a mental escape and a developmental learning-tool with types ranging from found objects and dolls to video games. An example of real-world toy design focused on this dual state – i.e. fun and learning – appears in chapter II.

---

<sup>1</sup> Zhuangzi was a Chinese philosopher around the fourth century BCE. His writings reveal the teachings of Dao rather than an explanation of them, hence the idea of discovery over teaching (Buber, Page, Zhuangzi, and Pu 1991, 91).

*Gone Beyond* is an art toy that creates a semi-structured activity for the player, or gallery visitor. It is similar to a video game because it is intended to make the player explore both the virtual and actual space to allow for discovery of this mixed reality space and contemporary society's mixed reality existence. However, I use video game technology to create a toy which provides the player with an open-ended environment and no rules, much as Wright explains below:

You can play games with toys. But you can also engage in more freeform play with toys. It doesn't have to be a goal-directed activity. I think of toys as being more open-ended than games. We can use a ball to play a game such as basketball, or we can just toss the ball back and forth, or I can experiment with the ball, bouncing it off of different things. So, I would think of toys as a broader category. Also, toys can be combined. I can strap Barbie to my R.C. car and drive her around, thus making up a new activity by combining toys. Games tend to be isolated universes where there's a rule-set, and once you leave that universe the rule set is meaningless (Will Wright quoted in Rouse 2005, 413).

By playing with toys, one comes to understand deep principles of life. *SimCity* and *Spore* are two video game examples that contribute to this principle of discovery linked to play and are the brain child of game designer, Will Wright (2006). (Wright's work is also examined in Chapter II.) "Understanding through discovery" is often more valuable than being taught in a less interactive, but standard, manner as Wright notes:

Montessori taught me the joy of discovery... It showed you can become interested in pretty complex theories, like Pythagorean theory, say, by playing with blocks. It's all about learning on your terms, rather than a teacher explaining stuff to you. *SimCity* comes right out of Montessori—if you give people this model for building cities, they will abstract from it principles of urban design (Wright quoted in Seabrook 2006, 89-99).

Wright created a palette and moved away from game design conventions, giving users the chance to create their own rules. Before Wright, video game design had a set goal, i.e. a set path that must be taken to complete each task, to reach the end of the game,

and succeed, whereas Wright's design did not have a pre-set goal or path, but the opportunity to create a set of goals. Due to the overload of media stimulus that exists within technologically advanced countries, the inhabitants of these environments have developed the ability to tune out unnecessary 'informational chatter.' The world has become a melting pot of realities, where the real and representational are often blurred together.

### ***B. Hyperreality and Elements of the Hyperreal***

Before the reader can *experience* my project, to a lesser degree through figures contained in this thesis and, most appropriately, in person, it is important to present the theoretical and explanatory underpinnings for reality blending and the hyperreal.

By definition, *simulacrum* is the idea that a *copy of a copy* loses its relation to the original and can no longer be considered a copy (Baudrillard 1988). The simulacrum (i.e. copy of a copy) that simulations of reality have replaced within real and contemporary society is known as the hyperreal. This idea is applied to postmodern culture in the context of semiotics by Jean Baudrillard in his essay "Simulacra and Simulation" to argue that a copy cannot be defined as true or false because all that exist are simulations of reality (Baudrillard 1998, 166-184). Through the copy, this reality is not less or more 'real' than the reality suggested by such copies.

Baudrillard (1988) lays out the transformation from representation to simulacrum in four phases:

1. It is the reflection of a basic reality.
2. It masks and perverts a basic reality.
3. It masks the absence of a basic reality.
4. It bears no relation to any reality whatever: it is its own pure simulacrum.

In today's world, the hyperreal often becomes intermingled with virtual reality, and I too use the term virtual reality and hyperreality interchangeably. To be precise, however, virtual reality is a computer-generated reality alternative to the physical. On the other hand, hyperreality includes virtual reality whereas virtual reality is an experience in the actual, or physical sense.

### ***C. Art : Games and Interactive Projections***

Eddo Stern and Scott Snibbe are two interactive artists who I consider to be art-game designers. Eddo Stern, artist/game designer, addresses the border between fantasy and the real through his exploration of the often-unconscious links between physical existence and electronic simulation. His focus on linking the real with the virtual is seen in *Waco Resurrection* (2004) which called for the players to wear a mask for the voice activated navigation. A more extreme take on this is the game modification, *Tekken Torture Tournament* (2001), which brought the virtual into the real by making the players suffer electric shocks as their onscreen characters are injured. This game created a mixed reality through several means:

- Making the player feel their character's pain
- Placing the players alongside one another
- Allowing those watching to be in the same space as the players

(Stern, 2008 <http://www.eddostern.com>)

Scott Snibbe's wide range of interactive art addresses how seemingly independent events are actually co-dependent with the environment. His interactive works range from sculptures to projected installations to web pieces. Snibbe's minimalist style combined

with his use of contemporary technologies creates playful pieces that have a beautifully subtle game quality.

*Shy*, a piece in the *Screen Series* (2002-2003), is a projected white square with a timid personality that reacts to the user's invasion of its personal space by cowering away. The motion of the square references traditional animation giving it a familiar feel allowing the user to experience the relationship between him/herself and the screen without getting distracted by the technicality of the piece (Snibbe, 2008 <http://snibbe.com>).

Stern's experimental designs turn the video game into a physical computer by making the player aware of his/her existence within both the real and the hyperreal through a real-world tangible interface like the Waco mask. This tie between realities is similar to my use of the wireless keyboard in *Gone Beyond*.

Snibbe's exploration of user to environment as well as his practice of subtracting elements until only the absolute essential remain continues to have influence on my work.

#### ***D. Thesis Strategy for Reality Blending***

In order to design a game that seamlessly transitions between the real and hyperreal, my installation will present certain realities – for example, user sounds in the hyperreal state – through machine processed alterations and playback. This strategy creates an environment that exists outside dualism while keeping the dualistic nature apparent. By avoiding the use of Virtual Reality (VR) goggles, the line between realities is clearly demarcated between the projected world and the gallery wall. The user navigates the virtual space using a wireless keyboard and a neck-strap for mobility. By navigating both the virtual and real spaces simultaneously, the act of navigating becomes

part of the content. My interactive artwork/game offers a dynamic visual narrative that incorporates the user's actions along side the creator of the game, thus becoming a co-operation creation.

### ***E. Applications in Other Mediums***

Levin and Lieberman (2004) create software for dynamic audio visualization, also known as 'audiovisual instruments', and perform their dual-compositions live. Their focus on the need for creative expression through contemporary means investigates augmented-reality in a performance setting. For example, Levin and Lieberman's *Hand-Forms in Hybrid Light*, used a combination of interactive software, computers, analog projectors and digital video projectors to create an augmented-reality shadow puppet show. Levin and Lieberman's exploration of interactive expressions serve as a complementary precursor to my thesis project and provide inspiration for my own creation.

## **II. Implementation of 'Reality Blending' in Games**

### ***A. Overview-Interface/Interaction-Result***

Will Wright is a designer of 'software toys' who is driven by curiosity. He credits his schooling for his way of learning through exploration and aims to create games that give people an experiential sense of discovery (TED Talks).

Wright has shown through games that the traditional boundaries between the game creator and the user have collapsed. For example *SimCity*, released in 1989, did this by making the user control the game environment ranging from land zoning to building a

power structure. This implementation of user authorship not only introduced a new way of interaction, but also moved away from the traditional goal-oriented game play. Investigation into world making through co-authorship refined by Wright further inspired me to expand my project into the form it now takes.

*Gone Beyond* and SimCity share several similarities, one of them being co-authorship, which allows and encourages the user to create content in the game. In SimCity, the game begins with an empty plot of land upon which to build a virtual city, thereby giving the player complete freedom of design. In the case of *Gone Beyond*, the sound input is the tool that the player uses to create sound that simultaneously plays back as part of the game, thus co-authorship takes place. Additionally, both games are about exploring worlds and creating personal paths/experiences.

Another game designer who served to inspire my current project is Jenova Chen. Chen (2006) designs unique game experiences by providing the player with subconscious options. FLOW, a flash game created by Chen in 2006, expanded the traditional understanding of video game structure. The navigation of this game makes users reconsider their relationship between themselves and the virtual space they inhabit.

When I compare *Gone Beyond* with Jenova Chen's FLOW, both games are set in surreal environments that are intended to increase or heighten awareness of his/her surroundings. FLOW is set as an organism that navigates in a surreal biosphere, while *Gone Beyond* denotes an outer space feel, or a huge black void. Moreover, both games involve minimal game-play interaction, which intentionally pushes the user to dwell on the aesthetics of the game. However, the games differ in that FLOW is multi-level and

shows second person perspective, while *Gone Beyond* has a single level, and is shown in first person perspective.

The Lifelong Kindergarten group at Massachusetts Institute of Technology (MIT)'s Media Lab currently designs toys in order to expand the range of what people create within a focus on the learning process. The head of this research group, Mitchel Resnick, notes that, in regards to complex phenomena such as flocking birds and traffic jams, "We see the toys of tomorrow helping kids grow up with better intuitions for understanding those types of phenomena in the world (Resnick quoted in Anderson, 2001)." This idea of understanding deep principles of life through play is at the root of this thesis – in fact, it's a game exploring realities!

### ***B. Thesis Art: Game Presented as Installation***

Why is my thesis presented as an installation game? Essentially, this is because the art piece challenges the perception of reality through the creation of a mixed reality space.

*Gone Beyond* is a fantasy-like game set in what looks like outer space but sounds like the deep sea. The player starts within a large semi-opaque space and is enticed into the world by a group of heads on the move. Interaction with the characters is indirect, suggesting a dream state, as does the freedom to move through walls and go anywhere. After exploring the general environment, personal goals or desires, such as the urge to swim, are unconsciously formed while the abstract forms emit sounds of children playing.

This game is simple enough for the non-gamer to explore and interesting enough for avid gamers to investigate. This game is inviting and comfortable to play because the duration is not set and there are no pre-determined tasks. Furthermore, the rules of the game are only enforced by the player. For example, the player may choose, or not choose, to avoid the swarm of fish while darting through the kaleidoscope. I provide a detailed description of the game in Chapter IV, section B.

In addition, the piece encourages viewers to consider how they perceive reality (i.e. to reflect on reality) by taking control (keyboard), and navigating or exploring this world. The sounds generated by the viewers are captured and played back, which reinforces their sense of reality within the hyperreal. Some of the sounds in this virtual world will actually be audio created from within the virtual world. With navigation control and audio, the viewer becomes a co-author of the piece. During its interactive museum/gallery exhibition, we might be best served to describe peoples' reaction to the piece; or, ask a museum "expert" to explain the interactivity.

I chose to ask someone who is not a technically-minded person to give her impression which is stated below:

Last week I had the pleasure of viewing and interacting with Anna Knos's piece, *Gone Beyond*. I am not a highly technical person, nor do I even play video games, yet I found I had a surprisingly strong visceral and emotional response to her piece. The intrigue of the dimly lit room tucked away in the back of the gallery, along with Anna's simply designed keyboard with seven white directional keys both enticed the explorer in me to interact with her piece.

At the touch of a key, I found myself in control of the large image before me, moving freely around an expansive black and white landscape of vertical and horizontal surfaces and passageways. I quickly realized that I was unrestricted by usual boundaries, free of gravity and free to float through the structure's walls. At first I was simply amazed by the technical ingenuity of the piece. I don't know the first thing about creating a rudimentary computer program, let alone a complex interactive virtual reality.

The skill-level and dedication needed to create *Gone Beyond* in itself inspired a certain awe-factor for me. However, as I continued exploring *Gone Beyond*, I also became aware of a distinct emotional component to the piece. I quickly became immersed in the dark landscape and began to feel tiny and lost.

The random rotating heads and distant booming noises made the environment feel even more foreign and slightly hostile. At one point, by accident, I pressed the keys so that my vision turned towards the pure blackness that surrounded the virtual structure. I felt a tiny surge of fear and panic. I instinctively pressed the opposite keys so I would turn back towards the structure again. I felt the thrill of exploration and at the same time solitude, vulnerability and even loneliness.

In reality, I was standing in a small room with five other people, who were talking no less, yet somehow *Gone Beyond* had swept me away. This feeling of solitary peace and terrifying vulnerability is extremely rare, one could argue almost extinct, in our modern world of cell phones, blackberrys, and personal GPS systems. This emotional aspect of *Gone Beyond*, for me at least, transformed it from a virtual jungle gym into a complex interactive art form, and left me thinking about my experience later during the car ride to dinner, and the days that followed.

Micah Hales, aspiring writer/novelist  
-- and graduate of New York University

### **III. Theory: Perceived Existence, the Digital Age, and Mixed Reality**

#### ***A. Perceived Existence***

The manner in which humans perceive existence is shaped by natural and historical circumstance. History has lead humans within contemporary society to desire things (i.e. art/information) in closer proximity to us. This need for ‘the near’ has shaped a society that subsists beyond the pipedream of uniqueness to accept reality as nothing more than a reproduction of itself.

Technology did not make us lose touch with reality. Its existence shows us that the want for exclusivity is futile; the nature of being is repetitive. The metaphysical shifting that is currently taking place because of technology from the widely accepted dualist point-of-view to a monistic reduction of reality is, I admit, a bit unsettling.

Although technology is often synonymous with complexity, the fact remains that it can lead us to know and thrive in a simplified world of reproduction. This scientific perspective makes clear the paradigm shift in society, particularly how society relates to itself through art. This idea of pure social relations through art as expression and information sharing has only recently become a reality due to the paradigm shift caused by digitalization. Digitalization's impact on reality can be paralleled to the innovation of fire or the wheel.

Linking once again to reality and the hyperreal, reality has adjusted to the masses and the masses to reality just as it has throughout history. The shock lies in contemporary societies quiet acceptance of the 'hyperreal' (Baudrillard 1988). This nonchalant acceptance does not imply that technology has pulled the wool over the society's eyes, but instead opened our eyes to the truth; uniqueness is applied by the viewer and no work is, in itself, new or original.

Culture, on the other hand, is the sum of socially spread behaviors, arts, and everything produced from humanity. It is made up of contending forces resulting from ordered asymmetries in power, capital, and value. It is part of society's sense of identity and values and, therefore, part of contemporary ideology.

Culture in the age of New Media is a structured simulation; essentially copies of copies – or the notion of a simulacrum which I introduced in Chapter I. The social-cultural system is weightless, "it is no longer anything but a gigantic simulacrum: not unreal, but a simulacrum, never again exchanging for what is real, but exchanging in itself, in an uninterrupted circuit without reference or circumference (Baudrillard 1988,

166-184).” That quote refers to the question of God being reduced to signs proving his existence, but I feel it is applicable in reference to the structure of contemporary society.

One of my past interactive creations, which expanded my conceptualization of perceived existence, is called *Reverberation* which utilized a ferrous fluid as the expressive medium. This piece was conceived when I stepped out of a near-silent computer science lab and into the noisy world. I realized that data isn’t just information listed on the computer – it’s everything, everywhere. *Reverberation* was my first exploration into data visualization. In a very basic sense, the voice data utilized in this piece is similar to the generated data expressed in *Gone Beyond*, except the latter uses the clicking of a keyboard instead of voice data.

*Reverberation* is an installation game that drives users toward collaboration and opens the doors to unbridled creativity. This was a completely separate physical thing in its own personal space that’s completely and comfortably controlled by the user. The interaction consists of the user generating sounds whose waves would alter magnets. These magnets, in turn, repel the ferrous fluid, thereby creating visually stunning shapes that varied with the sound’s volume. Users behaved as though each rise-and-fall of the fluid existed solely within the quickly formed intimate relationship they had with the system. Yet, they also posed questions and interacted with fellow users.

*Reverberation* is an installation game where the player uses sound to alter the magnets that repel the ferrous fluid, consequently creating spiky half-domes. The player is presented with a wood box tower, one foot in length and width, and eight feet high; there is a division in the middle, where the ferrous fluid sits, and the top half section of the tower holds the magnets. This piece is voice activated like Stern’s, *Waco*

*Resurrection*, but unlike *Waco*, uses a discreet input device. The player manipulates or moves the fluid by creating sound with his/her voice and observes the fluid react. This, in turn, engages the user's curiosity to test sound levels, tones, pitches, and to further explore what shapes are created by certain sounds.

*Reverberation's* rule set includes three elements. First, the player must trigger the system display using his/her voice. Second, the player's sounds must be within a set or specific audio range. Lastly, the players' mark (fluid formation) exists only while there is a sound input.

I noticed that a disconnected feeling, inevitable boredom and fatigue are all traits familiar to the average technology user. I then saw the desperate need for a completely revamped data expression system. My interest with data expression grew as I explored this area and ultimately led me to my current project which is the object of this thesis.

## ***B. The Digital Age***

Let us now take a closer look at the paradigm shift in the perceived existence of reality. Traditional boundaries between 'audiences' and 'producers' have collapsed. Digital works of art are now effortlessly shared across borders despite political differences and language barriers – particularly in regions where information is 'free' and technology available because all digital works exist in the same form (bits) and use the same means to share. Knowledge is being shared and views expressed without any sort of physical attachment. The absence of a physical link makes the world more open to sending and receiving new ways of social or cultural consideration and expression. To do so is simply no longer threatening.

A work's functionality has changed over the years from 'author-author' to 'author-public' to 'author-public-author-etc'. The difference between author and public began to blur when the press made space in its newspapers for its readers with a call for letters to the editor (Benjamin 1985). Not long after readers were introduced to the ability to become writers, the Internet blossomed. The Internet took this idea of open literary license and applied it to text, image and motion.

The idea of 'natural material' in a socially accepted sense, not a scientific one, has grown from referring to organic matter to include bits. The basic unit of information storage and communication in digital computing is called Bits, or binary digits. To Benjamin, society's "...self-alienation has reached such a degree that it can experience its own destruction as an aesthetic pleasure of the first order (Benjamin 1985, Epilogue)." However, New Media has moved beyond the social alienation of television and film, as felt by Benjamin, and arrived at a new territory comprised of a social oneness. This new social area is structured by the mentality of the 'hyperreal' (Baudrillard 1988).

Baudrillard comments on society in the late 1980s by stating, "It is the generation by models of a real without origin or reality: a hyperreal. The territory no longer precedes the map, nor survives it (Baudrillard 1988, 166-184)." In the last twenty years society has experienced a paradigm shift where the need for a palpable 'real' is left behind in a world of the weightless hyperreal. Contemporary minds have indeed shifted.

In the late 1930s the idea that "quantity has been transmuted into quality" (Benjamin 1985, xv) was a sad truth, but today objects exist infinitely, hence the un-object. Therefore, quantity is not considerable and only quality remains. Similar to the "Mechanical reproduction of art changes the reaction of the masses toward art"

(Benjamin 1985, xii) in Benjamin's day, social response to art in the age of the New Media has shifted due to cybernetics and digital 'space'/reality.

### ***C. Digital Art within Contemporary Society***

Within the last two decades our understanding of matter, space and time has changed a great deal. As a result, the physical aspect of art must be reexamined. Huge technological advances brought innovations to artistic technique and public knowledge, which resulted in an altered perception of art. We are an 'information culture' that focuses on aspects of culture that rely on information; similar to a 'visual culture' relying on visual images (Manovich 2001, 13).

Lev Manovich uses the term New Media to mean all media that has numerical representation, modularity, automation, variability and transcoding (Manovich 2001, 20). I use the term Digital Media instead because it is no longer new. Contemporary society and digital media go hand-in-hand.

Art's ability to be copied, altered, and recopied is not a new issue. It is the grand scale in which art can be duplicated via digital reproduction that makes art critics squeamish. We cannot allow this accelerated power to make us cower and shy away from artistic innovation by dismissing digital art as unremarkable.<sup>2</sup>

The screen is one of the most common ways of experiencing digital art. This phenomenal idea is what we know as the "classical screen." Examples include monitors and televisions. It is another virtual space enclosed by a frame that resides within our

---

<sup>2</sup> Digital art is part of New Media, but New Media is not necessarily digital art.

normal space, staying independent of that regular space (Manovich 2001, 95). The age of New Media also supposes certain relationships to be clear, such as our relationship to the screen. When viewers have access to media using a screen, it is understood they should pay “attention on the representation and disregarding the physical space outside (Manovich 2001, 95).”

Digital reproduction frees the work of art from its dependence on ritual. With continued replication, the work of art develops into art premeditated for reproducibility. The digital medium allows for an object to be accessed without the change of the work as well as opens the doors for manipulation to the point of blurring distinctions between media (Paul 2003, 27).

In this thesis, I use the term ‘digital object’ to mean anything recorded by a machine in binary code and requiring a machine to render the code into human readable forms. An ‘object’ can range from text to image and from still to motion.

The nature of a digital object is made up of both the physical and the digital. The physical refers to the interface an artist uses to create an object as well as the way it is presented to the public and the transition and storage of the media. Digital refers to the series of binary signals that is the root form or true being of the digital object. Digital objects are created and stored as a form of information and can be seen as instructions for retrieval and construction of a specific work.

According to Christiane Paul interactivity, “With regard to digital art...allows different forms of navigating, assembling, or contributing to an artwork that go beyond this purely mental event (Paul 2003, 67).” This also applies to painting or sculpture.

Although my focus is in direct interaction, I occasionally create pieces that call for a more indirect relationship between the work and the public as illustrated by my interactive piece titled *Suction*. (*Suction* appears in Figure 1.on page 18.) The surprising beauty of the suction in airplane toilets inspired this piece in order to generate the same strong reactions from people that I felt.

*Suction* is also a very simple iterative game in which the player makes the point of play his own. Both *Suction* and *Gone Beyond* are single player games. For example, in *Suction*, by altering the paper so that it moves around the receptacle in a specific manner, the player leaves a mark, through the paper, that exists within the system for an unspecified amount of time.

The player is given only a few signs on how to interact with the system – a sketch of a hand with paper on the top podium and a sketch of a hand reaching for paper on the lower podium, making it a discovery game from the first moment. The game starts when the player waves his hand, with or without paper, through the opening in the podium. This action triggers a burst of suction throughout the whole piece for four seconds, and then stops. The two fans, located in the podium and the receptacle, continuously rotate throughout in order to keep the paper in the receptacle in motion and the paper at the podium to hover briefly before it is sucked into play, thus giving the system a sense of character.

*Suction's* rule set is simple. First, the player must start the system. Second, the paper must be placed in a specific part of the system; and, third, the players' mark (i.e. the paper) has a limited stay within the system.



Figure 1. *Suction*, interactive installation, 2007.

#### ***D. Mixed reality***

Paul defines mixed reality as the “merging of real and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and

interact in real time (Paul 2003, 197).” My own works were inspired by the meaning within these words as my previous piece titled *Character as Environment*.

My goal in *Character as Environment* is to create virtual worlds where the character *is* the environment. Motivation for this piece was based, once again, on the work of Zhuangzi:

Once upon a time, I, Chuang Chou, dreamt I was a butterfly, fluttering hither and thither, to all intents and purposes a butterfly. I was conscious only of my happiness as a butterfly, unaware that I was Chou. Soon I awaked, and there I was, veritably myself again. Now I do not know whether I was then a man dreaming I was a butterfly, or whether I am now a butterfly, dreaming I am a man. Between a man and a butterfly there is necessarily a distinction. The transition is called the transformation of material things (Buber, Page, Zhuangzi, and Pu 1991, 11).

From an art standpoint, inspiration for *Character as Environment* came from FLOW by Jenova Chen.<sup>3</sup> In this very simple game, the characters and the environment exist as one.

*Character as Environment* is a surreal virtual universe in which the user navigates using a keyboard. This piece is a digital toy running on a computer that presents the user with a 3D environment free from constraints where the player’s navigation is not hindered by gravity, but the objects in the virtual environment are constrained by gravity. There is also freedom to pass through walls while maintaining a dynamic tension. The player's sight is constantly stimulated by sudden dramatic changes in size, color and sound volume of neighboring objects, creating a feeling that one is lifted up, dropped, or

---

<sup>3</sup> To play this game open the below link in Internet Explorer: <http://intihuatani.usc.edu/cloud/flowing/>. See also: Jenova Chen. 2007. “Viewpoint, Flow in Games (And Everything Else).” *Communications of the ACM*, 50(4) April, 31-34.

dragged around. Some space feels loud and others quiet within the *all-encompassing rhythms that draw the user into the virtual world with intent and purpose.*

A wonderful example of a mixed reality piece is the installation by Jeffery Shaw called “The Golden Calf,” created in 1994. It is a virtual sculpture of a calf, viewed by visitors using a handheld monitor and moving around a pedestal. The piece is site specific because the surrounding environment is mapped onto the rendered golden calf’s reflected surface. Besides seeing one’s surroundings on the calf’s surface, a viewer can angle the monitor to see their own reflection on the screen and further blurring the edges between the real world and the virtual world. (Paul 2003, 95)

Shaw’s piece holds a great deal of *aura* (new media redefined). Its aura is not restrained to the physicality of the work because the actual ‘art object’ is an un-object and has no tangible qualities of its own. The tangible exists in the manner of viewing the piece through the handheld monitor. The spectator’s knowledge of the art in relation to their environment as well as themselves creates a distinctive quality, and atmosphere in which the viewer and the piece coexist. The Golden Calf resides in a reality of simulations that is the hyperreal reality within the age of new media. There is no call for an original and thus uniqueness cannot be derived from the work, but instead by the viewer (Benjamin 1985).

The World Generator/The Engine of Desire is a piece created by Bill Seaman in collaboration with Gideon May. This digital art is a full virtual environment constructed by the 3D selections of the user. The user chooses objects ranging from pictures to 3D models to sounds which are projected on a fifteen foot wide screen. I say it is a full virtual environment because the user has the ability to navigate through the space they

create and change the objects texturing. This digital artwork started in 1995 and is still being displayed. The participant built virtual space produces and ever-increasing involvedness allows for a dynamic state of meaning. This work has the user create the environment; and thus, reality. The “World Generator/The Engine of Desire” is another great example of an installation digital art piece that has aura (Paul 2003, 93).

### ***E. The Hyperreal***

Because digital art works often exist on a network, such as the World Wide Web, they are omnipresent and have the ability to display in different qualities depending on the viewer’s situation while maintaining the character of the work.

The idea of a true or false copy is nonexistent in the digital world. Contemporary society is settled into a reality comprised of simulations of reality which are no more or less true than the reality that they reproduce.

The intertwining of the digital medium and cultural understanding of reality allows society to exist in the hyperreal. The viewers’ decision about the symbolic content of an object determines the objects authenticity as understood based upon the ‘second order of interpretation’ (Baudrillard 1988). Digital objects are nonexistent or surreal, i.e. they lack physicality, because they are comprised of intangible bits, but can be accessed and made physical. As I mentioned in Chapter I, digital art exists in the fourth order of interpretation which is denoted by simulations.

The key to this new world of art (digital) is the cultural paradigm shift caused by new media. This shift created an environment where intelligent automations impact the way we go about our daily lives (think sensor stoplights and ‘smart’ coffee makers).

Through the communal weaving of cybernetics, the system moves from being an object to an allegory of the new ways we consider ourselves and our world (Nichols 1985). Nichols further states: "...art itself has not been radically transformed in form and function. A radical change in the nature of art implies that the very ways in which the world is seen has also changed (Nichols 1985, 4)."

#### **IV. Mixed Reality: My Project**

##### ***A. The Hyperreal in Games***

Three primary questions motivated me to pursue this project. How has our sense of reality changed because of new media and how has this change affected art? How does one authenticate digital art considering the lack of physicality and its infinite nature? Also, how does my work expand the hyperreal?

As Figures 2-5. illustrate, I view my installation approach as using technologies that are connected to the body through both visual presence and auditory presence. The body is connected to the technology through hardware controls and virtual navigation. I seek to create a dynamic game system, i.e. a smooth shift between the real and hyperreal.



*Figure 2. Gone Beyond, 2008, interactive virtual environment.*

Schematically I represent this as follows:

Game tuning (stages of thesis creation)

Actual space

Digital Space

Mixed reality

Adjustments (balance game play and technological)

Embed choices

Player control=reality tuning

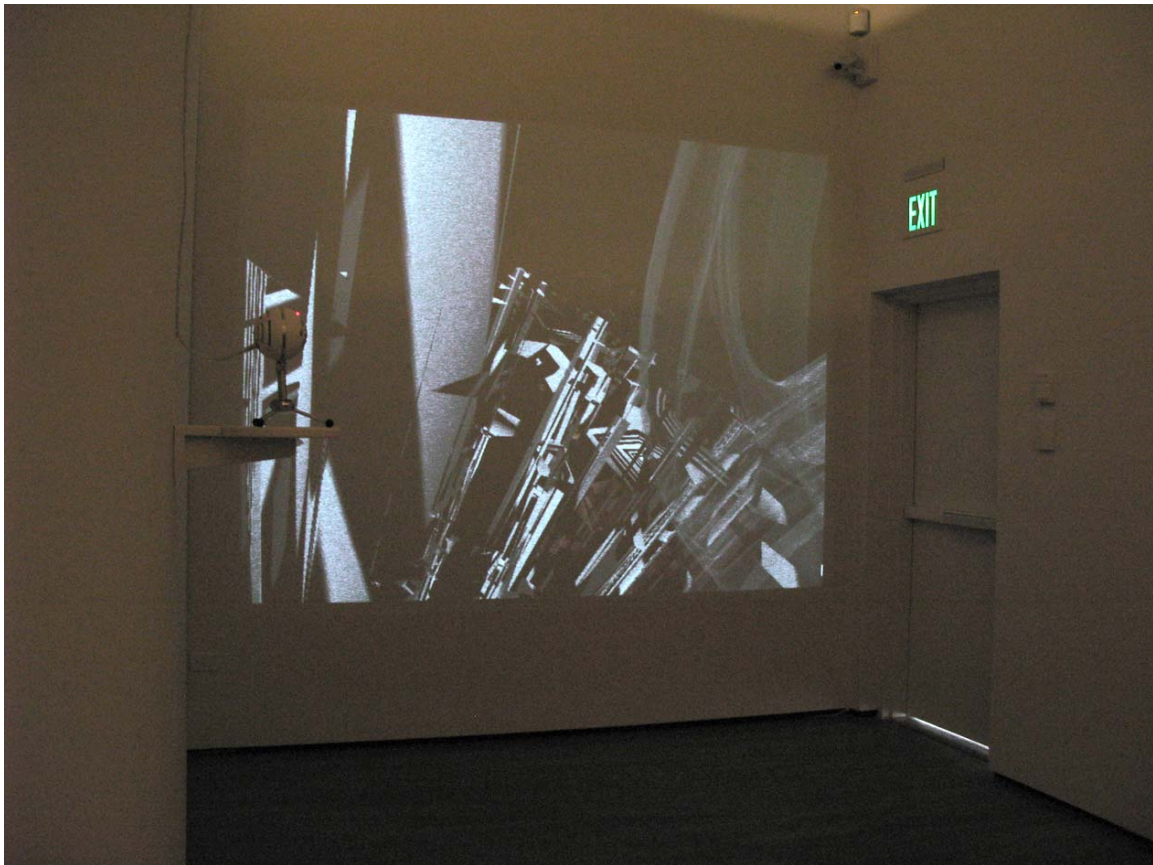
Technological solutions

Conclusion or End Result

Creating dynamic reality tuning in games.

***B. From Praxis to Game Presented as Installation***

Installation works “are concerned with possible relationships between the physical space and the virtual, and what distinguishes them are the balance between these two realms and the methods employed to translate one space into the other (Paul 2003, 71-72).” My project, *Gone Beyond*, is also concerned with this relationship which Paul describes.



*Figure 3. Gone Beyond, 2008, interactive virtual environment.*

I used a combination of software and hardware to realize this installation piece, *Gone Beyond*. Maya was used for the 3D modeling and texture mapping, Photoshop for creating the textures, and QuickTime for creating the animated textures. I also used Max/MSP Jitter to build the interactive environment.

The installation was in a 20'x10' space on with the virtual world projected on a single wall at 8'x5'.

To enhance sound effects, I added speakers and an omni-microphone.

A wireless keyboard was used for navigation. The keyboard was set on a shelf protruding from the wall and had a built-in neck strap. The strap provided the user with the freedom to move about within the installation space while navigating the virtual space.

The microphone and keyboard exist as a tie, or link, between the real and the hyperreal, i.e., a tie between realities. Keeping the computer, speakers, projector and microphone in plain sight, also serves to further reinforce the notion of a mixed reality.

Another method for reinforcing the notion of mixed reality is in the way in which I laid out the installation space. I projected against the wall next to the emergency exit and left the glowing sign and door as another real world element. This wall had a security camera facing the user that was not linked technically to my piece, yet served as another element reminding the user of the actual physical space in which he/she was maneuvering – or *playing*.

Each element in the virtual world was created individually using various software packages in an iterative (build-test-rebuild-test-etc.) process that took into account

considering its relationship to the other elements within the world. There are five different models in the world, each with a unique texture.



*Figure 4. Gone Beyond, 2008, interactive virtual environment.*

One model is of two faces pointed away from each other and connected in a bevel manner. It is shown as “a multiple” and seems to swim, like a school of fish, through the space giving the illusion of intelligence by the way in which it moves.

Another model is of a man’s head cut off at the neck, and hollow, so that the face can be seen from the outside as well as the inside. This 3D element follows an ever expanding path through the world, much like an expanding orbit in space. The heads start their orbits fairly close together and, within three hours, can only be seen as small dots in

the blackness that surrounds the rest of the models. Although they are very far away, they can be reached and explored individually provided the user wants to devote lots of time to make his/her discovery.

There is one very soft model in the world of two faces that are also pointed apart, connected to form a snakelike element. This piece is stationary and is about 400x the size of the heads with a smooth, slightly transparent off-white texture.

The two-face model is pierced by an angular model that is about one tenth the size of the two-face. It is made up of 160 planes and is organized into an abstract hallway with a moving texture that seems like “still pink” and then flashes soft white which gives the model a sense of life and adds to the overall motion of the work in an ever-so-discrete manner.



*Figure 5. Gone Beyond, 2008, interactive virtual environment.*

The final model in the virtual world feels massive in comparison to the other models, yet tiny in contrast to the black space surrounding all the elements. Twenty-five of the two-face models can easily fit into its sliced, cube form. The texture is a black-and-white striped reflective map that can be likened to a kaleidoscope.

Each element was modeled in Maya and placed in the virtual world in Jitter, then assessed. The model was then tweaked and retested. My main concern was to maintain the *feel* of the space I created, and the placement of each element was determined for the primary purpose of keeping the user in an exploratory, or discovery, mode. For example, the fish-like models move specifically in the directions they do in order to cross certain spots that can hold the user up, such as the back of the black-and-white kaleidoscope model, and direct them back to the rest of the world.

### ***C. Gone Beyond: Aspects of Hyperreality***

The virtual aspect of *Gone Beyond* is hyperreal because it is a synthesis of multiple models in a space void of atmosphere. The flying heads of men are models of a real head without an origin and have no relation to reality, which is why I maintain that *Gone Beyond* incorporates the hyperreal into its design.

Tangible elements, like the keyboard and microphone, act as both input devices and reminders of the real much like the masks in Stern's game *Waco Resurrection*. This aspect allows players to co-author their experience by their navigation of the virtual space as well as through their own voices, thereby creating a mixed-reality environment. The game takes a 4 second recording (memory/mark) of players (exhibition space) and, after

applying a very slight gauss filter, plays back the input audio along side the game audio. The ability to make a mark in the virtual world is common in games.

#### ***D. Conclusion***

Finally, my intention is to make people step back and see the reality in which we live now; and, to consider the real and the hyperreal through a mixed reality space. After all, we live in a mixed reality and are constantly overwhelmed and consumed by technology. My purpose in creating this piece is to guide people toward equilibrium by experiencing both poles – the real and hyperreal, simultaneously. As a result, the viewer will move beyond duality – and that’s what *Gone Beyond* is all about.

My future work will include combining an exploration of the notion ‘character as environment’ with the reality blending explored in *Gone Beyond*. I will do this by constructing the exhibition space as the interior of one of the virtual characters and correlating the starting position in the virtual with that of the real. Selected real world elements will be represented digitally and act as a user interface element. This introduces a relationship between realities creating an augmented reality environment, my ultimate goal. One example might be a rocking chair that acts as both an object for sitting and a tool for navigating the virtual space by rocking the chair to propel the player’s position on screen. The nature of reality in the twenty-first century is increasingly blurred between real and hyperreal, and the experiential dimensions of my art are designed to explore this phenomenon.

## References

1. Anderson, Mark. 2001. Mitchell Resnick quoted in: "Toys are Made For Tinkering." *Wired*. 9(6) June 16.  
<<http://www.wired.com/gadgets/miscellaneous/news/2001/06/44355>>.
2. Baudrillard, Jean. 1988. "Simulacra and Simulations." *Jean Baudrillard Selected Writings*. Stanford, CA: Stanford Press, 166-184.
3. Benjamin, Walter. 1985. "The Work of Art in the Age of Mechanical Reproduction." In: Benjamin, Walter, Hannah Arendt, and Walter Benjamin *Illuminations*. New York: Schocken Books.
4. Buber, Martin, Alex Page, Zhuangzi, and Songling Pu. 1991. *Chinese Tales: Zhuangzi, sayings and parables and Chinese ghost and love stories*. Amherst, N.Y.: Humanity Books.
5. Chen, Jenova. 2007. "Viewpoint, Flow in Games (And Everything Else)." *Communications of the ACM*, 50(4) April, 31-34.
6. Levin, Golin and Lieberman, Zachary. 2004. Hand-Forms in Hybrid Light.  
<<http://www.tmema.org/mis/>>
7. Manovich, Lev. 2001. *The Language of New Media*. Cambridge, MA: MIT Press.
8. Nichols, William J. 1985 "The Work of Culture in the Age of Cybernetic Systems." *Studies in Communication and Information Technology*. Queen's University; published as Nichols, William J. 1988. "The Work of Culture in the Age of Cybernetic Systems." *Screen*, 29(2) Winter, 22-45.
9. Paul, Christiane. 2003. *Digital Art*. London: Thames & Hudson Ltd.
10. Rouse, Richard. 2005. *Game Design Theory & Practice*. Plano, TX: Wordware Publishers.
11. Rutkoff, Aaron. 2006. "Game Theory: How a grad-School Thesis Theory Evolved into a PlayStation 3 Game," *Wall Street Journal*, November 28.  
<[http://online.wsj.com/public/article/SB116460570723333343-\\_wOSu3g2II5Vtw\\_TIMRN2noG0TQ\\_20061227.html?mod=tff\\_main\\_tff\\_top](http://online.wsj.com/public/article/SB116460570723333343-_wOSu3g2II5Vtw_TIMRN2noG0TQ_20061227.html?mod=tff_main_tff_top)>.
12. Seabrook, John. 2006. Will Wright quoted in: "Game Master - A video-game visionary takes a new turn." *The New Yorker*, 82(36) November 6, 89-99.
13. Snibbe, Scott. 2008. "Interactive Works" at <<http://snibbe.com>>.
14. Stern Eddo. 2008. "Select Works" at <<http://www.eddostern.com>>.

15. TED Talks. 2007. Video “Will Wright: Toys that make worlds.”  
<<http://www.ted.com/index.php/talks/view/id/146>>.
16. Wright, Will. 2006. “Dream Machines.” *Wired*. 14(4) April, 110-12.