Becoming Dragon:
a mixed reality, durational performance in second life

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“Breakfast ended
and everything began
with 1mg of estradiol.”
Excerpt from “Homage to Orlan, biochemical poetry, a beginning” by Micha Cárdenas

“Much like the paradigms installed by the discovery of endorphins, Being-on-drugs indicates that a structure is already in place, prior to the production of that materiality we call drugs, including virtual reality or cyberprojections.”
- Avital Ronell, Crack Wars

"The becoming-woman serves as a point of reference, and eventually as a screen for other types of becoming (example: becoming-child as in Schumann, becoming-animal as in Kafka, becoming-vegetable as in Novalis, becoming-mineral as in Beckett)... There is no such thing as woman per se! No maternal pole, no eternal feminine... The man/woman opposition serves to establish the social order before class and caste conflicts. Inversely, whatever shatters norms, whatever breaks from the established order, is related to homosexuality or a becoming-animal or a becoming-woman."
- Felix Guattari, Becoming Woman

At the time of this writing, today is day 13 of Israel's current assault on Palestine, a tragedy involving the deaths of over 700 people[1] with the “U.S. Senate [voicing] strong support”.[2] I think of the duration of my performance, which seems easy when compared to the feeling and sounds of bombs and missiles dropping all around me, on my friends and family. We cannot have a discussion of the possibility of new life and new ways of being without remembering the difficulty many people endure to simply survive, and our own complicity in that violence.

ABSTRACT

The goal for Becoming Dragon was to develop a working, immersive Mixed Reality system by using a motion capture system and head mounted display to control a character in Second Life - a Massively Multiplayer Online 3D environment - in order to examine a number of questions regarding identity, gender and the transformative potential of technology. This performance was accomplished through a collaboration between Micha Cárdenas, the performer and technical director, Christopher Head, Kael Greco, Benjamin Lotan, Anna Storelli and Elle Mehrmand.

The plan for this project was to model the performer's physical environment to enable them to live in the virtual environment for extended amounts of time, using an approach of Mixed Reality, where the physical world is mapped into the virtual. I remain critical of the concept of Mixed Reality, as it presents an idea of realities as totalities and as objective essences independent of interpretation through the symbolic order. Part of my goal with this project is to explore identity as a process of social feedback, in the sense that Donna Haraway describes “*becoming with*”[3], as well as to explore the concept of Reality Spectrum that Augmentology.com discusses, thinking about states such as AFK (Away From Keyboard) that are in-between virtual and corporeal presence.[4] Both of these ideas are ways of overcoming the dualisms of mind/body, real/virtual and self/other that have been a problematic part of thinking about technology for so long. Towards thinking beyond these binaries, Anna Munster offers a concept of enfolding the body and technology[5], building on Gilles Deleuze’s notion of the baroque fold. She says “the superfold... opens up for us a twisted topology of code folding back upon itself without determinate start or end points: we now live in a time and space in which body and information are thoroughly imbricated.”[6] She elaborates on this notion of body and code as *becoming with* each other saying “the incorporeal vectors of digital information draw out the capacities of our bodies to become other than matter conceived as a mere vessel for consciousness or a substrate for signal... we may also conceive of these experiences as a

new territory made possible by the fact that our bodies are immanently open to these kinds of technically symbiotic transformations"[7]. A number of the technologies used in this performance were used in an attempt to blur the line between the actual and the digital, such as motion capture, live video streaming into Second Life and 3D fabrication of physical copies of Second Life avatars.

The performance was developed using the following components:

- An Emagin Z800 immersive head mounted display (HMD) allowed the performer to move around in the physical environment within Calit2 and still remain "in game". Head tracking and stereoscopic imagery help to provide a realistic feeling of immersion. We built on the University of Michigan 3D (UM3D) lab's stereoscopic patch for the Second Life client, updating it to work with the latest version of Second Life.

- A motion tracking system. A Vicon MX40+ motion capture system was installed into the Visiting Artist Lab at CRCA, which served as the physical performance space, to allow real-time motion tracking data to be sent to a PC running Windows. Using this data, the plan was to map the physical motion in the real world back into game space, so that, for example, the performer could easily get to their food source or to the restroom. We developed a C++ bridge that includes a parser for the Vicon real time data stream in order to communicate this to the Second Life server to produce changes in avatar and object positions based on real physical movement. The goal was to get complete body gestures into Second Life in near real time.

- A Puredata patch called Lila, developed by Shahrokh Yadegadi of UCSD, which was used to modulate the performer's voice, to provide a voice system that allowed chat ability in Second Life, which was less gendered and less human.

INSPIRATIONS AND BEGINNINGS

Becoming Dragon was initially inspired, in part, by Celia Pearce and Artemesia's essay "Communities of Play: The Social Construction of Identity in Persistent Online Game Worlds"[8] in which they say "many members of The Gathering of Uru say that in some ways they feel 'more themselves' in the avatar persona than they do in real life. " This struck me as similar to the feeling expressed by many transgender and transsexual people that they are in the "wrong bodies" or that their gender they were assigned at birth does not reflect their "true self". Yet the essay complicates the question of the "true self" more by introducing the notion that "most players concurred that being an avatar changed them."[9] Recent studies by the Virtual Human Interaction Lab at Stanford have shown that "even 90 seconds spent chatting it up with avatars is enough to elicit behavioral changes offline."[10] In this way, we can think of virtual worlds as a way of not just finding one's "true self", but engaging in an act of construction of a self, of training, of becoming. Celia Pearce's essay discusses identity as a social process, which has more recently been expanded in the writing of Donna Haraway, in When Species Meet, who says, ""The partners do not precede their relating: all that is, is the fruit of becoming with: those are the mantras of companion species." [11] Haraway here describes the way that relationships and social interactions are constitutive parts of identities, that identities are produced in interactions with others. As a tansgender person myself who is undergoing hormone replacement therapy, I seek to explore the transformative potential of virtual worlds and the implications of the possibilities of transformation provided by contemporary technology.

Becoming Dragon began with this question: given that transgender people have to fulfill one year of Real Life Experience as their chosen gender before getting Gender Confirmation Surgery (aka Sex Reassignment Surgery), could this be replaced by one year of Second Life Experience to lead to Species Reassignment Surgery. This paper will expand on my findings with regards to this question.

In order to examine this question, I lived within Second Life using immersive technology for 365 hours, approximately 15.2 days, from December 1-17th of 2008, remaining within the Visiting Artist Lab at the Center for Research in Computing and the Arts (CRCA) in Atkinson Hall at UCSD for the entire duration of the performance. I only left the room and removed the HMD for bathroom breaks and sleeping. In addition, throughout the performance, I performed my poetry about transition twice and engaged in 3 public talks: "Gender and Desire in Virtual Worlds" with Sandy Stone, "The Body in Transmission/Transition: Learning to Live in Mixed Realities" with Stelarc and "Biopoltics and Self-Governance in Second Life" with Brian Holmes and James Morgan, aka Rubaiyat Shatner.

TECHNICAL OVERVIEW

To facilitate this performance, living in a mixed reality environment for an extended period of time, the goal of using Second Life as a mixed reality platform involved a number of additions and modifications to the Second Life viewer, in addition to a number of helper scripts and applications, which will be described in this paper.

Vicon Motion Capture System

The 8 camera Vicon MX40+ system was used to track the performer's location within the room. Motion capture was thought to be useful in exploring the embodied aspect of performing an identity, such as proprioception and muscle memory of the way that one walks.

Fig. 1: Installation Layout Overhead View

The technical requirement for using the Vicon motion capture system as a means of spatial navigation within Second Life was to provide the ability to access live data from the local Vicon system located in the lab at CRCA from within Second Life. The primary Vicon desktop application used for recording motion data, "ViconIQ", also provides the facility to transmit positional information in real-time. Unfortunately this function of ViconIQ is closed in the sense that it is poorly documented. It would have been possible to glean information about the transmission format by watching the live network stream, but we didn't have nearly enough time to re-implement the entire protocol from scratch.

Initially Vicon provided a C++ example, but it was not nearly complete enough in scope to be usable for our needs. A short time later they provided a Windows-only static library with built-in functionality for creating a network connection to the ViconIQ software, enumerating data frames, and reading the coordinates of the motion-capture markers in the physical space. We built a small application around the static library provided by Vicon to create a small server that would respond to network requests with an XML listing of all the markers present in the physical space and their locations relative to the center point of the room.

Because communication from within Second Life to outside data-sources is web and XML based, a PHP script was written that created a socket connection to the server (using the standard PHP socket library), requested information about the current location state of the active motion capture markers, and disconnected from the server. This allowed a script to be created within Second Life (using the built-in LSL scripting language), that would continually poll the PHP script for updates. The response was used by the script to move the primary avatar within the Second Life space in proportion to the physical space in Calit2.

The performance of the Vicon was disappointing, which is perhaps related to some of our choices made throughout the performance. The cameras were arranged around a 16'x20' area of the room, at various heights, with 6 cameras mounted

on the walls, one on a tripod and one mounted to the platform the projector was hung from. We needed to calibrate the system daily to get any acceptable level of tracking from the system. In addition, the capture area with 8 cameras was only a roughly 6'x6' area in the center of the room. In addition, the Vicon IQ software would crash after running for a few hours, and need to be recalibrated, which required me to leave the HMD, which I was reluctant to do repeatedly.

Perhaps one of our problems was with our rigid body definitions. The markers were placed on the front of the HMD, as well as on the sides and on the strap across the top of my head. We redefined the rigid body daily, sometimes more than daily, but still, the system often failed to find enough markers to identify the rigid body. Perhaps, in retrospect, this was related to our placement of the marker on the head strap, which could move, as I had to constantly adjust the HMD to alleviate the physical discomfort. Perhaps we could have mounted a rigid piece of plastic across the top of my head on which to place the markers, without adding too much weight, such as a helmet, which would cause additional neck discomfort with prolonged use. It was also unclear why at times the live data stream would only send data about markers that were part of defined objects, but at times would send data about any markers seen. With the crashes and the disappointing capture area, I limited my usage of the motion capture system. I felt that living in a 6'x6' area was beyond what I had set out to do.

In order to use the motion capture data in Second Life, we wrote a script using the Linden Scripting Language that would read the coordinate data for the markers in XML over HTTP. The bulk of this script reads the XML data over HTTP using the llHTTPRequest function and parses the data into a local vector data structure. The main function of the script is to take the marker coordinates and set them to offsets appropriate to the location of the center of our room in Second Life, relative to the origin of the parcel, and to move an object in Second Life to those coordinates using the llMoveToTarget function. Then, any avatar can simply attach this object to themselves and activate the script, which will then begin moving the object and forcing the avatar to move as well to the location of the object, allowing the avatar position in the room in Second Life to match the location of the markers in the actual room. In Second Life our 3-D modeler Anna Storelli constructed a scale model of the actual room, so that the motion capture mapping would require no translation and could be used to navigate the actual room.

This approach had a number of limitations and much more lag than was desired, but because the Second Life client's camera view relied on the head tracking, which was much faster, it was acceptable, and because of time limitations it was necessary. One major factor introducing lag was using HTTP to send the XML data. A much faster approach would have been to patch the client to include the Vicon live data parsing code, and then send that data over a chat channel. We attempted that approach, but due to the difficult byzantine build procedures of Second Life in Visual Studio and its library dependencies, we were unable to implement that approach in time for the performance. Another major limitation is that in Linden Scripting Language, HTTP requests are limited to once per second, so the updating of the avatar's position in the room was jerky at best, with over one second in between updates. Another aspect of the position updating is the physics interpolation of the position of objects in Second Life. LlMoveToTarget includes a Tau parameter for the time with which to move to the position, which cannot be zero or no movement is achieved. So, there was an additional .1 second delay introduced in the call to llMoveToTarget, yet the function creates the illusion of movement from one spot to another, not just a jerky disappearance, but a transition, which was useful in creating the appearance of motion throughout the room. The script used to read the motion capture data and move the object in Second Life can be found on the project blog, http://secondloop.wordpress.com.[12]

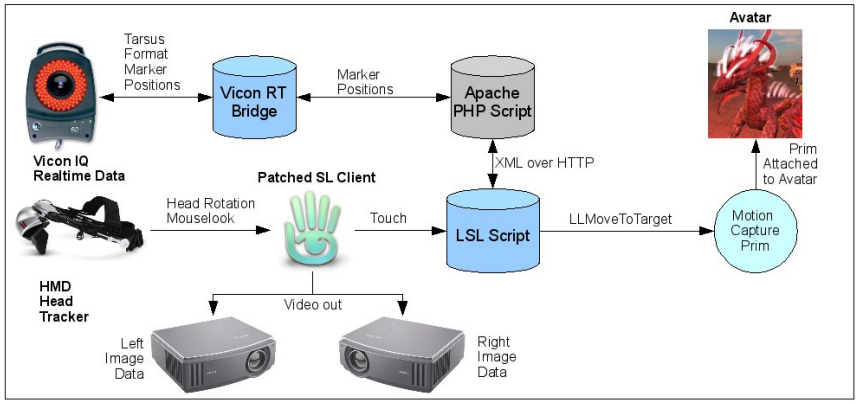
While we did not achieve full body motion capture in Second Life and were only able to achieve position tracking, the scripts we used can be expanded to do so without much modification. Using llMessageLinked , the object containing the main script can send a link message to any child objects which are linked to it. With this call, child objects could be sent their coordinates relative to the root, allowing, say, leg objects to move with and relative to a spine object. While we developed the code to handle the link message, we did not have time to parse and send the rotation vectors for objects, which prohibited us from having more full body motion capture.

Stereoscopic Patch to Second Life

The Second Life client is GPL licensed, allowing artists and scientists to change the working of the application to suit their particular needs. For this performance, our goal was to be able to use the Z800 HMD as a stereoscopic display, as well as having a stereoscopic projection for the audience to view. We were successful only at the projection, but not with

the HMD. The University of Michican 3D Lab wrote a patch to Second Life[13] to provide stereoscopic display, both anaglyph and time-sequential, but their patch only worked with version 1.18.2.0 of Second Life. At the time of the performance, Second Life was up to version 1.21.6 and the server software had been changed so the time-sequential patch no longer worked. As such, we had to update the patch. After discussions with the Second Life developer's list, we were advised to use the maint-render-8 branch as our development platform, which we did. We followed the structure of the University of Michigan 3D Lab's code and modified it for the current iteration of the viewer. The routine basically sets up two cameras corresponding to the left and right eye, and renders the scene twice for each frame for each eye. For our implementation, we activated Stereo on the switch to fullscreen, and hard-coded the viewing parameters (eye-seperation and focal distance).

Fig. 2: Data Flow System Overview



We spent a considerable amount of time testing various Nvidia display drivers and after much debugging, we were able to see a stereoscopic display of Second Life in the Z800 HMD the night before the performance. We used Nvidia's current stereoscopic display driver and created an application-specific configuration for Second Life which forced Stereo shuttering. The day of the opening, we were also able to run Second Life on a dual projection system using the same code and libraries, which was used for the audience's stereoscopic projection using a polarization preserving screen and glasses.
Yet in trying the same custom compiled version of Second Life on a second machine, we were unable to see a correct stereoscopic display in the HMD. For some reason we still do not understand, the display of the right eye was doubled with a bright duplicate of the image which was incorrectly scaled, making stereoscopic display unusable in the HMD. After numerous debugging attempts, in week 2 of the performance, this problem also began to occur in the stereoscopic projection, after which we stopped using the projection.

The largest problem with the stereoscopic display was our use of Microsoft Windows and the Nvidia drivers. Due to our limited budget, we purchased an Emagin Z800 HMD and focused our developments on Windows XP. While the Nvidia 7900 cards were able to run in stereoscopic mode with DirectX applications such as Half Life 2, they were totally unable to run Open GL applications including Quake 2 and Second Life. After trying a myriad of driver versions and even trying Riva Tuner to activate extra features of the card, we were unable to ever get Open GL applications to work with our video card. After upgrading to Nvidia Quadro 4500 cards generously provided by the Immersive Visualization Laboratory at Calit2, we were still unable to get Second Life to enter stereoscopic mode. While Quake 2 could run with these cards under Open GL, Second Life would fail to get a pixel format descriptor from windows with PFD_STEREO enabled. After countless debugging attempts at the previous University of Michigan code, we were still unable to get it to work and instead changed the window creation code to directly call a proprietary Nvidia library, which ultimately failed as well. We finally found success with a specific configuration of settings on the current Nvidia driver and our adapted UM3D patch. We used the Quadro 4500 cards with the 178.46 Quadro Windows XP drivers, after trying many, many alternative combinations of hardware and software.. For the projection, we used the driver in Nvidia Clone mode with two HD projectors and circular polarizing filters to achieve passive stereoscopic 3D. During the performance, we posted a patch to the Second Life JIRA bug database containing the code we used.[14]

Head Tracking

The Emagin Z800 contains micro-electro-mechanical system (MEMS) accelerometers and 3 gyroscopes that provide 3-dimensional head tracking with very low latency. Using the Emagin windows drivers, this can be mapped to mouse movement, and using Second Life in mouselook mode, one can emulate head tracking within Second Life. While this took the least of our development time, it turned out to be the most reliable component, and the most useful. It was the most useful because it did not rely on coordinates relative to the actual room, so I was able to use it anywhere in Second Life. I did not restrict my time in Second Life to the replication of the actual lab, at the advice of Tom Defanti (co-inventor of the CAVE™ Virtual Reality system), who told me that I needed a sufficient amount of mental stimulation to be able to exist for such a long duration in Second Life. Also, my contract with myself was simply to be in Second Life for the duration of the performance, which allowed me to explore the vast and multiple spaces there. An additional benefit of using mouselook for the head tracking is that the Second Life client updates the avatar's head and body orientation to follow the focus of the gaze (i.e. mouse position), so by using mouselook my dragon avatar's head and body would orient itself correctly towards whatever direction I was looking in the actual world.

Still, the head tracking was also one of the main limitations. Mouselook mode is very imprecise, and did not create the necessary precision to navigate the actual room in an augmented reality mode. After changing the X and Y resolutions of the head tracking in the 3D launcher program provided by Emagin, the head tracking was more precise, but it still was constantly running up against the edges incorrectly and getting off center. As such, I had to reorient by leaning my head as far back as possible and recentering, which became a very dizzying move as the days continued and I was forced to use the mouse to recenter more on later days. In addition, the head tracking would often cause the machine to force reboot. I was unable to deduce why, my best guess is that it was a USB problem, possibly with the length of USB extender I was using, but the sudden hard reboots only happened when using the head tracking for the HMD. As such, I had to disable the head tracking at times, at least once a day, and for major events such as the poetry reading at opening night and on December 5th, I had to disable the head tracker so as to prevent the long delay of a hard reboot with the audience present.

PHYSICAL EXPERIENCE, DIFFICULTIES

Training

In order to be able to use the HMD for extended periods of time, I trained myself to do so, at the suggestion of my academic advisor Ricardo Dominguez. In the months from May to November of 2008, I used the visor for longer and longer periods of time. My first time using it, I experienced adverse effects after an hour of use, including dizziness and nausea from the stereoscopic display. Over the next few months, I periodically used the HMD again, for longer periods of time. My longest time using the stereoscopic display was 6 hours. During this training time, I used Half Life 2 as a training platform, because it had a functioning stereoscopic display with the Z800 in Windows XP. On November 20th, 2008, I did my first day long trial run, using the parts of the performance environment which were working at the time, which did not include stereoscopic display.

The Emagin Z800 HMD uses an 800x600 resolution at 60 Hz. It has a 40 degree diagonal field of view. I learned after a few days of the performance about an option in Second Life which allows you to set the field of view to improve the experience of using an HMD. The Control-8 keyboard shortcut makes the field of view smaller, while Control-0 makes it larger. Using this option was very useful in getting more accurate head tracking and a more realistic feeling of immersion.

On November 11th, I used the HMD for 10 ½ hours, remaining in the lab at CRCA and in Second Life for the entire duration, as a test, which Larry Smarr, Director of Calit2, adamantly suggested that I do. I experienced a headache and minor vision impairment at the end of the test. The most noticeable effect seemed to be that my eye muscles became accustomed to looking directly at the HMD in a stationary position. After I removed the HMD, when I turned my head, my eyes did not move correctly to track what I was focusing on. This effect wore off in a few hours. During the performance I remained in the HMD longer, most of my days were 15 to 16 hours in the HMD.

Findings

A significant finding, I feel, is that yes, extended living inside of a mixed reality environment is possible. My performance was 365 hours, 15.2 days, yet I feel that I could've stayed longer. In my research for this project, many people told me it was impossible. An expert in the field of HMD usage for augmented reality at the University of Toronto said in an email to me: “Using an HMD for more than a couple of hours will have severe negative effects. Longer usage can result in brain damage (i.e. development of predictive activity) and 'flashbacks' later on.” Still, I continued my research and I could not find a study of HMD usage longer than a few hours. Sandy Stone, who I attended class with at the European Graduate School (EGS) in Saas-Fee, Switzerland, told me in an email that the concerns about brain damage are just rumors, unsubstantiated by any real evidence. So, I proceeded. Medical doctors who advise Calit2 also warned me of the danger of Intensive Care Unit (ICU) Psychosis, which is a temporary sense of total disorientation that patients in ICUs suffer as a result of being in unfamiliar, stressful circumstances for extended periods. I consulted with Counseling and Psychological Services at UCSD and was advised by a psychologist on staff. She said that while she thought I would probably be safe in my performance, due to the unprecedented nature of it we prepared an emergency plan for my supporting collaborators, including phone numbers of medical and psychological services to call.

The support system for the performance was critical to its success. My collaborators came to the performance space 3 times a day to help calibrate the motion capture system, bring me food and check on my status. One of the main suggestions from the psychologist was that I should have one main support person who would check in with me daily to make sure that I knew facts about the world outside of Second Life, such as what city we were in and who the current president is. Elle Mehrmand fulfilled this role, as she was in the space multiple times a day to help provide photographic documentation of the performance and has experience doing long durational performances herself. If I was having severe difficulty with these facts, or was in extreme physical distress, she had the authority to end the performance. Fortunately, neither of those possibilities occurred.

What did I experience, physically? As Anna Munster writes[15], users of virtual reality environments report a sense of time loss, which I consistently experienced. The experience was much like being constantly distracted, being in one or more conversations at once, constantly interrupted by technical failures, juggling multiple systems periodically failing and trying to get them back up. Another significant physical experience was that of not being hungry. While some attributed this to a feeling of disembodiment, I reject the binary of embodiment / disembodiment, for a number of reasons including the feeling of reembodiment that makes identification with a virtual avatar possible. I attribute my ongoing lack of hunger more to a particular physical state, that of being continually distracted and stimulated and of my body being in a state of emergency. With a constant 60 hz flashing before my eyes, pain in my nose or head and visual disturbance when removing the HMD, I would describe my body as being in a kind of state of alert, possibly having a raised level of adrenaline or dopamine, contributing to my never feeling hungry. My lack of hunger is actually one of my most significant personal observations supporting the idea that through durational performance art, the performance artist can enter into a liminal state, outside of everyday experience and awareness, sharing similarities to shamanic trances and rituals. As one visitor told me, who is writing her thesis on shamanic practices and transitional living spaces, the essence of shamanic practice is being in between two worlds, in liminal space, and she felt that was exactly what I was doing with my performance. [16]

On the night of day 5, though, my lack of hunger caught up with me. I forgot to eat or drink for 6 hours, as my collaborators providing support were busy with a performance art seminar at UCSD all day. That night was the worst adverse symptoms, including disorientation, confusion, nausea and dizzyness. After day 5, I began to feel better, to adjust to virtual living. I realized that I could adjust the head strap on the HMD so as to shift the weight from my nose to the back of my head. The simple addition of a small piece of fabric across the bridge of my nose was essential, though, as the Emagin Z800 has hard plastic edges where it rests on your nose, a simple design change that can improve long term usage drastically. Still, my long distance vision continued to worsen as the performance progressed. After the first few days, when I would walk down the hallway at CRCA to go to the bathroom, the end of the hallway was blurry and looking far away made me feel dizzy and nauseous.

Another ongoing difficulty was my cognitive impairment. I am not sure if it was the result of EMF output from the device, lack of exercise and sunlight or removal from my everyday surroundings, but as the performance proceeded, I felt slower, it became harder to concentrate and harder to remember facts from real life, such as the names of artists. I realized especially when I was on the Second Life game show 2nd Question that I was especially slow cognitively, but I still managed to win a few points.

My physical recovery was quick. Only 2 days after the performance I visited Student Health Services on campus and had my vision tested, and it had returned to 20/20 already. They also tested my blood pressure and found it to be slightly high, and slightly higher than before the performance. My lack of appetite surprisingly continued for a few days. During the performance I persistently felt sick instead of hungry, and this feeling of sickness when I was hungry persisted for about 4 days. In addition, as long as 5 days after the performance I had small moments when turning my head where my eyes did not move properly with my head movement, giving me a brief sensation of slight dizziness and disorientation. After 6 days, I still felt that I had some trouble remembering occasional real world facts, but it is hard to quantify these instances and separate them from regular forgetfulness. After a week I felt that all symptoms from the performance had subsided.

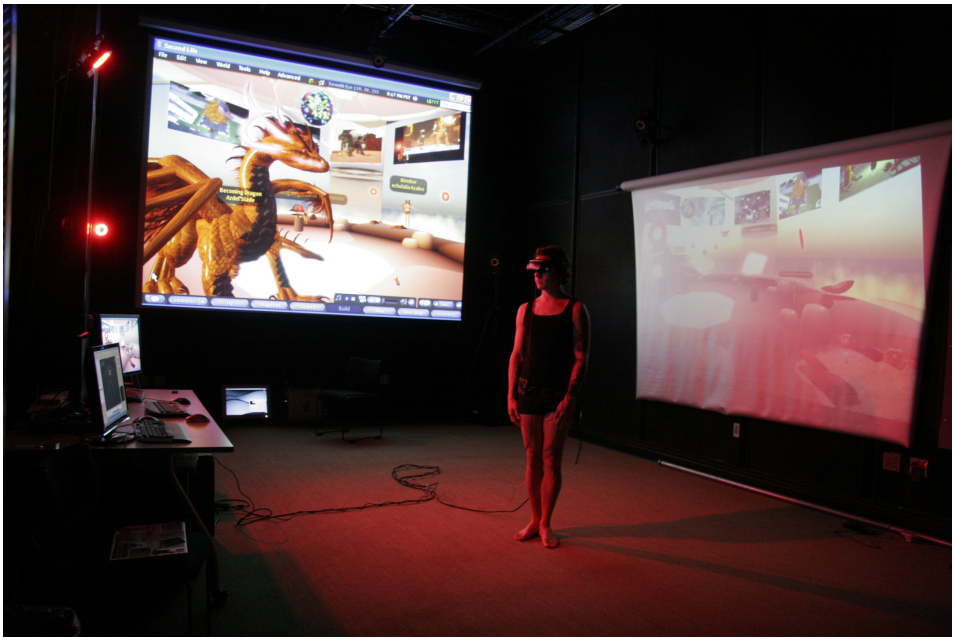


Fig. 3: Full Installation View, Photo by Elle Mehrmand

FEELINGS OF IMMERSION

In a paper in the January 2009 issue of Science magazine, a recent study shows that "immersion in a digital environment can enhance education in at least three ways: by enabling multiple perspectives, situated learning and transfer,"[17] and that "*Immersion may enhance transfer through simulation of the real world...* Transfer is defined as the application of knowledge learned in one situation to another situation."[18] (emphasis in original) During my performance I used the first person perspective for the majority of the duration, but also switched to third person perspective often. Immersion is defined in the Science article as "the subjective impression that one is participating in a comprehensive, realistic experience"[19] Degrees of immersion are discussed in reference to handheld GPS enabled augmented reality applications.

While the lack of stereoscopic vision diminished the feeling of immersion I experienced, the duration of the performance added to it. After a few days of the performance, I found myself standing in the performance space, looking in the direction of an avatar in Second Life and having a long conversation with them, orienting myself towards them as if they were in the actual lab, looking them up and down. On numerous occasions, people I was speaking with in the actual space were very confused by my usage of the word "here" to refer to Second Life. I myself was surprised that on numerous occasions, at the end of a 15 or 16 hour day in the HMD, I was reluctant to go to sleep, to sign off, to end the conversations. I found myself extremely excited when friends would visit me in Second Life, saying things like "you're here!", even when those same friends were in the actual room at the time. Using the HMD in the room where my point of view was projected also added to the immersion when participants in the actual room would refer to objects and people in the Second Life room.

In addition, the installation provided some degree of immersion for audience members as well. Emagin says that the Z800 provides the experience of viewing a 105" display at a distance of 12 feet, and visitors to the performance space watched the performer's point of view on a 12'x9' display at a distance of roughly 18 feet, in a darkened room so that their focus was on the projection. A few visitors reported feelings of disorientation and nausea themselves from watching the head tracked movements of another, which is similar to the feeling of being in a StarCAVE[20] with a viewer centered perspective being controlled by another person.

In addition, I discovered, to my pleasant surprise, that many spaces in Second Life are incredibly rich and detailed and are wonderful spaces to inhabit in an immersive manner. I spent many long hours watching the moonlight reflecting off of the ocean, listening to the waves at the Nameless Isle, a perfect location for my performance focusing on being in permanent transition, outside of and in between easily nameable identities. Similarly, the Chakryn Forest was another location I spent many hours in, attempting to relax, watching the sun rays pouring through the canopy. On my last day I was extremely happy to find the steampunk creation Bogon Flux, a building made out of a set of curved tubes and rooms which disassembles itself periodically and randomly reassembles itself before the viewer's eyes, another excellent location for a meditation on transition.

TELEPRESENCE AND INTIMATE TECHNOLOGIES

An unexpected finding was the intensity of the telepresence in particular situations. The installation included a large projection for the audience, 9'x12', of my point of view in the HMD, cloned in the driver settings. In addition, the replication of the room in Second Life had a large screen in the place of this actual screen where a live video feed from the lab was projected, creating a mixed reality window between the actual room and the digital room. Any time someone entered either room, everyone in both rooms knew it. Throughout the performance my attention was split between people trying to talk to me in the actual room and people messaging me or talking to me with voice chat in Second Life. While this is a common experience, splitting attention between one's cell phone or instant message conversation and an actual conversation, it was amplified here, as I was communicating using voice chat in Second Life and using voice in the actual room. Most Second Life users, though, don't use voice chat, perhaps because it breaks the illusion of the avatar, and towards the end of the performance I relied on typing more often.

Yet the most unexpected moments of the strength of telepresence came from my own intimate relationships. During the time of the performance, I was in a non-monogamous relationship of two years, and had just begun seeing a new lover who I had intense feelings for. This new relationship and the amount of time I was putting into it was causing a great deal of tension in my previous relationship. I thought that my two lovers would have a difficult time organizing their time when they wanted to see me in the actual room, but I did not expect the complexities of telepresence. We shared many moments where one of my lovers would be visiting me in the actual lab, only to have another lover walk into the room in Second Life, and these were intense and difficult moments. Further adding to the complication were the avatars themselves, as I had been discussing reproductive options with my original lover, and in her excitement she chose an avatar with a pregnant appearance. The notification windows in the bottom right corner "X is online" and the pregnant avatar walking into the room in Second Life, and their resulting emotional effects for my lovers, and myself, were complex.

Still another unexpected event was the constant interaction. While I should have understood that many people use Second Life in order to find social interaction, I did not realize that during my performance I would be in constant conversation for 15 days. On day 5 I added a greeter to the space in Second Life that would keep statistics, and there were 108 unique visitors from that day until the end of the performance, between 15-32 visitors each day, including a class from San Jose State University and Cal State San Marcos. I don't have statistics for the physical space, but I did have a number of visitors every day of the performance. I would estimate 5-30 visitors each day, including people bringing their classes and events. In addition, as I explained my project to people, and my experience as a transgender person, my ideas about gender and my hormone replacement therapy, they proceeded to tell me their intimate feelings and thoughts on the subject, without the usual social restrictions that might prevent such immediate intimacy. I feel that it is similar to the masking of my face in the actual lab by the HMD, which also allowed audience members to be at ease and to engage in deep, personal conversations with me for hours. One Second Life escort told me that she could have sex in real life ten times a day and still want more. One transgender person visited my in Second Life and told me that she

lives in Mississippi and that she doesn't know any other transgender people in her real life, only in Second Life. The fox that introduced me to the notion of Otherkin told me that since she was 7 years old she has known that she was trapped in the wrong body, that she was really a fox, not a human, and that that she feels her phantom tail on a daily basis.

CONCLUSIONS

A number of factors motivated this project. One is my strong identification with the notion of Genderqueer, of a million genders for a million people, [21] or "to each its own sexes", as Deleuze and Guattari wrote in Anti-Oedipus[22]. I see my own gender as outside of male and female, and I see the notions of male and female as flawed, essentialist constructs that do not match the rich multiplicity of the material world. Sandy Stone writes, "In the transsexual as text we may find the potential to map the refigured body onto conventional gender discourse and thereby disrupt it, to take advantage of the dissonances created by such a juxtaposition to fragment and reconstitute the elements of gender in new and unexpected geometries."[23] I would propose that the Dragon, a mythical shapeshifting creature of magic, is one such unexpected geometry, akin to the Coyote spirit of transformation that Donna Haraway writes about[24]. Another factor is that I am currently undergoing hormone replacement therapy, which I began during the research for this project. As I have been writing about the effects of estrogen on my body and my psychology, the notion that I am transforming complicates the notion of an author or a subject at all, and introduces instead the subject in transition, in constant transformation, in between simple labels like male or female. It was my goal to look more closely at how technology can facilitate transformation and to what extent and to understand more how we can theorize such states of being inbetween worlds and identities.

What I want to say about Becoming Dragon is that I began the project by thinking of gender as an expressive texture, a way of naming forms of bodily expression, and in trying to imagine genders outside of male and female, many people identify their genders as other species or other than human, bunnies, monsters, cyborgs. These are some genders that friends of mine identify with. Given this, I wanted to ask if one could really become one's avatar. What I discovered is that people's identifications with their avatars in Second Life went beyond playtime fantasies. Many people deeply feel that they can only be their "true selves" in Second Life. Some of these people call themselves Otherkin, and feel deeply, truly, painfully that they were born as the wrong species, that they are foxes, dragons and horses. I would refer to them as transspecies.

This discovery led me to a new level of thinking about the meaning of transgender, transhuman, or trans, and I think is closely related to other kinds of trans such as transabled people. What lies before us is a field of open possibility, as the recent Human 2.0 conference explored, where the human body is used as a platform for augmentation through prostheses. More than ever we can become something else. Yes, there are people who have an intense attachment to their identities in virtual worlds, to the extent that one person told me she would sign up for species reassignment surgery in a second. A foundation exists which calls itself the Equine Dream Foundation for "morphological freedom"[25], dedicated to investigating the possibilities of species transformation. While many of their approaches seem misguided to me, it is clear that there are many people who take this very seriously. If we additionally consider that transabled people are willing to travel to foreign countries to have their limbs removed, and current prosthetics allow for physical abilities beyond the bodies we are given, the future possibility of large scale body transformation seems not only possible, but likely, and virtual worlds are currently facilitating the creation and development of these identities. As motion capture interfaces for virtual worlds improve, they only become better platforms for transformation, for *becoming something else*.

Yet the initial question of this project deals with the psychiatric and medical requirements that present legal obstacles to people's desires to become something else. So the question of Second Life Experience and Species Reassignment Surgery would appear to be far in the future, if limited to the current medical and legal institutions. Fortunately, a set of practices is progressing, with various names, Extreme Body Modification, Biohacking, Body Hacking, in which people are developing means to circumvent the restrictions of the medical institution. Just as cheap access to media technology and knowledge brought Tactical Media, perhaps cheaper access to medical technologies and knowledge will bring about Tactical Biopolitics, to invoke the title of a recent book edited by bioartist Beatriz Da Costa and Kavita Phillips.

One of my hopes with this project is to open up the field of experimentation with ways of being outside of the limitations of current thinking about gender and species. Perhaps the development of these new ways of being, similar to the

development of new conceptions and expressions of gender, can serve to slip outside of the protocols of biopower, to escape the control of contemporary power by escaping definition. Using a notion of biopolitics based in the idea that "Life has now become... an object of power"[26] then creating new ways of living can be seen as an act of biopolitical resistance. As Hardt and Negri state in their book Empire,

> "those who are against, while escaping from the local and particular constraints of their human condition, must also continually attempt to construct a new body and a new life... These barbaric deployments work on human relations in general, but we can recognize them today first and foremost in corporeal relations and configurations of gender and sexuality. Conventional norms of corporeal and sexual relations between and within genders are increasingly open to challenge and transformation. Bodies themselves transform and mutate to create new posthuman bodies."[27]

Hardt and Negri speak here of the need to create new bodies in order to create new lives, or in this context, new worlds. Similarly, Giorgio Agamben argues that what is needed to escape the state of total control that defines contemporary governance, which he refers to as the state of exception, is to find new ways of using the body. In a seminar at the European Graduate School in Saas-Fee, Switzerland, he stated, "to make something inoperative is to open it to another usage. Can we think another usage of genitals? Can we think another usage of the body? ... Can we conceive of another usage of the organs of the body? This is the central political question, the ability of thinking another usage of human bodies, human gesture, human behavior, human work".[28] These political questions drive my work, not the drive to find a new life as a form of entertainment, as Linden Labs, the creators of Second Life present it, not to fulfill desires shaped by current circumstances, but the drive to construct new more liberatory possibilities.

Yet, as Judith Butler states in Undoing Gender, for many, choices of gender are limited by the real life and death threat of daily violence. It is also my hope to reduce this violence by widening the field of possibility and therefore the field of understanding. Butler states, "I would say that it is not a question merely of producing a new future for genders that do not yet exist... it is a question of developing within law, psychiatry, social and literary theory a new legitimating lexicon for the gender complexity that we have been living for a long time."[29] Towards this end, Becoming Dragon seeks to question the requirement for Sexual Reassignment Surgery by looking closely at the issue of "Real Life Experience" and what it means to perform a gender to fulfill a requirement. In my case, I am literally performing the gender of dragon for the requirement of my MFA thesis. How does one perform a gender in order to prove to a psychiatrist that one is prepared for surgery? With clothing, gesture, voice? Through the proper social interaction and acceptance as that gender? Through "passing", or being "read" or perceived as one's chosen gender? As Stone points out, "the candidates for surgery were evaluated on the basis of their performance in the gender of choice. The criteria constituted a fully acculturated, consensual definition of gender, and at the site of their enactment we can locate an actual instance of the apparatus of production of gender." [30] These interactions between transsexuals and psychiatrists actually produce gender, the moment of relating, of interacting, of being and being seen is gender itself, just as the moment of performing an identity and being perceived as that identity is the moment of becoming, and that is not to privilege an attempt to "pass" as an identity, but also to include becoming transgender.

Can these skills and experiences be duplicated in an online-networked 3D environment? A recent study entitled "Virtual World and Real World Permeability: Transference of Positive Benefits for Marginalized Gay and Lesbian Populations" claims that "engagement with Second Life can be a positive experience and that this positive experience can extend beyond the virtual world to provide lasting benefits in real life."[31] Anna Munster links Virtual Reality specifically to becoming, saying "the virtual dimension of matter, that is, the capacity of bodies to enable this transition, is really an ongoing question, how can our biology continue to become different? ... But if VR as a digital technology has something to say to us in the register of existence, it is to underscore the fact that bodies in many kinds of experiences are in the process of becoming virtual; VR is only one among the countless other organizations of virtuality." Perhaps, but the real life social limitations, as Sandy Stone referred to in our discussion, the moment when the bigot picks up an empty wine bottle and smashes us in the head, are mostly absent from Second Life. While the verbal and social alienation can still occur, the threat of physical violence is absent. The night I was driven home from the end of the performance, we thought for a moment that a cop was following us. My concern for my own well being, what I was currently wearing and how that might be perceived by a cop or in jail crossed my mind. Within minutes, the real life danger of being transgender had returned. Still, this experience is tiny when compared to the violence people are suffering in the Gaza strip, in part because of their identities and positionalities. The social conditions are inextricable from the possibilities for

personal transformation.

Despite this, what I want to say is that yes, there are many people who want to become their avatars, for whom virtual worlds are a very serious undertaking, where they can explore and develop the identities they want, outside of the limitations of social norms and the present medical institution. And yes, we are taking these technologies into our own hands and becoming something else and creating new worlds. Further still, we already are our avatars. It is a mistake to think that there is an endpoint to becoming. Everyday as we inhabit these digital bodies in Second Life, we temporarily inhabit a mode of being these avatars. As Critical Art Ensemble said in The Electronic Disturbance, "for the critical performer, exploring and interrogating the wanderings and manipulations of the numerous electronic dopplegängers within the many theaters of the virtual should be of primary significance,"[32] because we are surrounded by avatars, ghostly doubles of ourselves which exist in digital form, from social networking site profiles to our own photos, our identities are multiple and are constantly being produced by our imagining of them and by others' interactions with them. Avatars are just one way in which identity becomes an assemblage, a distributed network of feedbacks, flows and processes.

The process of becoming is a state of being, and there is no privileged final state of completion to hope for. As the performance artist Stelarc stated about Becoming Dragon, “SL extends our bodily boundaries. Virtual experiences are RL experiences. Micha's extended period of immersion in SL enhances RL and actualizes SL as an alternate operational system, one that allows us to perform beyond the boundaries of our skin and beyond the local space that we inhabit.” [33] Our avatars are not separate from us, but constitutive parts of our identities that are in constant feedback with our sense of who we are, shaping each other. As in Lacan's mirror stage, where the baby sees itself in the mirror, held up by its parents arms, and mistakenly thinks it can walk. The baby then proceeds to move towards the identity it imagines itself to have. As such, we can think of becoming as the process by which we conceptualize an identity and move towards it. Yet in this process, one already has an identity. The baby in the mirror is walking, held up by the prostheses and social structure of its parent's loving arms. The mistaken identity is real, as is the process of becoming the next identity, in an endless feedback loop where one becomes something else. Being is becoming.

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