

SOUND AND VISION

By

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Abstract

This thesis outlines the processes, methodology, and research for my practice which is based on sound and light. This paper unpacks the process and development of two major works, *Binary Ghost Planet (2015)* and *Lines of Light Receding (2016)*. These two pieces emerged from my research into the subjects of online privacy breeches and surveillance. Our online activities are assembled into a profile which is used by corporate and governmental bodies. The result of my research in these areas developed a central focus on two questions: what is the sound of online surveillance? What does the world of this profile sound like?

The installations were meant to create immersive phenomenological experiences for the viewer that evoke a sense of time and place inspired by a virtual world. As such, the evolving production process of these works has been essential in creating these experiences. Challenging the viewer and their own perception are key to the outcome of this practice.

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Entering the work

Our relationship with modern computing technology and smart mobile devices is constantly evolving. The industry continues to innovate and as users within this complex system these innovations intrude deeper into our personal space. These new technologies push us forward in uncharted directions with unknown consequences. We have come to rely on these tools for our daily interactions online and come to expect a modicum of privacy. Only in recent years has it come to light that when we go online we imprint ourselves there, leaving traces of who we are on the imperfect internet digital archive. Our activities—comments, likes, tweets, and interactions—are collected and assembled into a profile that is used by unseen corporate and governmental forces. In some cases, our profiles, our echoes—our ghosts—are then reflected back to us. These are unauthorized copies of us which exist in a virtual world. This vulnerability has exposed us in ways we have not anticipated, but in so doing, also created a world we had not considered: a virtual planet. What does this planet inhabited by ones and zeroes sound like? What does it feel like? Through a phenomenological exploration of media, I aimed to traverse this unknown—this binary ghost planet.

The two major works that I will discuss in this thesis are *Binary Ghost Planet* (2015) and *Lines of Light Receding* (2016). *Binary Ghost Planet* was a sound and light installation exhibited in the Abraham J. Rogatnick Media Gallery of Emily Carr University for the exhibition Mixtape: Black Holes, Trauma, and Leather. To create a dark quiet space, the walls of the media gallery were draped in black velvet theatrical curtains from floor to ceiling. The media gallery was approximately fifteen feet long by thirteen feet wide and fifteen feet high. In the back, I installed a ten-foot-tall by five-foot-wide black monolith that was eight inches deep. On the sides of the monolith were frosted plexiglass windows approximately three inches wide. Behind the

plexiglass were LED strips which were connected to a hidden dimmer and controller which was programmable using Sunlite lighting software. This software allows the user to create colour sequences with any light connected. In the case of *Binary Ghost Planet*, I was using colour mixing LED strip lighting. Their ability to emit the primary colours of light (red, green, and blue) meant I could essentially mix millions of colours. It is when the RGB (red, green, blue) levels are adjusted that new colours are seen. In addition, their saturation level could be altered. So, the lights could have a hint of warmth or an intense red light. This software also allows the user to create sequences of varying length within “scenes” that can be saved on an external controller. For instance, the lights could remain a pale blue for two minutes, then turn red for three seconds, then back to blue and so on. The sequence and scene can be saved as a file, exported onto an external controller and played on loop for as long as needed. Once downloaded, hitting the play button runs the saved sequence program independent of a computer. The lights were programmed with a short light sequence that were meant to reflect the passage of time. To do this, the beginning of the sequence began with the cool blues of the evening progressing to the warm colours of the morning. The light sequence, or as I refer to it, *lightscape*, was two minutes in length.

The LED light has its own quality and increasing the saturation settings produced light that looked both vibrant and artificial. When the viewer entered the space, the monolith was usually glowing from its edges displaying a single uniform colour which slowly changed over two minutes. This glow of the monolith is similar to the glow witnessed by anyone using their mobile device held near their face, most noticeable in a darkened space like a movie theatre. The artificial quality was important as it also suggested the synthetic quality of the content we consume online.

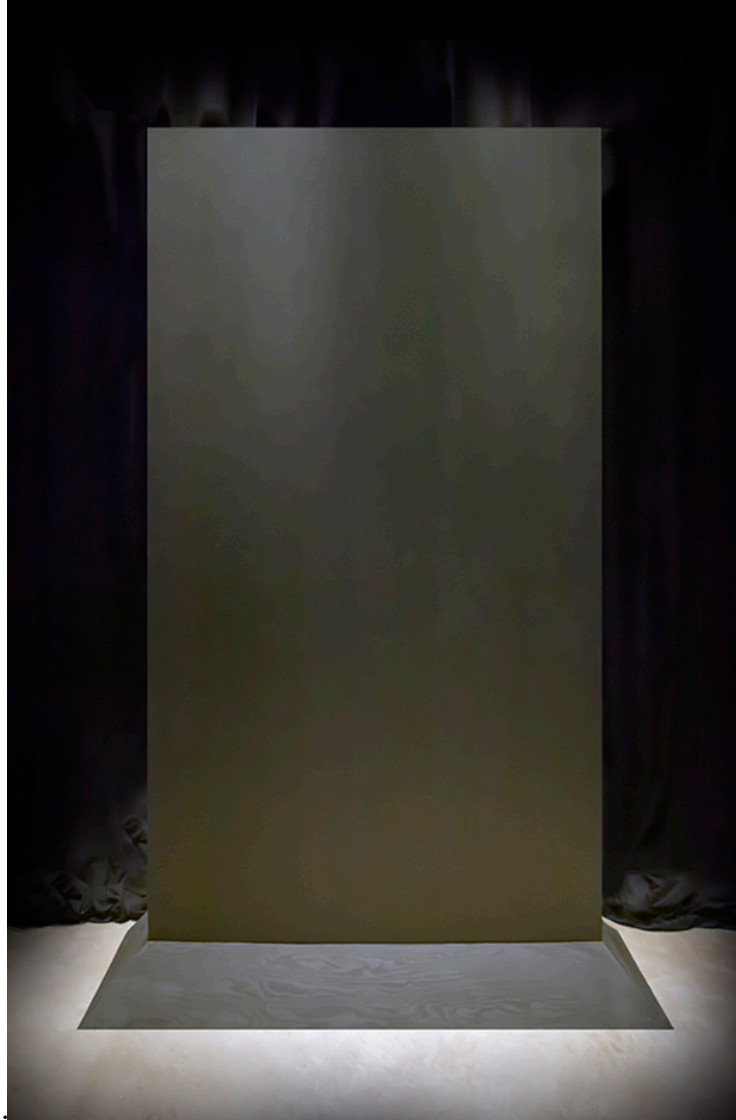


Fig 1: *Binary Ghost Planet* 2015, Abraham J. Rogatnick Media Gallery, Vancouver. Photo: John Rao.

For documentary purposes, full room light is used in this photo.

Speakers were suspended from the ceiling around the room in 5.1 surround to play pre-recorded sound pieces, which I refer to as *soundscapes*. These soundscapes were created in both stereo and surround sound. The viewer entered through the curtains which covered the entrance into a near black space. Once through the curtains, it was difficult to navigate in the gallery. The

monolith was barely visible except when the light sequence was active (See figure 1 to figure 4). It lit the space nearby, but the room remained rather dark save for the monolith lighting.



Fig 2: *Binary Ghost Planet* 2015, Abraham J. Rogatnick Media Gallery, Vancouver. Photo: Ross Kelly



Fig 3: *Binary Ghost Planet* (2015). Detail of light transitions. Photo: John Rao



Fig 4: *Binary Ghost Planet* (detail) 2015, Abraham J. Rogatnick Media Gallery, Vancouver. Photo: Ross Kelly

The other work I will discuss, *Lines of Light Receding* (2016), was installed in a semi-light locked space constructed for the exhibition titled “7” in the Charles H. Scott Gallery at Emily Carr. The room was approximately fourteen feet square with two speakers hung from the ceiling in the back of the space. The walls had sound baffling installed on the front and back of the space. The baffles were eighteen inches wide by seventy-two inches high. Two forty inch LED bars were hung in the centre of the ceiling. They were focused (pointed) slightly right and left to ensure complete room coverage. (see figure 5). The LED lights lit both the walls, ceiling, and floor on their respective sides of the room. These LED bars were not designed to fill a space, but used as wall washers. The lighting house where they were purchased typically sell lights like these for commercial purposes. They are used to light a wall of an atrium, entryway of a high end restaurant, or office building. They are intended for ambient lighting, not central or main room

lighting. As such, they have a fixed projection space. In order to cover the room of the gallery, they needed to be hung close together on the ceiling to uniformly light the room and to have overlap for colour mixing in the middle of the space. You can see the results in figure 6.

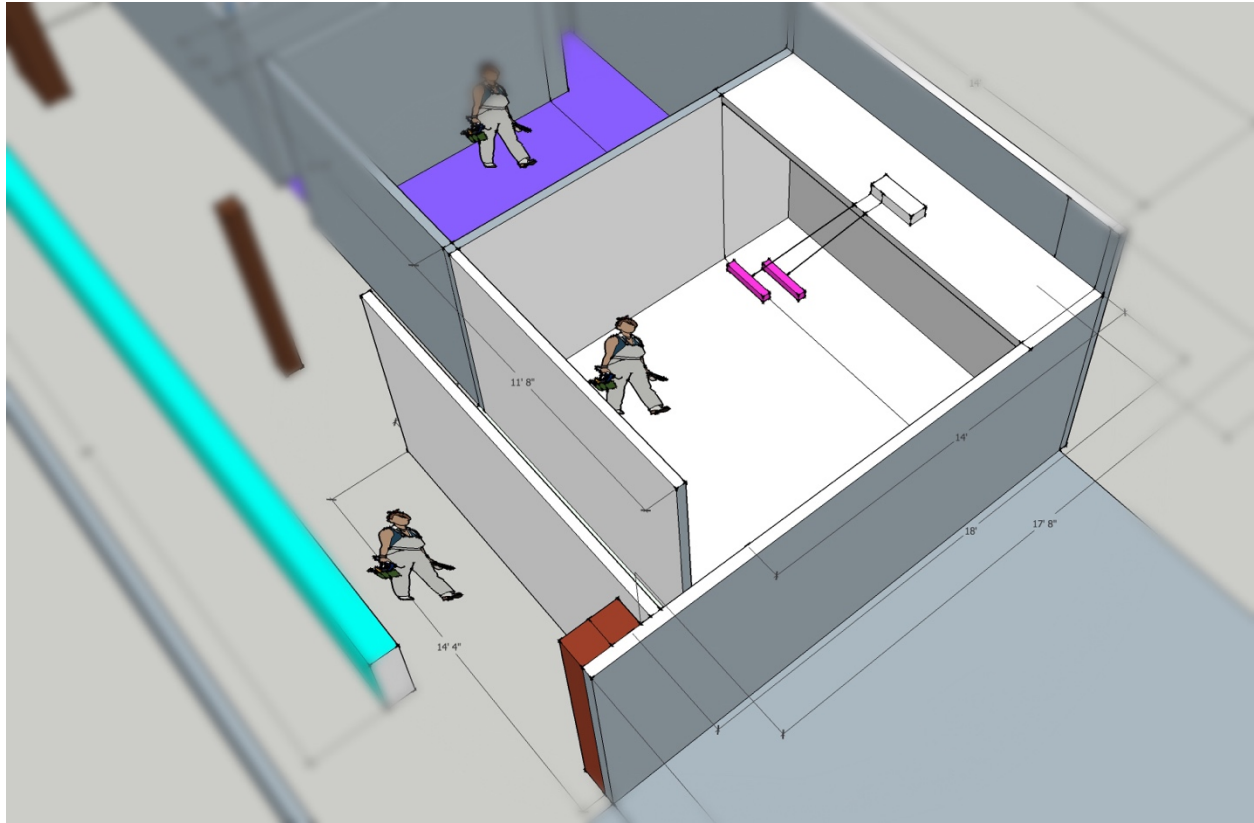


Fig 5: Elevation of plan for construction of *Lines of Light Receding* (2016) John Rao

To enter, the viewer walked down a light-locked hallway and entered the white void. The gallery space was filled with coloured LED light as the 12-minute-long soundscape bellowed through the space. Both the lightscape and soundscape looped continuously. Like *Binary Ghost Planet*, the lighting followed a similar colour sequence and pattern based on how light changes in our environment from evening to sunrise.

I should outline a few differences in the two pieces. As you can see from the photos above, *Binary Ghost Planet* was a predominantly dark space, while in *Lines of Light Receding* the entire room changed colour with light. In addition, there was no specific object present like the monolith in the installation of *Lines of Light Receding* as there was in *Binary Ghost Planet*. Also, the lightscape for *Lines of Light Receding* matched the length of the soundscape which was twelve minutes in length and looped. The lightscape for *Binary Ghost Planet* was two minutes in length, while the soundscape was five separate but related pieces totaling about fifteen minutes. Both the lighting and sound looped.

During the process of creating these works as the soundscapes evolved, so too has my focus. As a citizen, I believe this breach of online privacy is an important issue highlighting our changed world. It requires a considered conversation not only at water coolers in offices, but in the halls of power around the globe. Leaders need to be held to account by their employers, the people. Whether that occurs through overt political action or the commentary of artists and thinkers, it is important that the issues be met in open and clear dialogue. Thematically, I feel there is still much to say and to explore on the topic. However, during this process I have become fixated on the experience of sound—the experience of creating soundscapes and experiences for an audience. As I dove deeper into the soundscapes of the *Binary Ghost Planet*, the potential of the works remains many fathoms deep. I feel I have only skimmed the surface and need to plunge deeper to explore what emerges.



Fig 6: *Lines of Light Receding* 2016, Charles H. Scott, Vancouver. Photo: Ross Kelly

Origins

The origin of my installations emerged organically from my research in online surveillance. There were two audio experiences that shaped the direction of all the work that would follow. I encountered a video of a military drone patrolling over Gaza and a second called “the sound of the internet”. The latter was the quiet hum of a server room and the occasional beep of a failing hard drive. I found the quiet murmur of the server both relaxing and unsettling. It was unsettling when considering the potentially dark activities that occur inside the electronics, code, and interactions online. Yet, despite the myriad of happenings that occur inside this vehicle, the computer, on the outside sits a mostly ubiquitous utilitarian object plugged into a wall with a few blinking LED lights. The white noise of the cooling fans blend into any modern environment. These servers stand ominously in an air-conditioned space—a gateway to a world that does not physically exist, only in its plastic and metal form. They share no politics, no feelings, and to the uninitiated, no purpose.

Computers. Servers.

Monoliths of nothing. And yet, monoliths of everything.

The video of the drone over Gaza gave me a different perspective and transformed the direction of my work. It was a video of what appeared to be a backyard; the camera was pointed to the sky. A building is on the edge of the frame. There is a deep buzzing sound in the distance of a military drone lurking over Gaza echoing through the mountains and buildings. Occasionally typing can be heard on a computer, the sound of home, the call of a child playing in the background, birds, and little else for several minutes. Near the end, explosions can be heard in the distance—all under the cover of blue sky.

It was disturbing.

This was the sound of someone's world.

Every day.

At this point in the conflict in Palestine/Israel, according to the user, the military drones patrolled 24 hours a day. A constant hum echoing in the distance like giant bees hovering overhead.

Such dread.

A fear of an unknown mechanical and otherwise alien object waiting and watching.

Acting without warning at any moment.

It was a torture I could not imagine.

In so many ways, the fear of terrorism has led to the constant surveillance we currently have online. Following the attacks in America in 2001, the socio-political environment has led to the justifications of many policies, including online surveillance, that have compromised the way of life on—and offline. And perhaps, our acceptance of these policies.

I could not personally relate to the tension and terror of predator drones flying over my house. I live near an airport and occasionally hear a helicopter bringing oil workers to the rigs, but it is a momentary disruption to the audio environment I live in. My world generally sounds like suburbia—cars, wind blowing through the trees, dogs barking in the distance, children playing in their yards, the sizzle of a neighborhood barbeque, people chatting on walks, lawnmowers, snow blowers, my neighbour's Harley, gusts of air in my fireplace, the rattle of the fan in the kitchen, the jolt of the compressor in the fridge, and the gentle hum of my many computers.

There is no explicit immediate danger in my exterior world.

But.

My virtual world is tracked.

As revealed by Edward Snowden—it is surveilled.

It is watched explicitly and intentionally. We have learned, my comments, likes, tweets, and interactions are assembled into a profile by unseen nefarious forces, used in untold ways by corporate and government agencies. I wondered about that world *my profile* lives in online—my ghost's world. Is it housed in one of their rooms? In the unassuming box? What is it like in there? What might be happening there? *Is* there life inside? What is the sound of that ghost's world?

It is the pursuit of this “Binary Ghost Planet” where I found a process and form for my work. The “drone,” both musical and “alien,” the ghosts, the sound of everyday life—I returned to these ideas more and more as I created the soundscapes which are central to my practice.

What does a world sound like with inhabitants that are always absent? How do I create the sound of this world?

Soundscape Production and Process

“My job as an artist is to compose elements. Composition is the key. So any elements, which are brushed up carefully, are the subjects to be composed. I compose sounds. I compose visuals. I compose materials. I can't put, or analyze, myself in the context of something between art and music; I am naturally doing what I am doing.”

(Ikeda, qtd. in Eubank)

Like Ryoji Ikeda, this blurring of art and music is more apparent to others than it is to me in my own work. I see one as I do the other – they are both art forms and their languages allow me to create work that is true to my background in drawing, painting, music, and theatre. It is challenging to unpack how to live and create more simply than Ikeda does here, “I am naturally doing what I am doing.” Further examinations somehow dismantle the natural creative process.

In the early stages of these audio works, the main sources of content were found sounds which I did not create. To create sounds of the *Binary Ghost Planet*, the inspirations of the server room and the video of the military drone over Gaza played on my mind. The sound of my world rang in stark contrast to the sound of war machines circling overhead in Gaza. These flying death machines were remotely controlled using an elaborate architecture of computer systems which sat in secret temperature-controlled rooms thousands of miles away. How to capture this overt physical surveillance and this more insidious silent online surveillance became my initial challenge. My early experiments used the audio from both videos. But as time went on, I became more interested in exploring that mysterious virtual world I felt existed, the Binary Ghost Planet.

Early works were animated text on video with found audio. I captured the audio of both the server room and the buzzing military drone over Gaza and blended them together. While binary code played on the screen, the audio hummed underneath. After some additional experimentation, I found the focus of these early works turned to the visual and as a result, the effect of the audio was lost. When I removed the video altogether and focused on sound, the work was transformed. It allowed the listener to find their own way in.

The subsequent experiment led to what would become a soundscape called “Ping”. For “Ping,” I returned again to a blend of the server room and the military drone. Together these two elements became a musical drone (a constant note that might be played throughout a piece of music). This may be most recognized in the way a Scottish bag pipe starts with a single note that precedes the melody being played.

It is interesting to note, according to the Internet Engineering Task Force, computers use ICMP (Internet Control Message Protocol) to communicate, commonly referred to as a “ping” (ietf.org). For me this link to computers calling and answering one another gave life to this virtual world.

In my soundscape “Ping” from *Binary Ghost Planet*, the ominous technological sounds of the military drone and server room became the all-powerful surveillance machine in search of their target. I borrowed the sound of a submarine “ping” as an audio signifier to suggest the target of surveillance might be found. Following the droning sounds, I pointed to a cultural image that is the subject of surveillance—Islam. I then introduced the “call to prayer” as the imaginary target was located. With additional effects, the singing seems to emerge from the distance and disappear as the surveillance machine hovers in search of more targets.

This sense of place I had searched for emerged in this mixing choice and became the basis of all the future soundscapes I would create. The technological droning sound, the musical hints, the sense of being hunted or tracked. After these initial experiments I decided rather than appropriating sounds, I looked at myself as the subject of surveillance. As a result, I created all sources of sound. This allowed me to have full control over the direction of the work. More importantly, it expressed my agency as a subject of surveillance because, as I will outline, we are all in fact subjects of surveillance.

Moving away from sourced or appropriated sounds also meant my *prints* were present in each piece like a sculptors' are in clay. I enjoyed the juxtaposition of artificial sounds like white noise next to the organic quality of the human voice. This juxtaposition was emblematic of the relationship I was exploring with technology. We are reliant upon technology and reminded of that dependence when it fails during operating system updates, corrupt hard drives, or exploding batteries.

Sounds like a song associated with an important memory, heard years later trigger that memory and can locate the listener in a place in time. In the early stages of these sound pieces, I wanted to elicit this same sense of time and place that the military drone over Gaza and the sounds of the server room did for me. I endeavoured to create an impression of this new world through the use of sound.

Moving forward from "Ping," my experience as a songwriter reemerged and I explored the typical song structure: intro, verse, chorus, verse, chorus, bridge, chorus, and outro. I enjoyed giving the listener a sense of the world I was expressing with an almost pop sensibility.

I then moved away from this rigid structure and began playing with the listeners' experience. Sounds were placed in the audio field to disorient the listener, to inspire a feeling of safety, hope, dread, surveillance, and loneliness. These were the same conditions I had experienced online.

To achieve these soundscapes, audio elements are captured and mixed in stereo or 5.1 surround using an external mixing console and studio microphone connected via USB to a computer. Audio is recorded with Adobe Audition or Logic Pro. Some elements are my voice others are instruments. For example, I sang six different notes to form a chord which sounds like a chorus of voices which can be heard in *Lines of Light Receding*. I duplicated the voices many times to give it a more authentic choral feel and to sound like hundreds of people. In this case, I was expanding on the sound of the surveillance drone against a musical drone. I have explored this relationship on almost every soundscape I have created and continue to find new ways to express the drone motif. It is this sonic exploration I find most interesting. Each variation says something new about a similar idea, but expresses itself in different ways to the listener. The monotonous singing of a single note by multiple voices, the emotionless vibration of fans in a monolithic server, the persistent buzzing of the blades of a surveillance machine—all constant sounds which blend into the background of environments that people inhabit in various circumstances around the world.

For other elements, I have played melody lines or harmonics on my acoustic guitar. Harmonics are the chiming or bell sounds heard in *Lines of Light Receding*. Using a midi-controller, which looks like a standard keyboard, I was able to add additional textures and sounds via plug-ins in Logic Pro. There are a number of sampled instruments and effects available to the user. Up to this point, my process was in many ways analog. That is to say, I was using older technology, basically, my voice and a guitar. Once I added the midi-controller, I was able to

create new drones with new digital qualities which had not been possible in my previous process. I felt it was creatively important to find new tools, but also to reflect the digital world in a language used in that same environment.

Once bed tracks are recorded, the work emerges in the editing and mixing process. Some pieces had as few as ten elements while others had as many as 200 layers or tracks. There was great time and consideration given to the tone, colour, shape, and feel of each piece. The soundscapes, with a few minor exceptions, were created using the voice, an instrument, or an object that is manipulated to create unique textures.

I began with familiar elements that might locate the listener somewhere in the real world and explored potential analogs of their digital equivalents. What would wind sound like in a digital world? Is it an exact copy of the wind or waves and the motion of the earth? I turned to altered white, brown, or pink noise to suggest this experience. These types of noise are generated in Audition through a plug-in. Reverb on individual sounds of clicks or pings created a sense of space, such as being in a large building. This suggested an impression that life was present somewhere in the distance.

As the pieces evolved to become the final soundscapes for the *Binary Ghost Planet* installation, there was a loose narrative that bound the soundscapes. Rather than being the **subject** of surveillance in my work, I became the **explorer** of this virtual planet. It was this shift that caused a thread of science fiction to come through all subsequent soundscapes. There was discovery in “Orbiting the Binary Ghost Planet,” first steps experiencing this new planet in “At The Gates,” feeling trapped in this ethereal world in “Entombment,” and finally a meditation on living on the planet in “Binary Ghost Planet Reflection”. “Ping” was the first soundscape that

found a voice and inspired subsequent pieces, so it was important to include as a type of epilogue.

The ambient soundscape of *Lines of Light Receding* features five separate sound pieces composed into a larger sequence lasting 12 minutes. At its opening, organs and keyboards emerged like the morning dawn stretching into the early day reaching a crescendo followed by a rumble of technology which bellowed beneath them. An ominous drone of the organ and an alien-like roar lands the listener somewhere unknown. A hiss of noise from an unknown origin travelled across the stereo field as the organs and synthesizers became quiet where it eventually returned to its source. There were chirps that could have been birds or a cell phone receiving a text. There was a long hiss like the rush of wind or waves followed by a call of male voices echoing from a distant altar of a great cathedral. The sound of typing on a keyboard enters the soundscape blending into the sound of home—a mother and child played. The rush of white noise and a high pitched chirp returned followed by a low rumble and hovered above the listener. A new tone emerged, opened and closed—giving moments of silence with a hidden rumble and flutters of the bird that explored nearby.

We were somewhere, but not there.

A chord repeated, shifted in pitch and tone downward, and then up again.

There was a sound of inevitability that emerged as a distant voice returned.

Strings echoed back and forth from speaker to speaker as the voice repeated a simple melody interrupted by another sudden hiss of noise. Towering organs returned. They rose and

morphed into a mirror of the opening, building into a final crescendo as the soundscape came to a close.

The soundscape alluded to specific imagery, but the interpretations are broad. The origins of each element are part of an evolution in my process as I created these sound works. Some of the elements sounded familiar and seem to place you somewhere specific, but they may confound. To borrow a thought from “The Matrix” (1999), this familiarity may resonate, but may be “like a splinter in your mind” that cannot be named or retrieved.

I was also unconsciously influenced by David Bowie’s Berlin albums – *Low*, *Heroes*, and to a lesser degree *Lodger*. “Bowie shifted to ambient music, focusing on tone and atmosphere rather [than] ... traditional rock riffs” (Mastropolo). It is this tone and atmosphere that is most appealing to me in the album *Low*. There is something ephemeral and elusive in the ambient vibe Bowie treads, and it is one that I push towards, albeit with considerably different results. While ambient music and sounds may lull the listener into a calm listening space, I intentionally disrupt those feelings, to have the audience reconsider their experience, alter the direction of their interpretation, or evoke a different state of being.

Lighting Sound and the Self



Fig 7: A viewer walks around the space in *Lines of Light Receding* 2016, Charles H. Scott, Vancouver. Photo John Rao

We consume pages and pages of graphics, concepts, and content that is passed through the great magnifier that is our tablet, mobile phone, or computer screen—the windows into the online world. Most of these devices use glowing light emitting diodes that highlight our face, firing the rods and cones to display these millions of images. These screens shoot stacks and stacks of content into our eyes which merge the red, green, and blue into white, and physically affect us in ways we have not considered.

Through our LED screens light is central to the physical relationship of our online experience. We know, for example, the blue light that is emitted by LEDs are, “especially effective at keeping you awake because it suppresses the production of the sleep-inducing hormone melatonin” leading mobile bedtime readers to stay awake longer (Wiseman). This disrupts sleeping patterns directly affecting our waking lives. So, in both *Binary Ghost Planet* and *Lines of Light Receding*, the senses were challenged.

Soundscapes are the foundation of both *Binary Ghost Planet* and *Lines of Light Receding*, but central to the experience of the former. The lightscapes were created after to augment the sonic experience. To achieve this, the lightscapes for both *Binary Ghost Planet* and *Lines of Light Receding* underwent a similar programming and mixing process. The LED lights are programmed using software while connected to a controller. This controller ran a program which played the lightscape automatically once started. Lighting had a more dominant role in *Lines of light Receding* than in *Binary Ghost Planet*. The use of the LED lighting is intentional as it is emblematic of our contemporary window into the online world—the mobile screen. In addition, all content online is artificial. That is to say, videos, photos, and text of ideas, while inherently real in that they exist and were created by human beings, are representations of ideas, events, and things. They are all two-dimensional images, or as William Gibson describes cyberspace in *Neuromancer*, “A graphic representation of data.” (Gibson 51). While they carry meaning, they are all artificial—virtual.

Lines of Light Receding was an immersive experience and asked the viewer to linger, rest, and allow the work to take over. The viewers’ eyes were flooded with a single colour at a time. Viewers found this to be disorienting when moving forward in the sequence. The viewers’

perception of each other and the space around them was altered not only by what was seen within one colour, but as the eye transitioned to others. The afterimage forced the eyes to constantly re-adjust to each new moment altering the experience of the work.

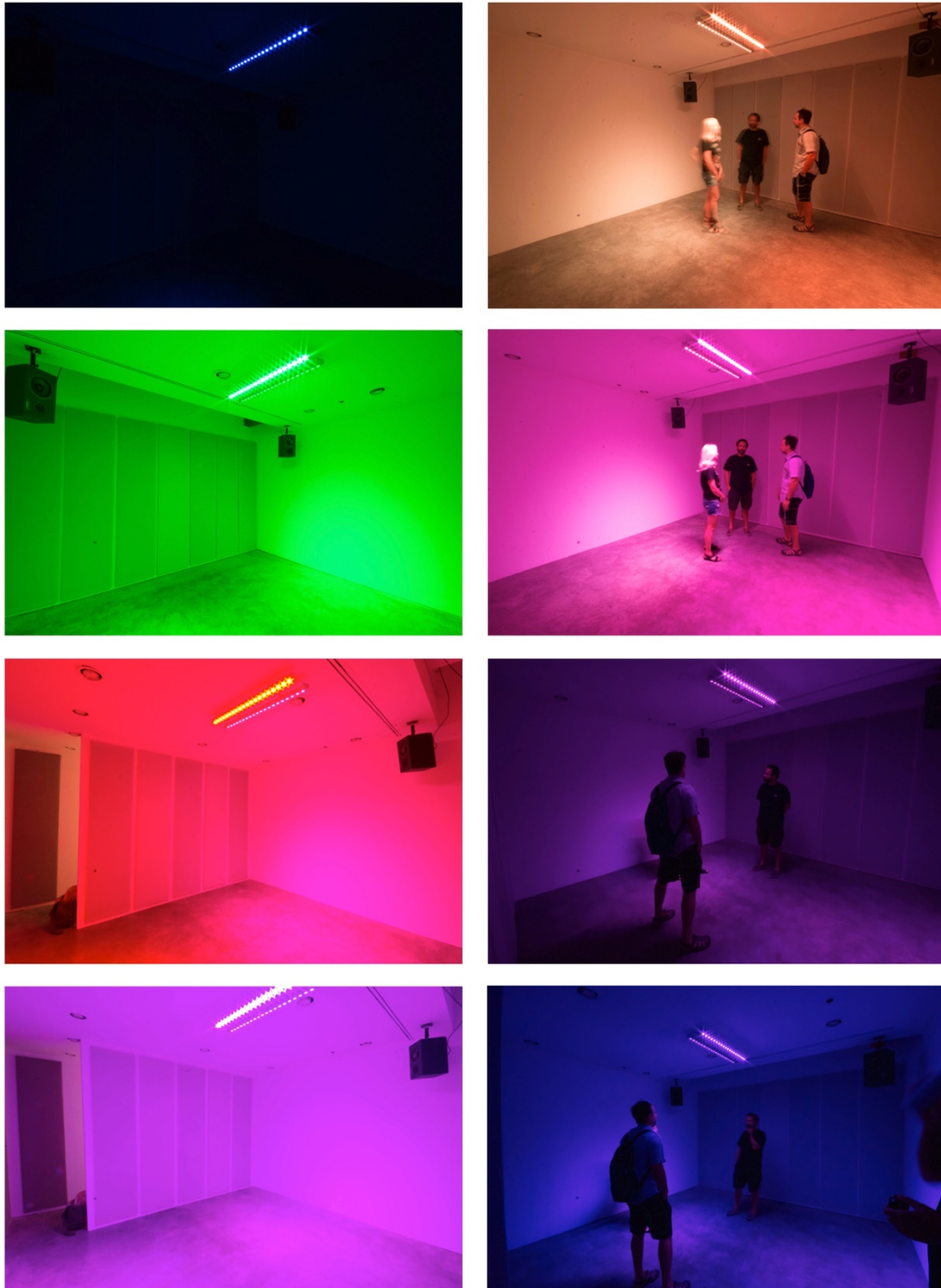


Fig 8: Lines of Light Receding (2016). Detail of “mobile colour sequence” of lightscape. Photos: Ross Kelly

I believe both of these works were for the body and challenged the senses and signal a phenomenological experience. “Carnal phenomenology reveals embodiment as basically a sensitivity to the environment, and indicates that this sensitivity cannot be thought apart from the flesh of sensations that simultaneously enable and disable the power of the (human) body” (Sparrow). When the viewer is placed in the dark in *The Binary Ghost Planet* installation, they are pushed into an awareness of the self, and in the light of *Lines of Light Receding*, to their proximity and awareness of other people in the space.

As previously stated, I was interested in the passage of time, and chose to use the light of day as a reference point for the colours of the lightscape sequences. The use of our light cycle (sunrise to sunset), is a signal to our day-to-day experiences, our comings and goings of our daily lives offline. In *Lines of Light Receding*, the first half of the sequence is based on this concept. This is followed by what I describe as a mobile light sequence. It is reflecting the day-to-day activity, but as it exists online. The juxtaposition of different colour light sequences (a sunrise to sunset light cycle, to a mobile light cycle of artificial colours) alludes to our movement on and offline seamlessly every day or through hybrid space.

Binary Ghost Planet and *Lines of Light Receding* are embodied experiences that are ontological in nature and explored “hybrid space.” As described by Jorinde Seijdel, hybrid space is “a complex of concrete and virtual qualities, of static and mobile domains, of public and private spheres, of global and local interests” (Seijdel 5). He suggests that the public sphere consists not only of parks, buildings, and streets, but also chatrooms and social networks. Put another way, we move through “hertzian spaces” (Dunne 7) and vacillate between the real and virtual in this “unstable space, defined from the different wavelengths and frequencies that arise

from interaction with the natural and artificial landscape” (Gomez). This movement between offline and online is reflected in both the lightscapes and soundscapes of *Lines of Light Receding*.

Rather than seeing the internet as a two-dimensional interface, in *Lines of Light Receding* the viewer completes what is now a *three*-dimensional interface. With only light and sound occupying the space in *Lines of Light Receding*, viewers became aware of themselves and some wondered where to look. While in contrast, in *Binary Ghost Planet*, the focus was on the monolith. Viewers described the active light in the white gallery space of *Lines of Light Receding* as feeling like “outside,” and the dark of *Binary Ghost Planet* as feeling like “inside.”

In a documentary produced for his exhibition at the Guggenheim, James Turrell describes our experience of art this way, “You’re not receiving perceptions, but creating them ... You’re not only looking at a painting or a work of art, but looking at yourself perceiving” (qtd. in Tie). Once the representational content is removed (the text and interactive graphic imagery) from our online interactions, the only thing that remains is light.

Once removed, we are lighting ourselves.

Considering Science Fiction

Vernor Vinge postulates that “[when] we...have the technological means to create superhuman intelligence ... Shortly after, the human era will be ended”, and we will have reached a “technological singularity”. This is a time when technology has advanced so far that our role as human beings on earth will be forced to change. How we interact with each other and our environment will be forced to evolve. I would suggest we are approaching this time. Technology has us moving ever forward in uncharted directions into an unknown world explored in science fiction film and literature.

William Gibson’s description of cyberspace in *Neuromancer* points to a world where technology is fully integrated:

“A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts...A graphic representation of data abstracted from banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding...” (Gibson 51)

While the title of my work is also nod to the novel, Gibson’s very colourful and dazzling description calls upon imagery like that of the opening sequence of Ridley Scott’s *Blade Runner* (1982) of a world buzzing with technology. Like the *Matrix* (1997), an overabundance of content being fed directly into our brains for consumption, “*a consensual hallucination experienced daily by billions of legitimate operators,*” or willing participants in this overt programming happening every moment. A marriage of technology and everyday life realized—a technological singularity.

I used a generic science fiction narrative outlined earlier, for *Binary Ghost Planet*, of the explorer experiencing this metaphorical virtual alien world. The soundscapes explored discovery, first steps, feeling trapped, and a meditation on living on the virtual planet. These are themes and ideas encountered in many narratives of science fiction, most recently Christopher Nolan's *Interstellar* (2014) or Ridley Scott's *The Martian* (2015). This structure does not limit the viewer to this interpretation, but rather informs my approach to creating the works. In addition, it later influenced the sonic direction of the soundscape of *Lines of Light Receding*.

In *Binary Ghost Planet* and *Lines of Light Receding* there are musical signals to not only the images suggested previously, but to the audio language of science fiction films. After completing *Binary Ghost Planet*, I searched for a new tool to generate audio besides my voice, software generated noise, or my guitar. I decided to use a midi-controlled keyboard (synthesizer) which emulated thousands of sounds via plug-ins in Logic Pro. Every instrument one might need to create a piece of music is available in this software and playable via the midi controller. The controller looks like a standard keyboard or synthesizer and can be used for recording or live connected to a computer. All audio work was performed by me, recorded, then mixed in Audition like any audio recording might be made. This new tool allowed me to make subtle nods to moments we might see in classic science fiction film with a more electronic quality I envisioned this virtual world should sound like. In a site visit with artist Isabel Nolan for *Lines of Light Receding*, these hints were quickly highlighted in the soundscape which referenced 1980's science fiction music and sound effects. Isabel also noted while standing underneath the LED bars in the space that she felt like an alien transport was about to take her away.

Science fiction inspires and informs how we think of technology and its potential as we move further into the 21st century. The optimistic look at the future in Gene Roddenberry's *Star*

Trek has suggested a time when life could be vastly improved through the successful integration of technology. Of course, not all science fiction sees a future filled with such optimism. The distillation of people into digital profiles online by the NSA and their corporate partners realizes the fears expressed in dystopic narratives. For example, in Yevgeny Zamyatin's dystopia "We," the citizenry was given alpha-numeric designations such as "O-90". Citizens of this world refer to each other as "numbers" and they are monitored by secret police. This common theme of surveillance is most notable in George Orwell's "1984" where citizens are monitored by Big Brother.

Following the attacks in New York in 2001, in his analysis of "We", Michael Amey points out the American public's preoccupation in "voyeuristic surveillance" (Amey 1) in reality TV shows leading to a:

Trend towards increasing surveillance coupled with a citizenry inured to a constant invasion of its privacy has formed the basis for a number of twentieth-century dystopian novels and films, such as George Orwell's 1984 (1949), George Lucas's THX-1138 (1971), Stephen King's The Running Man (1982), Peter Weir's The Truman Show (1998), Kurt Wimmer's Equilibrium (2002) and the Wachowski [siblings'] Matrix trilogy (1999-2003). (Amey 1)

Here, life imitates art. Elements of these dystopian visions seem to continue to manifest themselves in terrifying accuracy – the NSA has become a real life "big brother".

Through allegory and metaphor, broadly, science fiction allows us to examine our own world at a safe distance reflecting on contemporary socio-political circumstances. As we chase

technological innovations further into our future, science fiction will continue to serve as a window into the trappings and potentials of innovation and its role in our society.

Socio-Political Context

In *Lines of Light Receding*, facial features are obscured in the most saturated colours, and in some cases highlighted under others. It is interesting to note, many viewers took the time to take “selfies” (self-portraits), usually with friends. There were numerous attempts to photograph themselves in flattering colours or light when their mobile device was able to capture their image. Certain colours made the focusing mechanism in some devices difficult to operate producing poor quality images (See figure 9). From a privacy perspective, I thought this serendipitous effect was interesting given the long reach of the NSA and its ability to track all of us whether we are suspected of guilt or not.

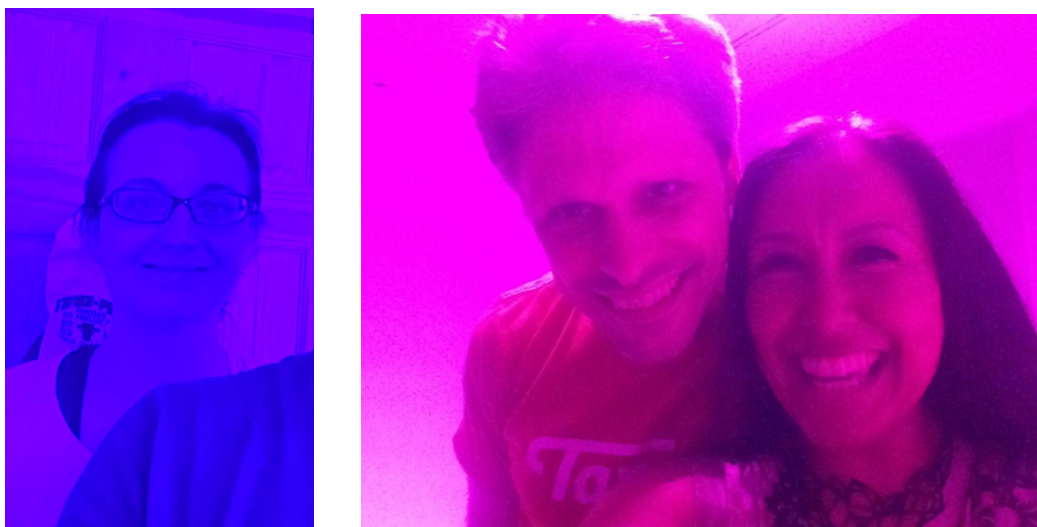


Figure 9. Mobile phone photo (left). Photo: John Rao “Selfies” (Right). Photo: Dionne Paul

My work operates in the contemporary context originally inspired by the revelations of NSA whistleblower Edward Snowden. We have learned from Snowden’s leaks that the US is monitoring a variety of data transferred via large telecommunication and Big Tech’s networks. These large technology companies are working with or, at the very least, colluding with the US government. The NSA has several methods at their disposal from:

Tapping directly into fiber-optic lines (including underwater cables) used to transmit international communications; redirecting messages into NSA repositories when they traverse the US system, as most worldwide communications do; and cooperating with the intelligence services in other countries. With increasing frequency, the agency also relies on Internet companies and telecoms, which indispensably pass on information they have collected about their own customers. (Greenwald 101)

It is within this context that the inspiration for my work emerged. Our behaviors are being tracked leaving traces which are exploited by governmental and corporate bodies. There are versions of us created from our metadata—likes, tweets, and clicks—merged into new profiles that are representing us, yet not quite who we are. These ghosts of ones and zeroes are alive and well, vibrating through servers pinging back and forth data collection apparatuses in their own world.

This unpopulated and crowded space teems with life that is never present yet feels inhabited. More troubling, this *ether space* is scrutinized by all-seeing powers, our big brothers, for any wrongdoing. According to the New York Times:

Since 2010, the National Security Agency [of the United States] has been exploiting its huge collections of data to create sophisticated graphs of some Americans' social connections that can identify their associates, their locations at certain times, their travelling companions and other personal information. (Risen).

This information renders a portrait of us assembled without our consent or knowledge. And right now these portraits, these profiles, our ghosts float about their own hybrid spaces,

vacillating between their virtual world, and our own, blurring our connection between off—and online. We are the ones and zeroes in their system, “*Lines of light ranged in the nonspace of the mind, clusters and constellations of data.*” (Gibson 51)

Artists of Sound and Light

There are numerous artists who work with sound and light, but I would like to discuss those whose work challenged me to push the limits of what I could accomplish in my own: Carsten Nicolai, Ryoji Ikeda, and James Turrell. While I did not attempt to emulate their work, they did provide markers for how far you can take a piece and the lengths one could go to realize an idea. One thing they all have in common, is large scale work that is immersive and all-consuming for the viewer.

Carsten Nicolai

Carsten Nicolai's work appears rigid, but is quite organic. He uses grids, drum beats, and simplified color schemes for complex work that is ambitious in scope, scale, and concept. Nicolai explores low frequencies. He is interested in the visualization that we "cannot necessarily sense." (gestalten.tv) In a public sculpture *Polylit*, he uses the frequencies of CB or mobile devices to affect the interior light of a sculpture encased in two-way glass to make it "transparent." For *Alpha Pulse*, Nicolai took over the lighting of the ICC building in Hong Kong. Across the harbour, he has placed LED screens where live audio pieces are performed in sync with the visuals. A viewer can sync a customized app on their mobile device with the light sequence in the building extending the work into their hands. The app flashes and plays audio in sync with the visuals on the building. The starting point of this Art Basel sponsored piece was to use "the city as the screen."

Nicolai is interested in biofeedback and stimulating brainwaves. It is difficult, even on the screen not to be affected by the drum sequences and strobing stark white imagery. Using a mobile device, you become part of the screen. When I used the app, I stared at my own screen

and was unable to discern where the work existed during that moment. It was like being *inside* the piece.

This immersive quality is what I endeavor to create in my installation works.

Ryoji Ikeda

Massive sprawling installations with an impeccably polished aesthetic, Ryoji Ikeda creates audio and video installations uses projection mapping with discrete audio soundscapes. Ikeda “investigates through a kind of mathematical inspiration the endless flux of data that ceaselessly traverses our world and that undergirds our experience” (DHC). The work is multifaceted, enormous, and terrifying. According to Ikeda, “the process happens in a trial and error and a back and forth way. It's an adventure between the hands and the brain that is both systematic and intuitive, and cannot be generalized.” Many musicians talk about their creative process of writing a song, composing a piece of music, or mixing a track in the same way, allowing intuition to be the guide.

Ikeda’s “Systematics,” which use punched tape for vintage computers in light boxes is of particular interest within the context of my work. The punch cards are old forms of code and in his presentation, beautifully express the binary core language of modern computers. Other pieces used piano rolls from player pianos. These rolls have a similar look as the punch cards and are striking in their simplicity. Placed in dark rooms they have the similar black and white aesthetic of his larger video pieces like, “The Transfinite” and “Test Pattern.” Ryoji Ikeda is masterful in his execution. His work invites audience interaction, and despite the esoteric content and form, is engaging and inspiring.

While Ryoji Ikeda and Carsten Nicolai's work is sonically and visually different, they share a similar process and interest in composition. They have also both released their audio works as albums or compilations along with the gallery-based experience. Their use of open sound (with speakers installed) for a group encounter versus a binaural experience via headphones highlights their interest in an embodied experience. This approach allows for an interactive engagement with the pieces, not unlike a concert, film screening, or play. This form is one in which I continue to foster in my own practice.

James Turrell

James Turrell's medium is light and he works deeply with perception. Chuck Close described Turrell as, "an orchestrator of experience, not a creator of cheap effects. And every artist knows how cheap an effect is, and how revolutionary an experience." (Hylton) His work in the Guggenheim used programmable LEDs and lighting software at a much grander and complicated scale than my works. Technically they follow the same principals—software and hardware—but are working in different realms.

Turrell is interested in what he describes as the "thingness" of light itself altering perception and space with light. In *Skyspace*, Turrell uses the time of day as a part of the lighting design and sequence. He has augmented the view of the sky with programmed lights in the viewing space that also reflect the time of day affecting how the viewer perceives the colour of the sky. This piece transforms over 24 hours. I also use the time of day, but with a very different effect. In *Lines of Light Receding*, the sequence takes place over about 12 minutes versus Turrell's 24 hours and the viewer is immersed in the specific colour with no real window outside of the installation space.

Turrell's work is intricately designed, and this design is in many ways invisible. The work is expertly executed with perfectly smooth surfaces and intelligent placement of lighting. The viewer enters the space unaware of anything other than the work. He has constructed a space comfortable enough so a viewer will remain. In the case of *Skyspace*, he has installed seating that leads the eye up and out into the sky. The viewer is left with a truly immersive experience that is sublime.

Presenting the Experience

Displaying the works *Binary Ghost Planet* and *Lines of Light Receding* presented unique challenges for exhibition. As a theatre director and musician, I have endeavoured to build immersive experiences that extend the narrative or live concert feel for the audience in previous productions. Janet Cardiff and George Bures Miller succeed in this live concert experience in *Opera for a Small Room* (2005). The soundscape synced with the light show created an exciting and evocative time based work that felt like the encore at a rock concert.

The passive interaction of a traditional gallery has been my greatest challenge. Despite these hurdles, I endeavor to emulate the live concert experience in a gallery. I find achieving this to be more challenging in a casual gallery environment where the audience can come and go as they please. Creating a space allowed me to design how the audience would interact with the work. The narrow hallway (a compression), into an open space (a release) are intentional elements of the design of these installations. This physical change focused the viewer to signal they were entering a world I had created.

James Turrell's thoughts on experiencing art, "You're not receiving perceptions, but creating them ... You're not only looking at a painting or a work of art, but looking at yourself perceiving," remind me that the challenge of creating a user experience cannot be controlled with just great planning and an infinite budget. While these components are key, we can never know what our audience brings into the gallery. Their experiences and bias reveal not only much about the work and themselves, but assumptions about you as an artist.

I made a conscious effort to remove as much as possible to eliminate distractions of my work for my audience. And once removed, revealed not only the audiences bias and vulnerabilities, but mine.

While my work was inspired by a socio-political question, it has grown and moved in new directions. The soundscapes evolved a great deal over the past two years. Musical elements have crept forward changing the trajectory of the pieces. It is clear, I have an intimate and unfinished relationship with music and one that needs to be revisited. Fortunately, this process has inspired new potentials and directions for me and my work. This convergence of sound art and music for me is a natural one which would not have emerged without this research process. While I am still passionate about the socio-political question which sparked this research direction, I think that this subject will emerge in new forms while I continue to explore the sonic depths of the binary ghost planet concept.

I am interested in finding alternative listening environments and experiences for the viewer. I have found the longer I work in this way, I believe these audio works are reflections of not only these concepts, but also in my own search.

A search of somewhere, but not here.

As our ghosts float around the binary ghost planet, the world around us continues to change. I have traversed this unknown space and discovered much about myself continue to learn from the installations I have created. We creep closer to the technological singularity and the hybrid and hertzian space we occupy has become the norm. As industry continues to innovate to simplify our user experience, inevitably, we create a more complex system which will

continue challenge us in ways we have not yet considered. As technology evolves so do we. Our life in the virtual inevitably is tied to the actual.

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