CYBERFLESH
THE ME I'VE MADE FOR YOU

JORDAN METZ

cyberflesh

the me i've made for you

a thesis presented in partial fulfillment of the requirements for the degree master of fine arts in digital + media of the rhode island school of design, providence, rhode island

by

jordan

metz

2023

Abstract

This thesis deals with the impact of digital life on individuals by examining how real things become virtual bodies of information. Throughout this text, I weave key theoretical and literary references between my own thoughts and experiences which led to the work that appears in this book. I find it useful to attend to the spaces in between entities, theories, and technologies. In these undefined spaces lies the spiritual dimension of media, the everyday magic that makes digital life possible. These 'in-betweens' are the site of transcendence granted by technology. In my practice, I've learned that things have a certain resistance to being captured, so the transcendence we gain is incomplete and muddled by corruption, distortion, and loss. I conclude with the suggestion of a new term to refer to the separate entity of data that constitutes a fractured and fragmented digital double. This cyberflesh is an evolving, vulnerable being, captured by media and contained within the global infrastructure of technology.

Introduction

All my life I have been pulled deeper and deeper into the ether.[1] When I was in elementary school, my classmates and I would meet virtually after school on Club Penguin, an online game in which users outfit their own penguin avatar, adopt imaginary pets, and chat with other penguins in a fictional town square. When we got a bit older, we would spend countless hours playing World of Warcraft, embodying magical avatars who allowed us to chat with strangers from all over the world without revealing that we were 11-year-old girls. When I made my blood elf avatar strip her armor and dance on top of the buildings in Orgrimmar, advertising cyber sex for five gold coins, I wasn't playing as myself- it was just a game. The avatars and screen names functioned as protectors, as guises that separated our personal identities from our online activities.

The development of social media as we know it concurred with my puberty. Many of my friends had a MySpace account by ten years old. During sleepovers, we would chat on AIM with our school crushes, messaging the things we wouldn't dare say in person. By thirteen, I had a Facebook account, a Twitter profile, and an Instagram page (though back then, I mostly used Instagram to add filters to photos ultimately intended for Facebook, before Facebook was overtaken by our parents and before #nofilter became the norm). Before I knew it, most of what I did online had departed the realm of pretend game-play and became inextricably linked to my identity offline. I began to perform how I wanted to be perceived online at the same time as I was figuring out how to be in the world.

[1] Ether is a colloquial term referring to the airspace through which radio waves are transmitted. It represents an invisible medium that supports a flow of information. In a contemporary context, technologies like Wi-Fi and bluetooth would occupy the ether.

[2] I use the word corruption to refer to a moral degradation and to the errors that occur in data transmission. These errors cause unintentional change of the original by making its copy. In this way, the transfer of information is potentially dangerous for the integrity of the information itself.

[3] By 'physical world,' I am referring to the place where bodies occupy space, as opposed to the digital world, where space and materiality are illusions created with information instead of tangible matter.

My practice deals with the ways in which digital life impacts how I act, how I feel, and who I think I am. Because my adolescence was propelled by my online activities, I view the digital world as a site of corruption.[2] In contrast, I idealize the physical world[3] with the nostalgia and innocence of childhood– the blissful period before I worried so much about how I was perceived by others. I am concerned with recovering the embodied experience that goes untranslated in the digital information systems which form online identities and inform offline behavior. In other words, what happens to the body as a representation of identity when it becomes a body of data?

Throughout this text, I weave key theoretical and literary references between my own thoughts and experiences which led to the work that appears in this book. My research and experiments inform and challenge each other. My practice is an ongoing conversation between the many sides of myself, where contradictions drive the next iterations of the work. I find it useful to attend to the spaces in between entities, theories, and technologies. In these undefined spaces lies the spiritual dimension of media, the everyday magic that makes digital life possible. These 'in-be-tweens' are the site of transcendence granted by technology. In my practice, I've learned that things have a certain resistance to being captured, so the transcendence we gain is muddled by corruption, distortion, and loss.

Collage on paper with dried ferns and thread

Specifically, my research has dealt with the way real[4] things become virtual[5] bodies of information. There is a dichotomy in my work between the ephemerality of digital media as a phenomenological experience and the precarious permanence of digital information. Digital information is both an enduring record and a transitory experience– it documents and displays; it recalls and also degrades. I am thinking alongside N. Katherine Hayles' seminal text How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics. Hayles attends to the commonplace misunderstanding of information as a bodiless abstraction, wholly separate from the material world. Instead, she insists that for information to exist, it must be instantiated within a medium.[6]

This fundamental misconception of information led to a long history of human-computer coupling that projected biological processes on machines, and absorbed system mechanics into the cultural conception of the human body. The body is not a machine, but it is susceptible to the pull of technological systems. Hayles writes, "Americans... increasingly engage in virtual experiences enacting a division between the material body that exists on one side of the screen and the computer simulacra that seem to create a space inside the screen."[7] I want to bridge this gap by inhabiting the real and imaginary space behind the screen and bringing it into an embodied relationship with the world on the other side.

[4] 'Real' has become a problematic term in my research. I will use it to describe things that exist without digital interventions while acknowledging that things that take place inside computers are just as real, physical, and material as the human body.

[5] 'Virtual' is also a term worth defining. Gilles Deleuze claims that virtual things are themselves real. In Difference and Repetition, he writes, "The virtual is opposed not to the real but to the actual. The virtual is fully real in so far as it is virtual." As is typical for French philosophy, this recursive definition is less than illuminating. Acknowledging the digital connotation of virtuality, N. Katherine Hayles defines virtuality in How We Became Posthuman as, "the cultural perception that material objects are interpenetrated by information." So to bring these two definitions together, virtuality encompasses everything that happens inside computers as well as the imagination. Put more simply, virtuality is the state of approaching reality.

[6+7] N. Katherine Hayles, How We Became Posthuman: Virtual bodies in cybernetics, literature and informatics (Chicago: University of Chicago Press, 1999), 13, 20.

[8] I am tempted to adopt the abbreviation AFK (away from keyboard) coined by Legacy Russell in Glitch Feminism. AFK honors the fact that our activities online are very much a part of real life, while IRL implies that offline is where real life happens. However, if I give it a bit more thought, I realize that there are few, if any, moments when I am truly away from the keyboard. My cell phone is with me everywhere, so I am always straddling the internet and offline experience. So, I don't find this distinction useful for my purposes. Instead, I think IRL can continue to refer to everything that doesn't take place within computers.

What we do in cyberspace is very real in that it impacts what we do out in the world. The Internet is out in the world because we bring it with us. More than just residing in our phones and computers, the Internet has come to occupy our minds and our bodies. I'm captivated by the way we contort our bodies and our identities for the viewing of others. Social media allows us to perform a curated version of our identity. Although there is such intimacy in baring yourself to the camera, the black hole of the lens becoming the eye of the future observer, a certain doubling takes place which allows for a degree of separation between the performance in front of the camera and the identity of the performer IRL.[8] Behind the interface, it's not only the images we share that fuel the algorithm, but also the information about what we watch, who we listen to, and where in the world we log on. I seek to escape this cycle by taking back control over my own image. Within my practice of digital performance, there is the chance to separate from my identity even further by becoming a disembodied sign in a depersonalized context. I find this space to be incredibly freeing for expression and play, with concepts and with the body. The exposure is temporary, but the product is still something highly controlled, edited, and framed with a critical lens for consumption. It is me on the screen and it is also not me, the one who is watching you watching the me I've made for you.

Data

I used to believe that what separated digital art from traditional mediums is an immaterial nature. The realization that digital information remains embedded in material reality has sparked my interest in the physical infrastructure of technology. Light and sound feel immaterial; they are out in the air; they come from machines; but the information which gives presence to these media does exist physically in the material world, stored as bits (1's or 0's) on metal-oxide semiconductors and transmitted as electrical signals to make their way onto your screen.[9] The hard, opaque surfaces of technology make it hard to imagine this process taking place inside computers. Our culture tends to value the visible, so the invisible operations of our computers are ignored. Imagine if you could see the digital trash bin on your computer filling up, or feel the weight of your device get heavier with each download– would the clutter of data impact the way you use computers?

The way computers know about us is data. For digital natives like me (a gen Z/millennial cusp) data has been collected about us for almost our entire lives. Since I was a child, almost everything about me exists as data somewhere. In addition, much of my childhood has been retroactively uploaded through pictures on Facebook. These social media images act as memories and become material records, accessible from anywhere on earth. I'm interested in exploring the existence of an emotional and physical double that exists inside the global network of computers and is made up of all of the information collected about an individual.

[9] Electricity is energy created by the movements of electrons inside some kind of matter. It is another kind of in-between.

[10] William Gibson, Neuromancer (New York: Ace Books, 1984), p. 51

My imagination of this space is influenced by the cultural imaginary of the inner workings of computers perpetuated by science fiction, namely William Gibson's notion of cyberspace: "A consensual hallucination experienced daily by billions of legitimate operators, in every nation... A graphic representation of data abstracted from the 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."[10] Cyberspace is the place where we don't go, but we are always in.

Everything I share online is in service of my digital identity. It's important that not everything is shared, and not everything that is shared is done so voluntarily. Social media gives users a sense of control over how they are perceived by others. Though we might be able to exert some control in compartmentalized social circles (i.e. work, school, friends might see a different side of you), social media acts on a global scale, affecting the perception of friends, enemies and strangers alike. It's different when the effect is a flattening one: reducing someone's life to a series of images, or a dataset for an algorithm. Social media writes our histories almost in real time. It dictates how we might choose to be remembered and effectively erases that which its archives do not contain from collective memory.

[11] Marshall McLuhan, The Book of Probes (Corte Madera: Ginkgo Press, 2003), 357.

"The more the data banks record about us, the less we exist." [11]

Memory Quilt (2022)
Polaroid photographs, chain rings. 32 × 18"

oblivion
(off-facebook_activity)

This textile was made with 88 pieces of canvas, 41 hours of laser engraving, ten hours of sewing, and two years of my internet browsing history as collected by Facebook. My "off-facebook activity" is a .json file containing timestamped page views and purchase history from every website and app I visited from approximately September 2019 to September 2021. We often hear that social media companies armed with this type of personal information can know us better than we know ourselves, but when I looked at this data I felt that my identity and personhood was completely absent. Within these files lies a seemingly endless pattern of letters, numbers, and punctuation representing my online life. My online life is already one degree removed from my real interiority, so this data was an abstraction of an abstraction. Each line of code contained nonsensical computer language. I became engrossed by the overwhelming gestalt.

laser-engraved canvas, thread,
3 video channels and sound
85 × 135"

```json
{
"off_facebook_activity_v2": [
{
"name": "Retina AI",
"events": [
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632735960
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632649680
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632563220
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632476820
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632390420
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632304440
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632269580
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632237540
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632044700
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1631958420
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1631893800
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1631785560
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1631751300
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1631708280
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1631695200
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1631613120
},
{
"id": 278731847094913,
"type": "CUSTOM",
```

your_off-facebook_activity.json

```
176
177        "id": 287435711376482,
178        "type": "RESULT_SENT",
179        "timestamp": 1631055120
180    },
181    {
182        "id": 287435711376482,
183        "type": "CUSTOM",
184        "timestamp": 1585620540
185    },
186    {
187        "id": 287435711376482,
188        "type": "CUSTOM",
189        "timestamp": 1581800940
190    },
191    {
192        "id": 287435711376482,
193        "type": "ACTIVATE_APP",
194        "timestamp": 1576720200
195    },
196    {
197        "id": 287435711376482,
198        "type": "ACTIVATE_APP",
199        "timestamp": 1576719780
200    },
201    {
202        "id": 287435711376482,
203        "type": "ACTIVATE_APP",
204        "timestamp": 1576714980
205    },
206    {
207        "id": 287435711376482,
208        "type": "ACTIVATE_APP",
209        "timestamp": 1576686720
210    },
211    {
212        "id": 287435711376482,
213        "type": "ACTIVATE_APP",
214        "timestamp": 1576681980
215    },
216    {
217        "id": 287435711376482,
218        "type": "ACTIVATE_APP",
219        "timestamp": 1576646940
220    },
221    {
222        "id": 287435711376482,
223        "type": "ACTIVATE_APP",
224        "timestamp": 1576629540
225    },
226    {
227        "id": 287435711376482,
228        "type": "ACTIVATE_APP",
229        "timestamp": 1576628700
230    },
231    {
232        "id": 287435711376482,
233        "type": "ACTIVATE_APP",
234        "timestamp": 1576600680
235    },
236    {
237        "id": 287435711376482,
238        "type": "ACTIVATE_APP"
```

Installation detail with magnifying glass.

"name": "Retina AI",
"events": [
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632735960 {

"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632649680 {
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632563220 {
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632476820 {
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632390420 {
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1632304440 {
"timestamp": 1632304440 {
},
{
"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 16327695BH

"id": 278731847094949
"type": "CUSTOM",
"timestamp": 163144

"id": 278731847094949
"type": "CUSTOM",
"timestamp": 1631353

"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 1631312

"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 16312674

"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 16312150

"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 16312060

"id": 278731847094913,
"type": "CUSTOM",
"timestamp": 16311611BH

Quilting served as a technique to interface with this data using my body, thereby emphasizing its materiality. Radka Donnell, in Quilts As Women's Art, frames the practice of quilting as an "interface with silence,"[12] referring to the isolation quilters endure through their labor. Silence is defined as a lack of noise, sound or speech, but a secondary definition is the absence of mention, or oblivion. I see oblivion as the current status of feminine and queer thought, bodies, and identity within the techno-heteropatriarchy that is the social media data mining industry.

Amidst growing concern over data privacy, most social media platforms have responded by giving users access to the information being collected about them. Dealing with these data-sets manually subverts the intentions of social media companies in making user data available for download. The data is logged and delivered in formats optimized to be read by other computer systems. Spending many hours reading and deciphering this language was a main component of my research. This exercise served as a meditation on the labor, both human and machine, that allows for the creation of online personhood and digital identities. The content and information created by individual users becomes the product in this capitalist and industrial endeavor. What's hidden by user interfaces are the infrastructure required to collect and store mass amounts of data and the marketplace within which this data is circulated.

In order to simulate an industrial environment that might contain this data, I recorded the machines used in the process of making this quilt. The timelapse videos of laser-cutting and sewing are accompanied by the raw sound of those machines. The middle channel scrolls through the data file in its native json format while the synthesized sounds of machines oscillate in and out of rhythm. This sound file was created by recording a work session in RISD's spatial audio studio with an ambisonic microphone and truncating the silent portions of this two hour file, reducing it to about 15 minutes of activity. I wonder what it means to forget the silent moments of our lives and labor, the time elapsed in between our minds and machines.

[12] Radka Donnell, Quilts As Women's Art: A Quilt Poetics (Vancouver: Gallerie Publications, 1990), 2.

35

Death no longer interests me because it no longer means obliteration. Too much of me will continue to live on, not only in the memories of my loved ones, but also in data stores around the world. Who will lay this information to rest? Who will write the eulogy of my life online?
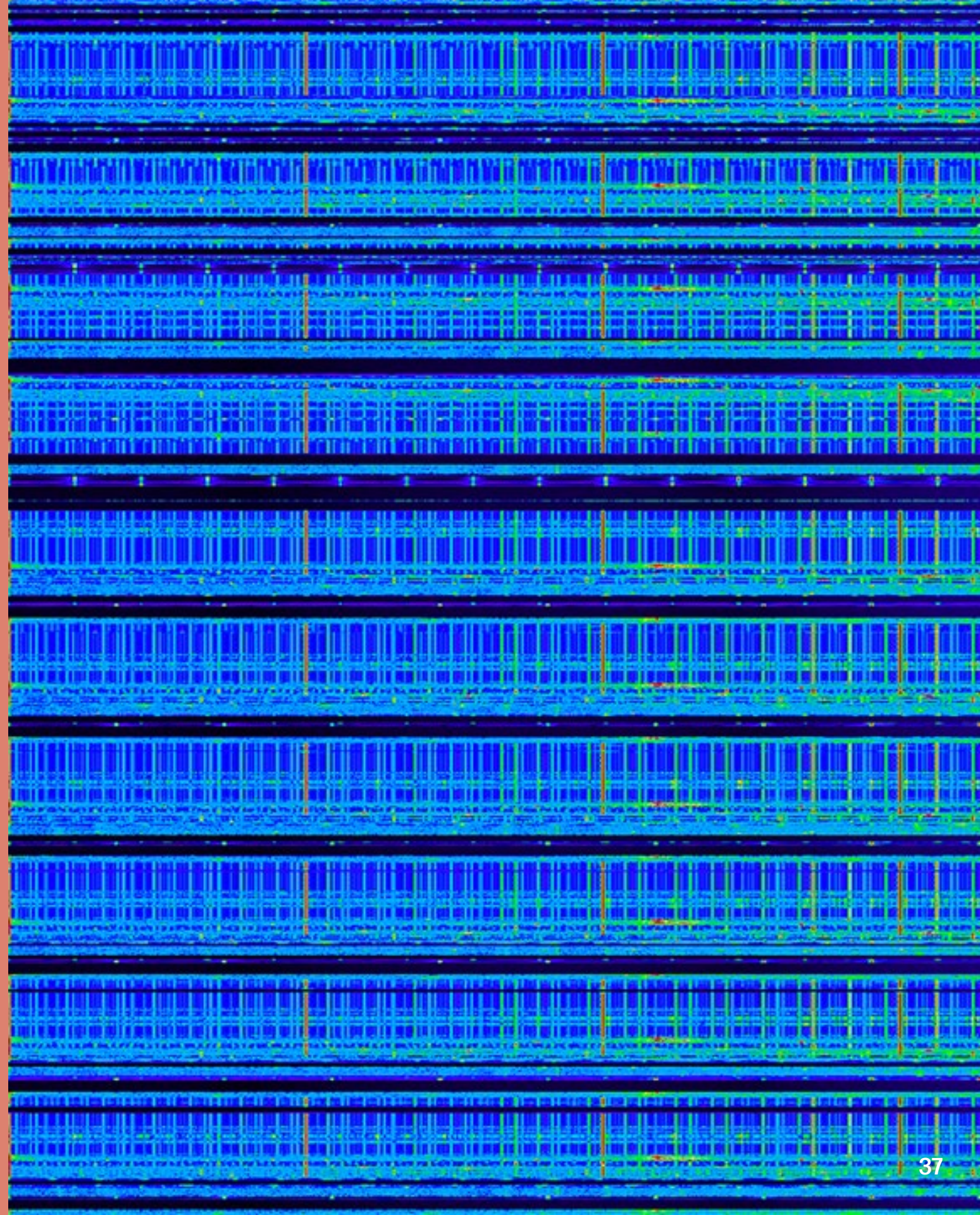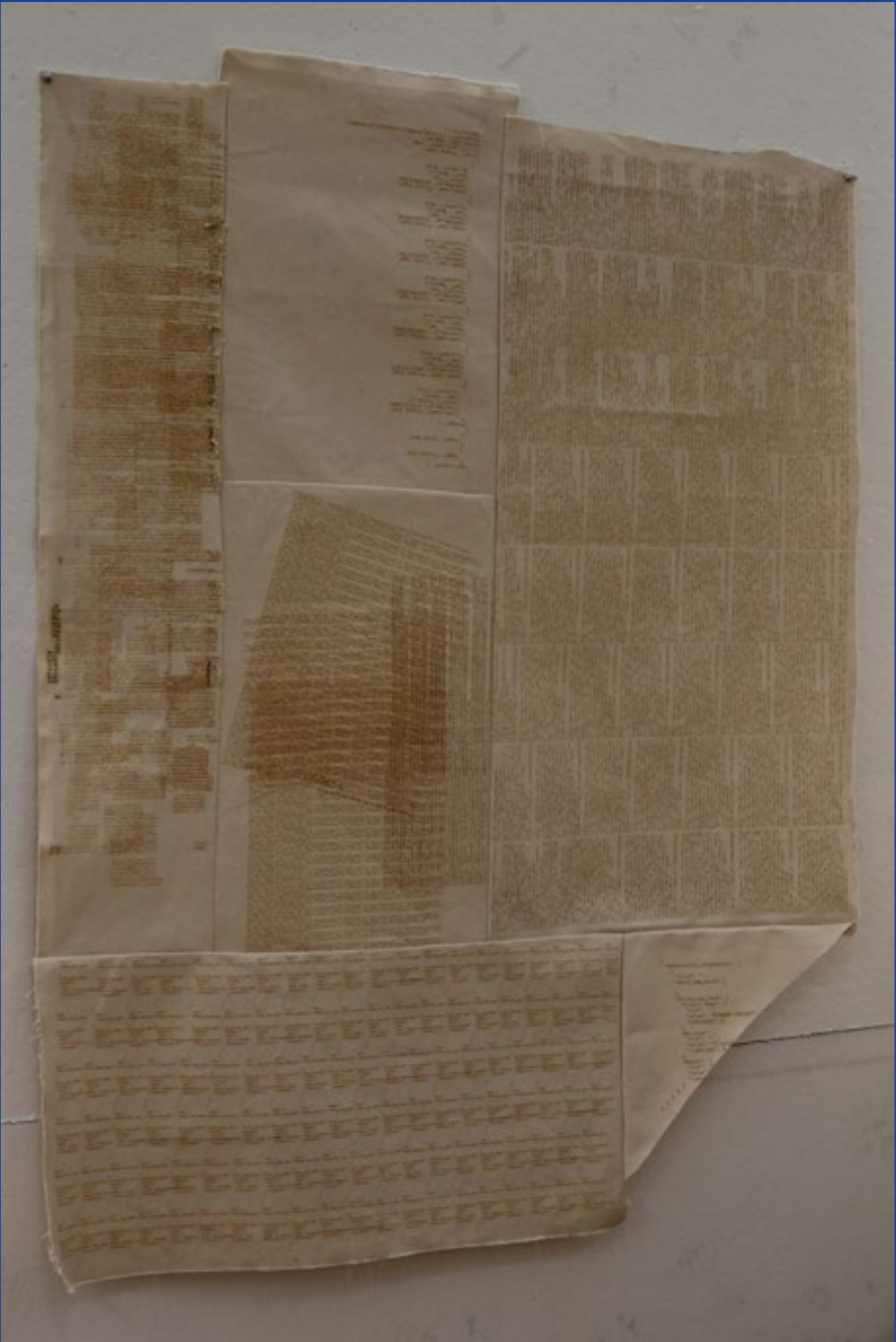
I fed archived instagram photos into an image to sound data translator that turns pixels into audio frequencies. After many iterations, the image becomes unreadable.
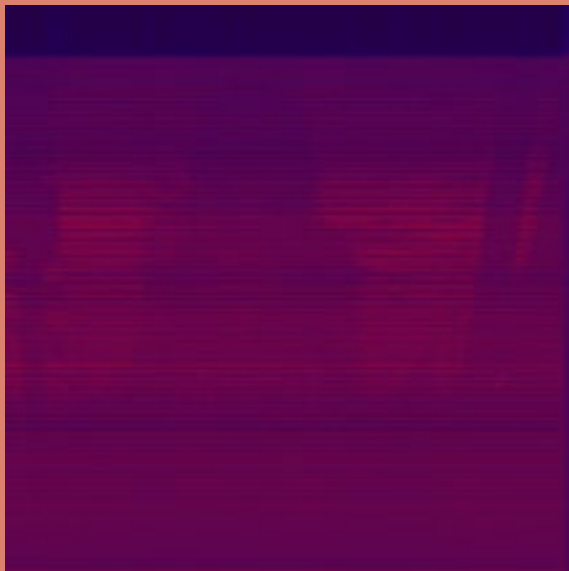
data quilt 1 (2021)
laser-engraved canvas,
thread
45 × 35"

Body

What is lost from reality by constructing its representation? Cultural critic Walter Benjamin would argue that a work of art loses its aura when it is reproduced.[13] But what happens to people through this process, rather than works of art? Representing people through digital means necessarily throws out an abundance of qualitative information about the person in order to construct an image. An image, in turn, actually gives individuals a certain aura: of objecthood, flatness, and permanence. It ignores dimensionality and personality in favor of the purely visible.

[13] Walter Benjamin, The Work of Art in the Age of Mechanical Reproduction, trans. J. A. Underwood (London: Penguin, 2008).

A TikTok filter recreates image synthesis used in facial recognition algorithms.

Fig. 25

THE ARCHITECTURE OF A SINGLE SAMPLE PER PERSON DOMAIN
ADAPTATION NETWORK (SSPP-DAN). [249]

This visibility is also limited to what can be detected by computers. As form gives way to pixels, the biological reality of our bodies is transformed into digital information. Although imaging technologies have advanced to be extremely precise and accurate, I still feel a tinge of the uncanny when I watch videos of me, listen to my own voice, or see images of myself. Perhaps it is this exactitude which disturbs my feeling of oneness within myself. I feel this as a dissociative fracturing of my identity, where pieces of me have been captured and contained by being reproduced. My digital double is a perfect replica of the surface of my skin, and yet it could not be more empty and lifeless, betraying my full humanity in its flatness and intangibility. At the same time, it's this doubling and extraction that allows me to play with my being.

"Are people hidden by too many images? …Do they become images?" [14]

[14] Hito Steyerl. How Not to Be Seen: A Fucking Didactic Educational .MOV File

Eternally Meeting My Self

This generative audiovisual performance is about the way we encounter ourselves and our bodies in the digital landscape. Both the 3D model and the video image constitute an instance of my physical existence in the world, captured and replicated by a digital mechanism, forever stored by a machine. This work imaginines the surreal place these instances go and how they might join to form a metaphysical sense of self that exists between media.

The custom program generates a new note every second using polyphonic synthesis, creating an eerie soundscape as the notes fall in and out of discordance. The glitchy movements of the 3D model are created by turning the audio signal into a matrix[15] and using that information to affect its position on the screen. After the video image is consumed by the 3D model, a close-up video of my eye is mapped onto its form, suggesting that I am still peering out of this new container. The additional sound samples were synthesized by reading images of myself into a spectrogram player, which reads pixels as audio frequencies.

[15] A matrix is a grid where each cell contains a piece of information. In a video screen, each pixel is part of a matrix of color values that come together to represent an image. Cycling '74. "What is a Matrix?" Accessed December 10th, 2022. https://docs.cycling74.com/max8/tutorials/jitterchapter00a_whatisamatrix.

"After the fantasy of seeing oneself (the mirror, the photograph) comes that of being able to circle around oneself, finally and especially of traversingoneself, of passing through one's own spectral body."[16]

[16] Jean Baudriallard, Simulacra and Simulation, trans. Sheila Faria Glaser (Ann Arbor: University of Michigan Press, 1994), 106.

Are pixels like biological cells? Do they know they are part of me?

Does it hurt to lose resolution, to be compressed into a .zip folder, or attached to an email?

What does my body learn from its extension into the digital world? Does it bring back poison or pleasantries?

How does one benefit from being represented digitally? How does it allow us to transcend our physical realities? What will be the impact of this?

Texture jpg created by the Einscan Pro HD 3D scanner.

2022/09/23
16:17:12
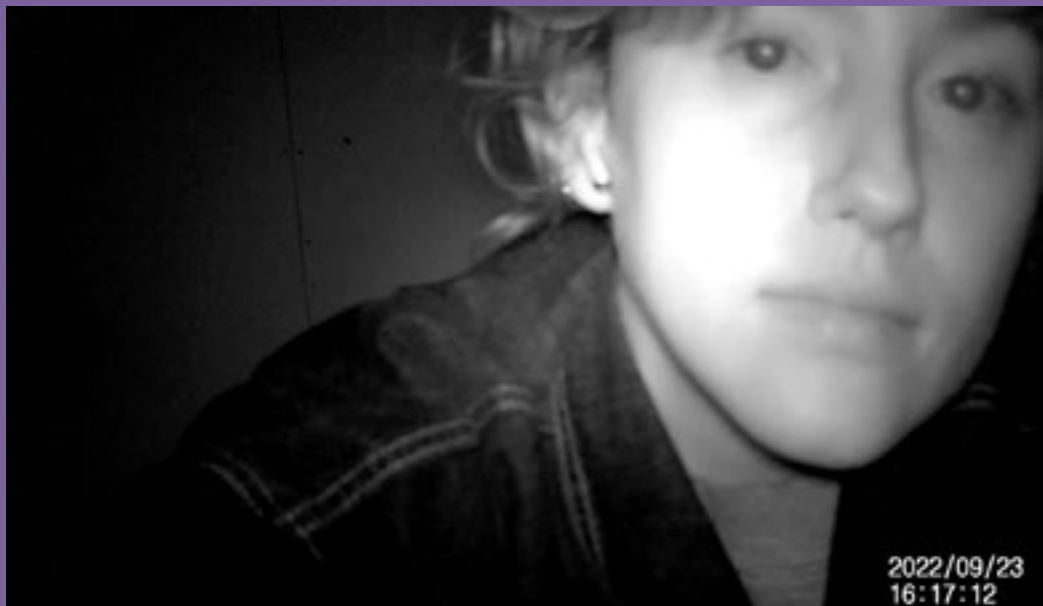
My body is a living, breathing archive of my embodied experience on earth. This information is inaccessible to others, to extractive technology, and even to my own conscious awareness. My body is my locus for knowing. "There is an essential gap between the idea of the human being as a computing machine of symbolic information and as something quite different, an embodied person who knows a great deal about the world preconceptually and non-symbolically through her experience of moving around in it."[17] How can this knowledge and experience possibly be translated into the digital world? Images only capture my surface. They know nothing of my knee pains and my head aches, or the constant tension between my shoulder blades, or the reflexive tightening of my abdomen just before the shutter clicks. It's more than hiding behind a smile– it's hiding behind my skin.

[17] Siri Hustvedt. A Woman Looking at Men Looking at Women (New York: Simon & Schuster, 2016), 262.

The gaze of the other follows me home. I perform for them, even when they're not around. I imagine cameras hidden in corners. I imagine cameras pointed in my windows. I imagine my neighbors are watching me change my clothes. I imagine someone is stalking me- they follow me everywhere and they know my every move. I imagine someone is tracking me online, stripping the location data from my photos and planning to find me IRL.

But I don't do anything to protect myself. I don't close the curtains or make my social media accounts private.

I imagine someone is combing through the archives of my digital data. I imagine they can read all of my direct messages and see my deleted photos. I imagine someone has found the SIM card from my first cell phone and they have downloaded all of the pictures I took at 12 years old. I imagine my private conversations are being discussed in public circles. I imagine my greatest fears and anxieties are written all over the Internet. I imagine someone is watching me through my computer and my phone. They have tapped into my webcam and my microphone and they survey me 24 hours a day.

"A woman must continually watch herself. She is almost continually accompanied by her own image of herself....From earliest childhood she has been taught and persuaded to survey herself continually. And so she comes to consider the surveyor and the surveyed within her as the two constituent yet always distinct elements of her identity as a woman...Thus she turns herself into an object – and most particularly an object of vision: a sight."[18]

What do I get out of being seen? It's a haunting confirmation that I do exist.

[18] John Berger, Ways of Seeing (New York: Penguin, 1977), 46-47.

Studio Trail Cam

I'm interested in uncovering the essential components of my identity— a potentially futile task. I've come to believe that who we are when no one is watching might represent our truest selves, without interference from an outside observer. For these reasons, I decided to install a motion-activated trail camera in my studio as a way to document myself in my undisturbed state of being. The camera was situated to face me at my chair, so that I was framed from about the waist-up as I worked at my desk. Every time the motion-sensor detected movement, a six second clip was recorded.

I quickly amassed thousands of video clips. The impossibility of my endeavor to capture every moment of my working hours became evident. I lost a lot of footage due to my own errors (not wiping the memory card before it filled up and stopped recording, or forgetting to format the memory card in the camera once I finally did copy the files over to my hard drive). There were also a multitude of videos where I did not appear at all, but some movements must have triggered the motion-sensors anyways.

I became very interested in these clips that seemed to represent transitory moments in my days, moments when I am in flux. They captured my presence without my image. I was simultaneously documented and completely absent.

Observer effect meme

Watching me watching me being watched.

2022/09/06
13:52:23

2022/09/08
10:37:02

2022/09/07
18:00:02

2022/09/08
15:28:35

76

77

2022/10/05
13:43:22

2022/10/05
14:45:39

2022/10/05
14:43:45

2022/10/05
16:45:31

motion-activated
camera in use

motion-activated
camera in use

motion-activated
camera in use

84

85

86

87

2022/10/07
17:15:13

2022/10/07
17:19:12

2022/10/07
17:17:12

2022/10/08
13:22:08

90

91

92

93

94

95

motion-activated
camera in use

2022/10/09
13:24:47

motion-activated
camera in use

2022/10/09
13:27:10

motion-activated
camera in use

2022/10/09
13:25:23

motion-activated
camera in use

2022/10/10
10:11:24

96

97

2022/10/11
16:13:57

2022/10/12
09:33:19

2022/10/12
09:32:14

motion-activated
camera in use
((( )))
2022/10/12
09:35:23

2022/10/13
09:29:48

2022/10/13
09:31:43

2022/10/13
09:31:43

2022/10/13
11:04:42

2022/10/26
14:41:18

2022/10/26
14:57:50

2022/10/26
14:42:15

2022/10/26
15:59:00

2022/10/26
16:12:47

2022/10/26
16:25:32

2022/10/26
16:16:04

2022/10/31
13:12:16

2022/10/31
13:16:48

2022/10/31
13:44:55

2022/10/31
13:34:51

2022/10/31
13:45:52

2022/11/04
14:17:10

2022/11/04
15:43:05

2022/11/04
15:29:50

2022/11/05
09:18:07

2022/11/05
14:07:11

2022/11/05
14:15:14

2022/11/05
14:11:10

2022/11/05
14:38:37

132

133

2022/11/09
16:39:08

2022/11/11
12:06:34

2022/11/10
12:02:03

2022/11/11
12:09:41

138

139

144

145

148

149

2022/09/09
12:48:52

Pandemic Interlude

5.6.2020

The gap between entities of consciousness seems insurmountable.

Are we as separate as our skulls, our skins?

Universes meet at perimeters and join in their separateness,

Barriers to connection constructed by dense meshes of particles and the gravity of ego.

I can never truly know you- i still surprise myself.

Quarantine grenadine (2020) Acrylic, collage, ink,
dried fern and thread on paper

Isolation is a door locked from the outside. It's staring out the window with longing. Isolation is a feeling in your bones. It is the call not returned, the message not answered. It is a ghost: looming invisibly. Isolation is looking in the mirror and not recognizing the face staring back. It is invisibility to yourself. Isolation is a pit of despair. It is an endless staircase, a ladder to nowhere, a boat with no sail. Isolation is dull- voices muted, colors desaturated, faces flattened. It is death by a million cuts of a blunt knife. It is pain spread thin and painted on gently.

Solitude is a door locked from the inside. It is an open window and fluttering papers on a cluttered desk. Solitude is a ceasefire in the body. It is the call ignored, the message not answered. It is the spirit settling in. Solitude is a great drawbridge hoisted up by chains. It is closing for the season. It is a sign on the door for an entire afternoon... 'back in 15 minutes.' Solitude is passing by the mirror without a glance at one's own reflection. Solitude is a mountain trail. It is a restful break and a handful of trail mix. Solitude is sharp. It is new flavors pairing with the old. It is moldy cheese and crisp, white wine.

"Who, nowadays, watches the light stream through the walls of her "dark chamber" with the company of a phantasmagoric assistant, or smashes at her eyes to reproduce lost color sensations, or stays up all night watching colored shadows drift across the walls? At times I have done all of these things, but not in service of science, nor of philosophy, not even of poetry."[19]

19 Maggie Nelson, Bluets (Seattle: Wave Books, 2009), 29.

We form our own image of ourselves through our relationships with others. But who are we if nobody else is around?

During the early days of the COVID-19 pandemic, I lived alone in a two bedroom apartment for six weeks. I didn't spend the whole time alone. As a low-risk individual, I left often to do my grocery shopping and patronize local cafes, taking iced oat milk lattes and pastries to-go. I also spent an inordinate amount of time riding by bike around my neighborhood in Santa Monica. Sometimes I'd ride an hour up the Pacific Coast Highway through Malibu, suddenly a much safer ride without the sports cars revving their owners' egos. But when I returned home, it didn't take long for the loneliness to set in. When the sun finally set, the night stretched long before me and I questioned if the next day would truly come.
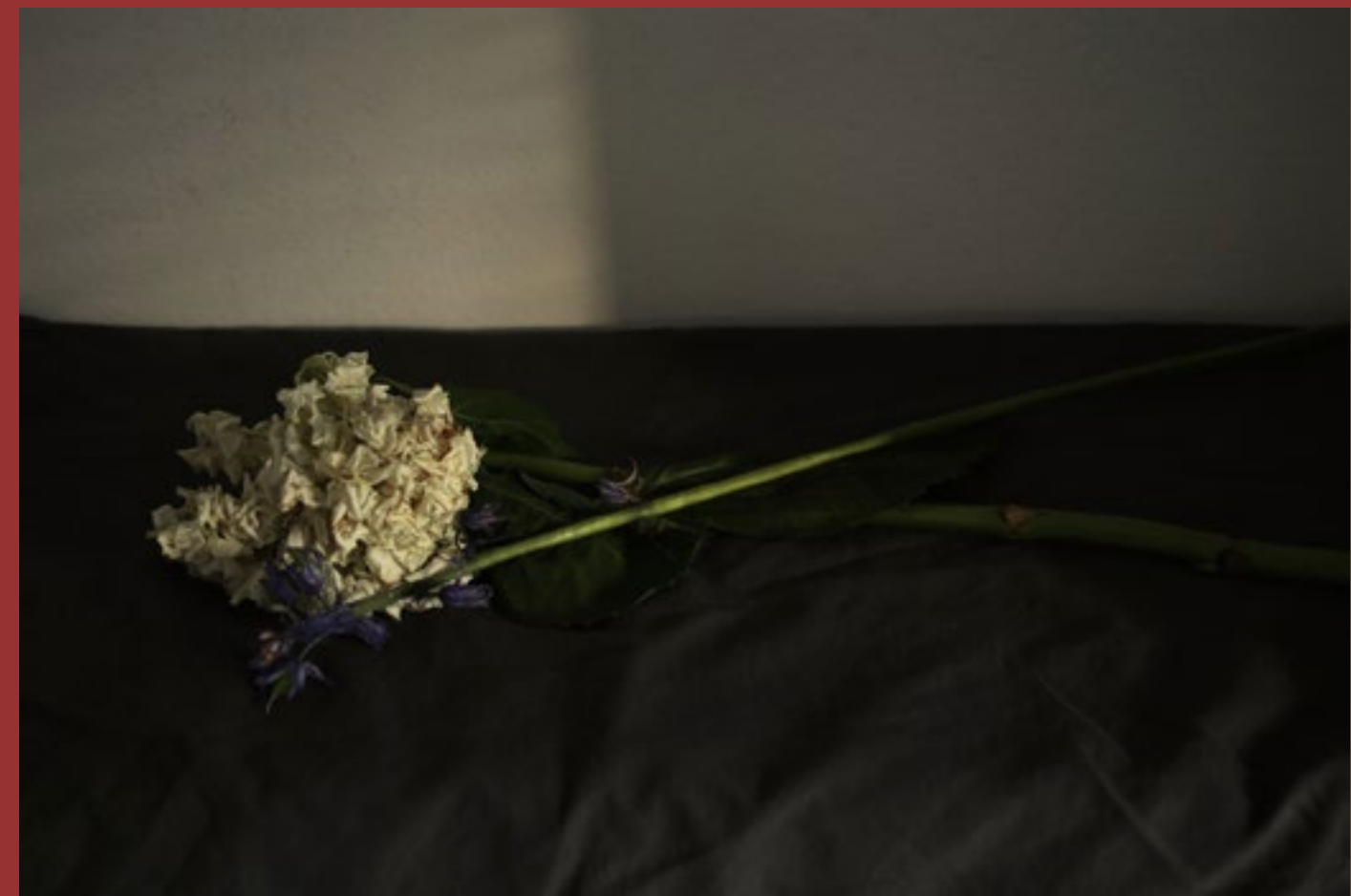
Still life (2020) when my apartment became my studio
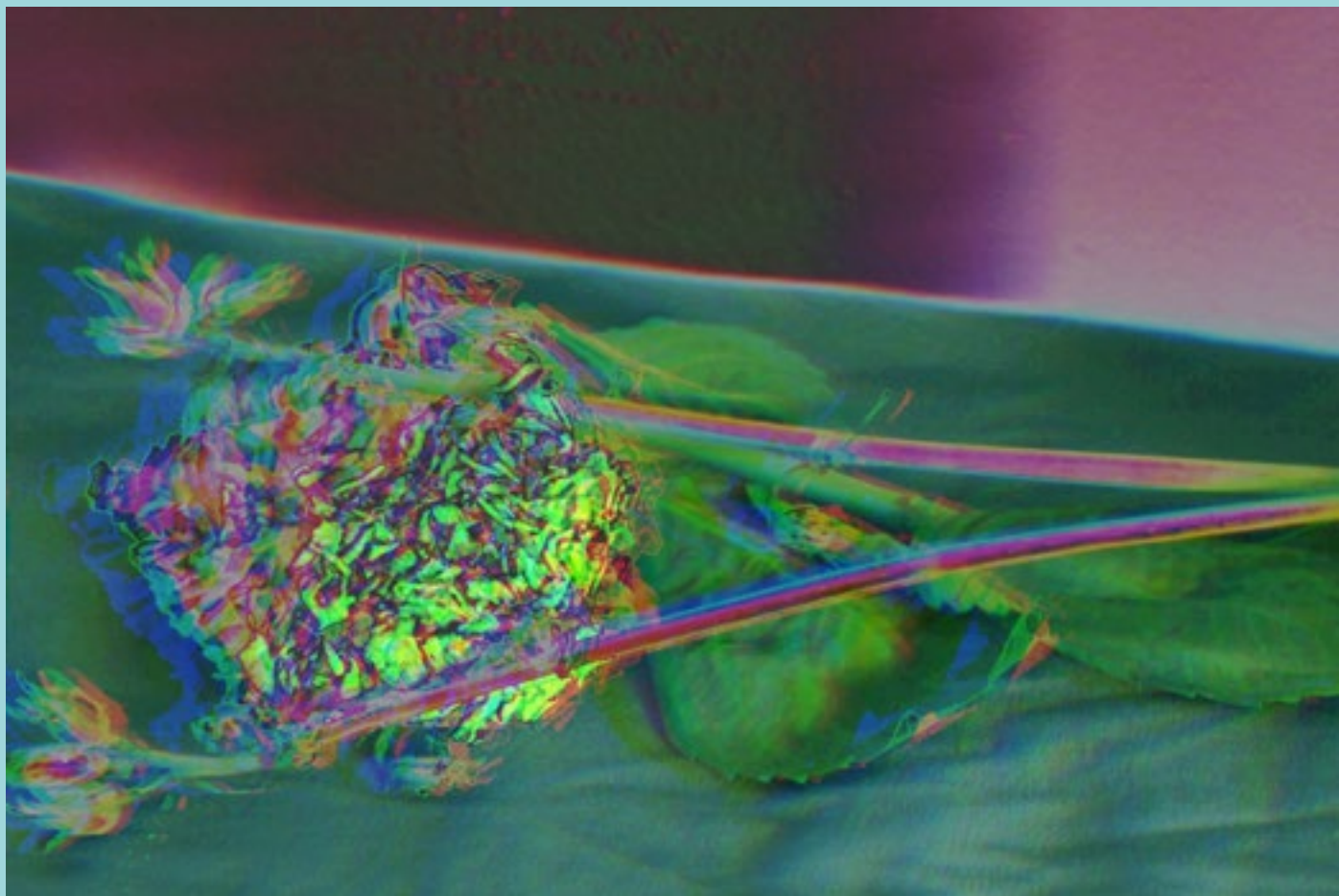
Still life image processed in photoshop

After some time of this routine, my small endeavors felt futile. It felt like I was performing in a simulation. My apartment was my stage, but a black box had been placed over it so the audience was obscured. Of course, I turned to social media to stay in touch, to feel relevant, and to look in the mirror at myself through the eyes of others. It was my tether to reality; but every day, a little more length was let out and I drifted.

Towards the end of this period, I spent a lot of time laying on the floor in my living room. I'd stick my arms straight up in my line of sight and play in the light spilling through the blinds. Sunset was my favorite time of day when shadows would dance across the blank, white walls. I'd play in these shadows too, making birds and bunnies with my hands. I'd dance with my whole body and watch my shadowed form abstract itself and coalesce back into the shape of me I recognized. My shadow became an anchor- a reminder that I am here, alone, in this cave of my consciousness.

Playing in the shadows

3D printed tombstone for my former sel

Living my best life in Animal Crossing
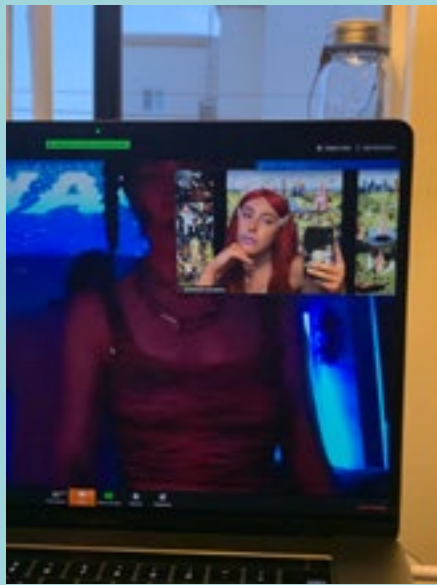
Quarantine Grenadine became my alter ego in online queer spaces
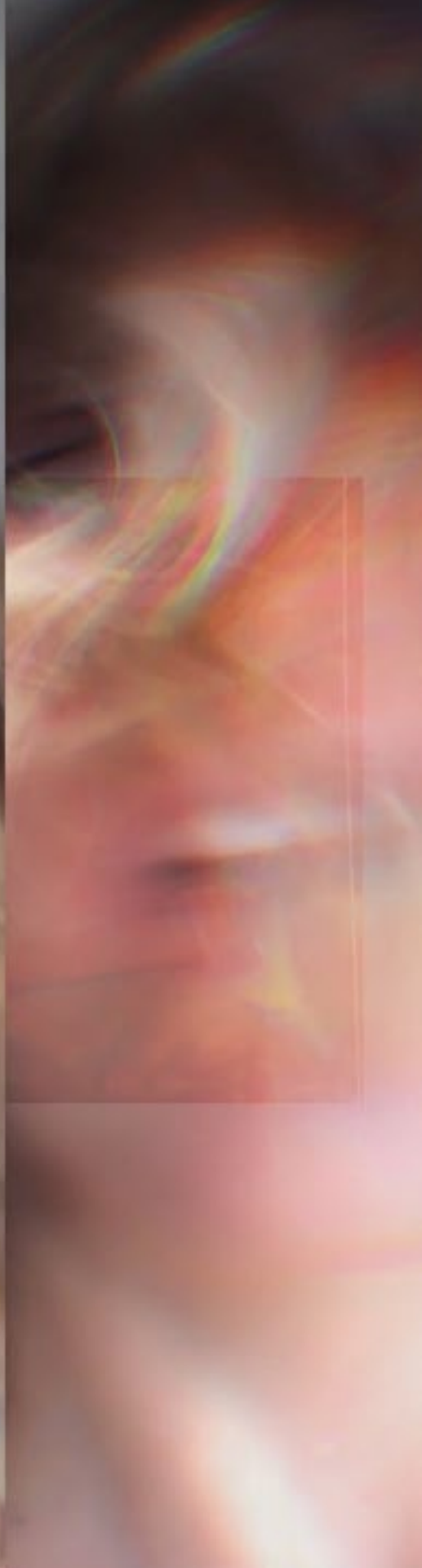
Occupying Spaces In-Between

"The new media are not bridges between man and nature– they are nature."[20]

[20] Marshall McLuhan, The Book of Probes, 18.

Tech Transcendence

The promise of virtual reality is to transcend the physical. Feminist anthropologist Roshanak Kheshti identifies a "will to shape-shift" as a driving force of humanity.[21] She traces the cultural history of the tools humans have used to transcend:

[21] Roshanak Kheshti, Wendy Carlos's Switched-on Bach (London: Bloomsbury Academic, 2019), 20.

> *The pre-Christian and early modern icons of shape-shifting (sorcery, alchemy, chimeras, magic, spirits, voodoo, hoodoo, ghosts, etc) became pivotal to the paradigm shift to the Christian and colonial eras. Jesus' resurrection comes to figure as exceptional and hence definitive of his divine power and an end is declared to the more commonplace, everyday forms of shape-shifting claimed by commoners. The mythos of resurrection elevated the birth and resurrection of Christ to the preeminent form of shape-shifting, rendering sorcery and magic as base and inauthentic.*

Biblically accurate Jor.

In the modern era, technology has answered this need to shape-shift, to extend outside of ourselves. Our lives are expanded into and through computers. The virtual world is a real place where we perform unreal feats in an attempt to fulfill our need for connection and metaphysical expansion. Technology is the magic of our time, and that of the past century since the proliferation of electricity ushered in new mediums of communication. In the United States, the mystical nature of electricity infected the religious imaginary of the 19th century. Many fringe religious groups, including the more popular Spiritualists, harnessed the telegraph's capacity to transmit messages over long distances as a performative tool to bridge the gap between the living and the dead. "Spiritualism represented an attempt to sacralize, and find transcendental meaning in, these new technologies."[22]

Today, virtual reality receives this kind of speculative attention about its capacity to transform humanity. VR offers a digital transcendence of our physical form, allowing us to embody the digital world like never before. We can seemingly be anywhere, in any body, with a host of novel corporeal capacities like flying, teleporting, and shape-shifting. The urge to overcome the body's limitations "is in part a response to the social, environmental and political climate, a realization that the human body, as well as the category human, is a limiting and exclusive container."[23] Spending our days in the crumbling social order we call the postmodern world, we reach for machines to transduce accumulations of energy into something immaterially new, destined for a human on the other side.

Technology-as-magic is a useful framework for thinking about the spiritual underpinnings imbued in the cultural imaginary of virtual reality. Facebook's transition to Meta was coupled with statements attesting to the social power of VR spaces to, "let you socialize, learn, collaborate and play in ways that go beyond what we can imagine."[24] Here the social order of the metaverse is posited as hyper-speculative, beyond the current limits of human imagination (though, I would argue that there are none). This is clearly a hyperbolic statement, but it is not out of line with Meta's self-designated mythology:

> When Facebook launched in 2004, it changed the way people connect. Apps like Messenger, Instagram and WhatsApp further empowered billions around the world. Now, Meta is moving beyond 2D screens toward immersive experiences like augmented and virtual reality to help build the next evolution in social technology.

[22] Enns, Anthony. "Spiritualist Writing Machines: Telegraphy, Typtology, Typewriting." communications +1, 11, 4, no. 1 (September 16, 2015): 1.

[23] Roshanak Kheshti. Wendy Carlos's Switched-on Bach, 30.

[24] Meta. "About Meta." Accessed May 17, 2022. https://about.facebook.com/?utm_source=meta.com&utm_medium=redirect.

Data transfer rituals

Facebook and other social media platforms just might be the tech equivalent of a holy resurrection, where humans upload themselves to an all-knowing, paternal cloud that enables them to signal beyond their physical locale. The self slips into the ether, and in a world where this transcendental space is controlled by corporate interests, the ether pulls you in deeper to the seeds of American capitalism. Referring to Baudriallard's characterization of contemporary media as the complete substitution of the real for its signs, Kheshti recognizes "the analogical condition of postmodernity, where the copy exceeds the so-called real in both symbolic and material value."[25] In a fundamental way, VR fulfills our human need to expand and transform reality via simulation.

Technology, however, can be a faulty tool for metaphysical transcendence. Anyone who has experienced virtual reality can attest to the ways in which the physicality of the technology itself hinders complete immersion. The cumbersome equipment and overwhelming audiovisual effects tend to reveal the falseness of VR, rather than creating a new, believable reality. In essence, what VR does is allow the human body to interface with computer programs beyond the mouse and keyboard. We replaced the keyboard and mouse with controllers in each hand, and replaced the screen with a smaller screen strapped to the head so that we cannot look away. In this way, our tools keep us grounded in our bodies and thus, in the physical world. Unable to achieve complete transcendence of our form, we occupy the spaces in between.

[25] Roshanak Kheshti. Wendy Carlos's Switched-on Bach, 35.

There is a certain amount of information that is lost when real things out in the world are recorded digitally. No matter the frame rate or the bit depth, a certain amount of data is not captured in video and sound recording, etc. In a DAW, (digital audio workstation) you can actually zoom in to see the individual bits of audio, and all of the space in between each data point. What is contained in this space? What does its emptiness represent?
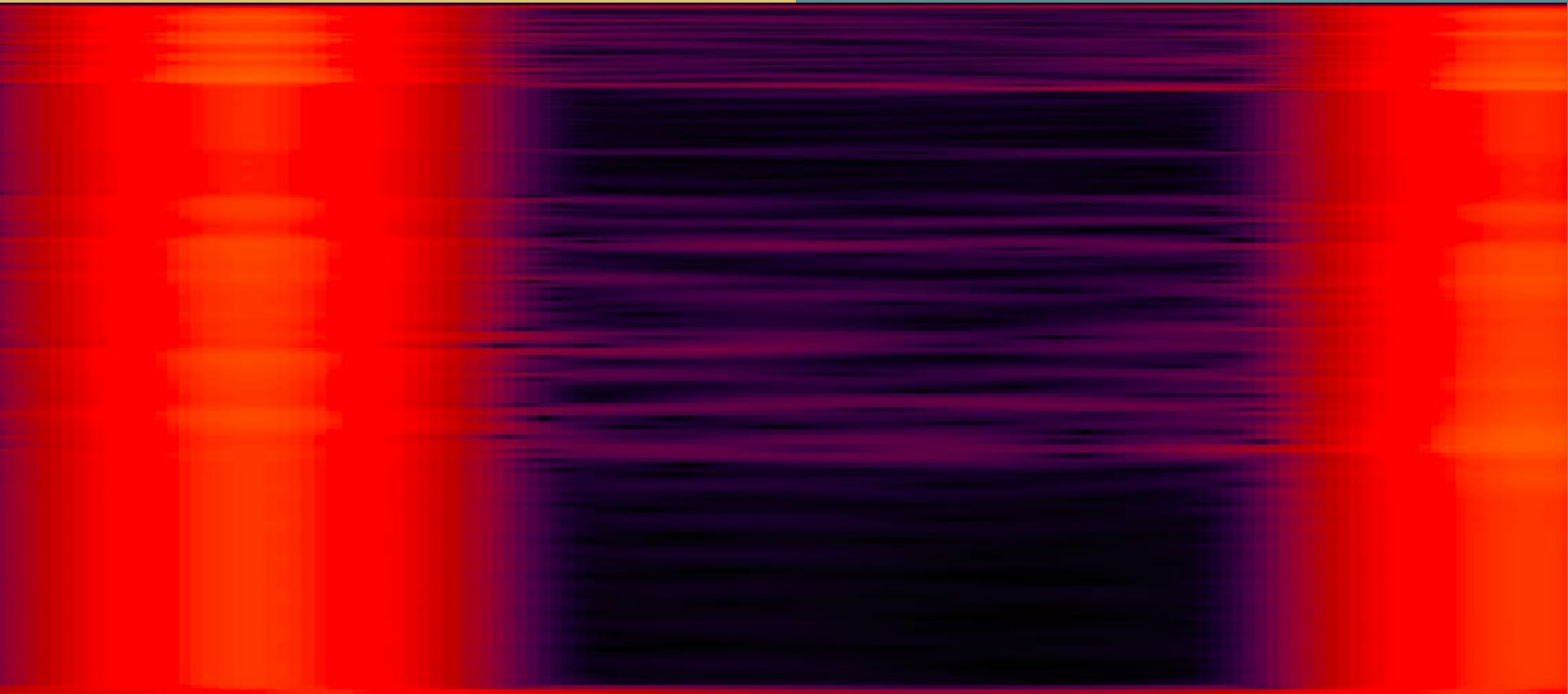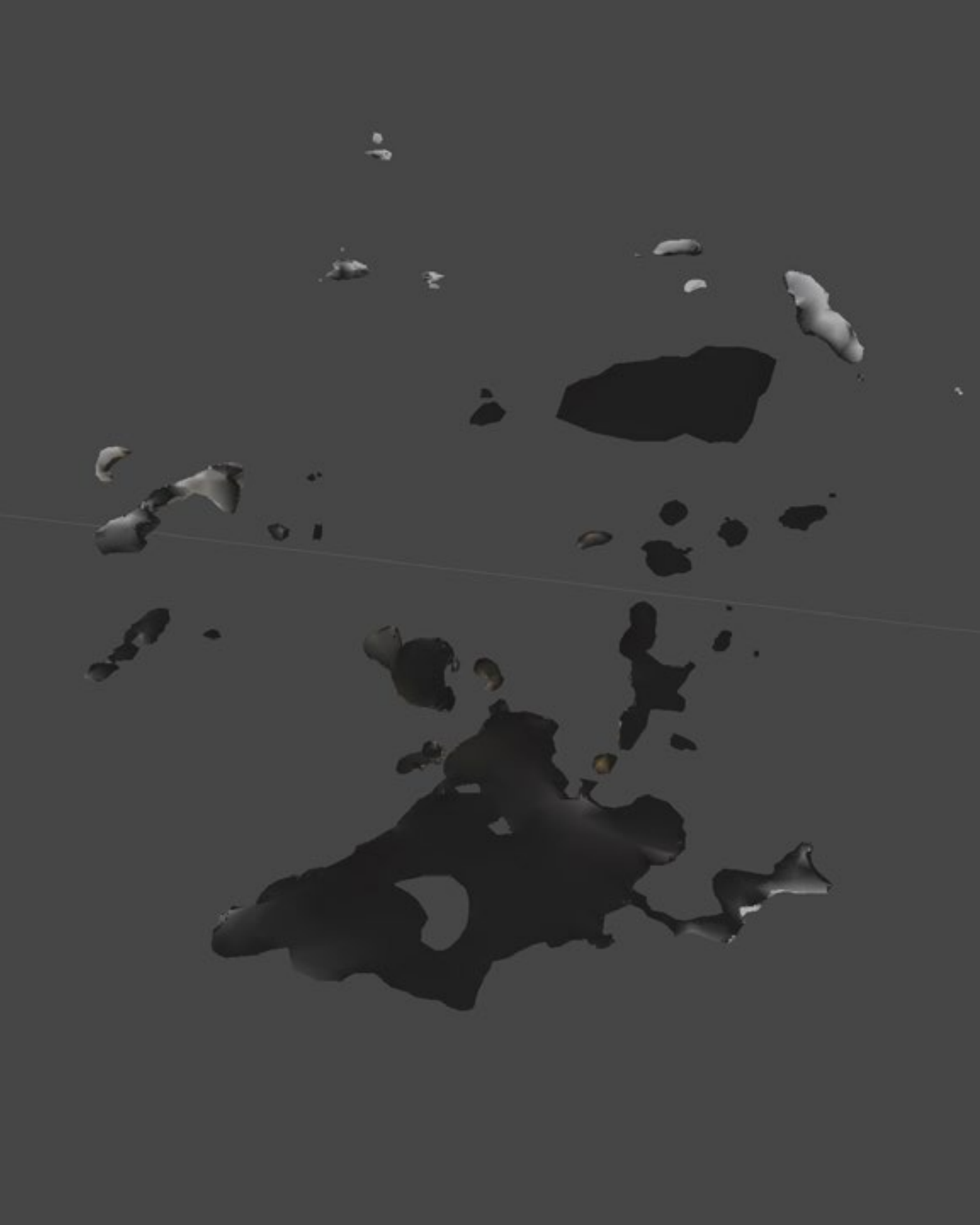
Failed rock meshes in Metashape photogrammetry software. In my practice, I've learned that things have a certain resistance to being captured in a digitally translatable manner. The more stellar examples of earth are belittled by 3D technologies, which flatten, smooth and decimate complexity.

Rock vessel #1 (2022)
3D printed wood-fill PLA, black glaze
5.5" × 7" × 6.5"

Virtual Reliquary
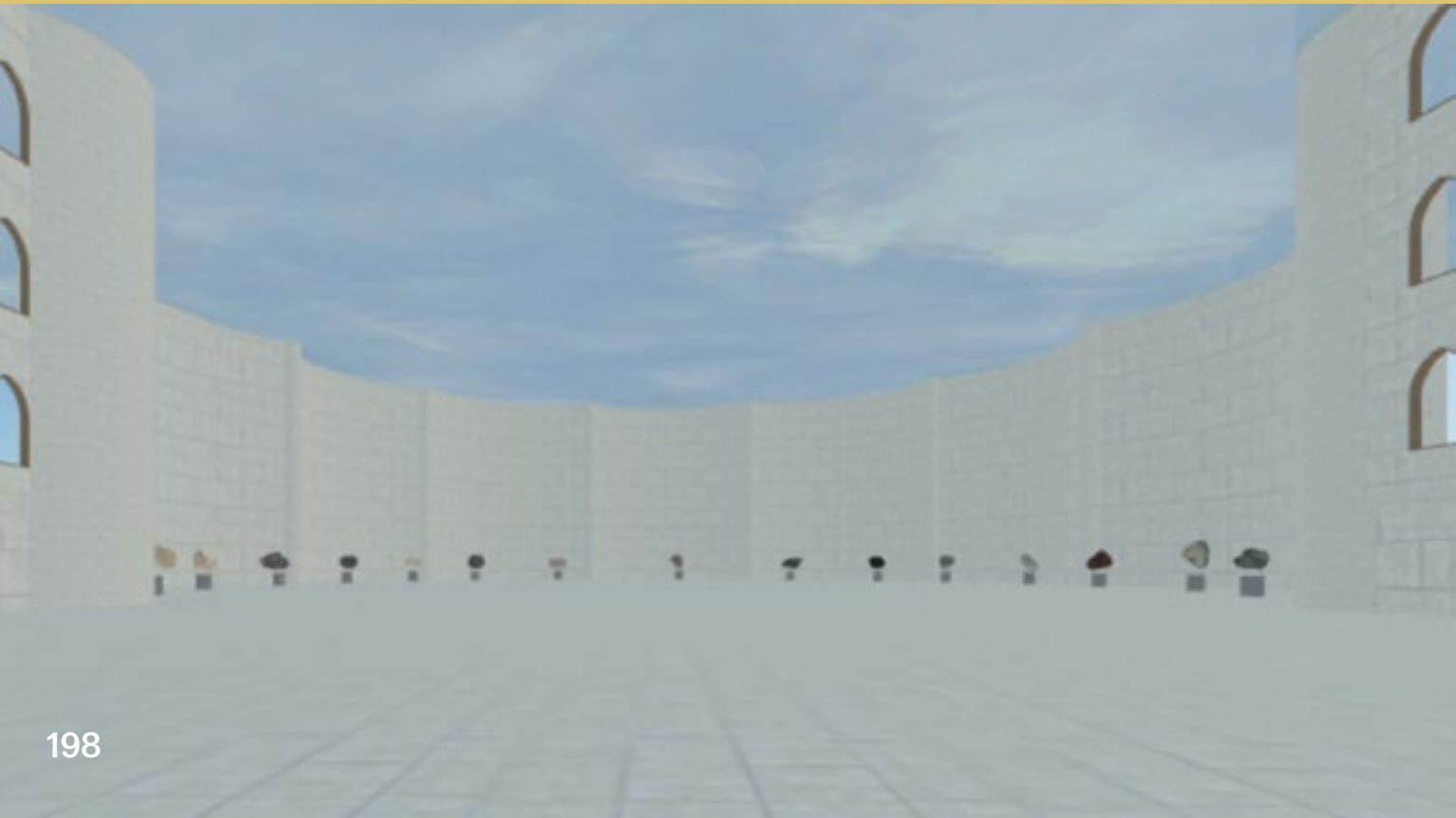
Virtual Reliquary is a virtual reality environment housing relics of the physical world. 15 rocks from around the world were collected through an open call wherein participants donated a rock they gathered in their daily lives. These specimens were then modeled using two industrial 3D scanners: the EinScan 3D Pro and the Artec Space Spider. The result is a diverse collection of virtual sculptures, each with a tie to a specific place and person in the world.

This project is a study of how real things become virtual bodies. I'm interested in transporting the natural environment into a virtual space and contemplating the meaning of making the earth intangible. I relied on the representational device of the medieval reliquary as an allegory for digital representations, which mask their infrastructure of information with a decorated surface. Mimicking the radiating chapels of Romanesque cathedrals creates intimate sites to interface with devotional reliquaries. Ultimately, the virtual environment became a kind of speculative religious space, replacing the remains of holy people with relics of the earth. I'm curious about how we will relate to nature through virtual reality as climate disaster makes the earth increasingly uninhabitable.

One very interesting artifact of 3D scanning is the production of a material file and accompanying image that represents the surface of the scanned object. This image is essentially a flattened version of the object that 3D modeling programs use to wrap around the 3D form. These images inspired me to create my own texture studies with the same rocks. I made a series of monoprints by dipping the rocks in ink and pressing them into paper by hand. The manual impressions stand in contrast to the dense grids of information produced by the 3D scanner.

Optimized texture jpg from Einscan Pro HD 3D scanner
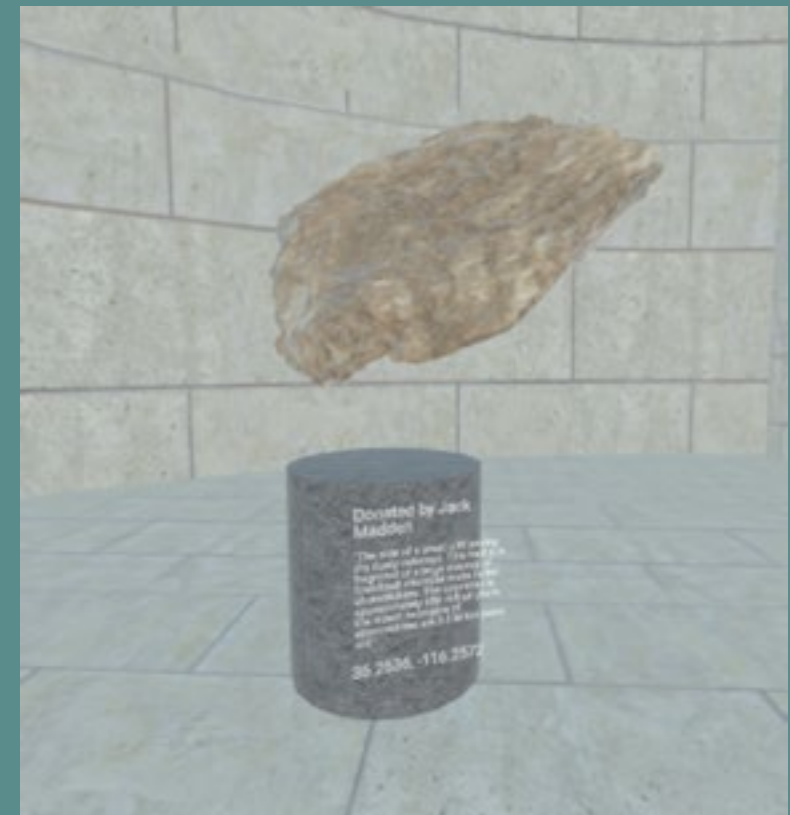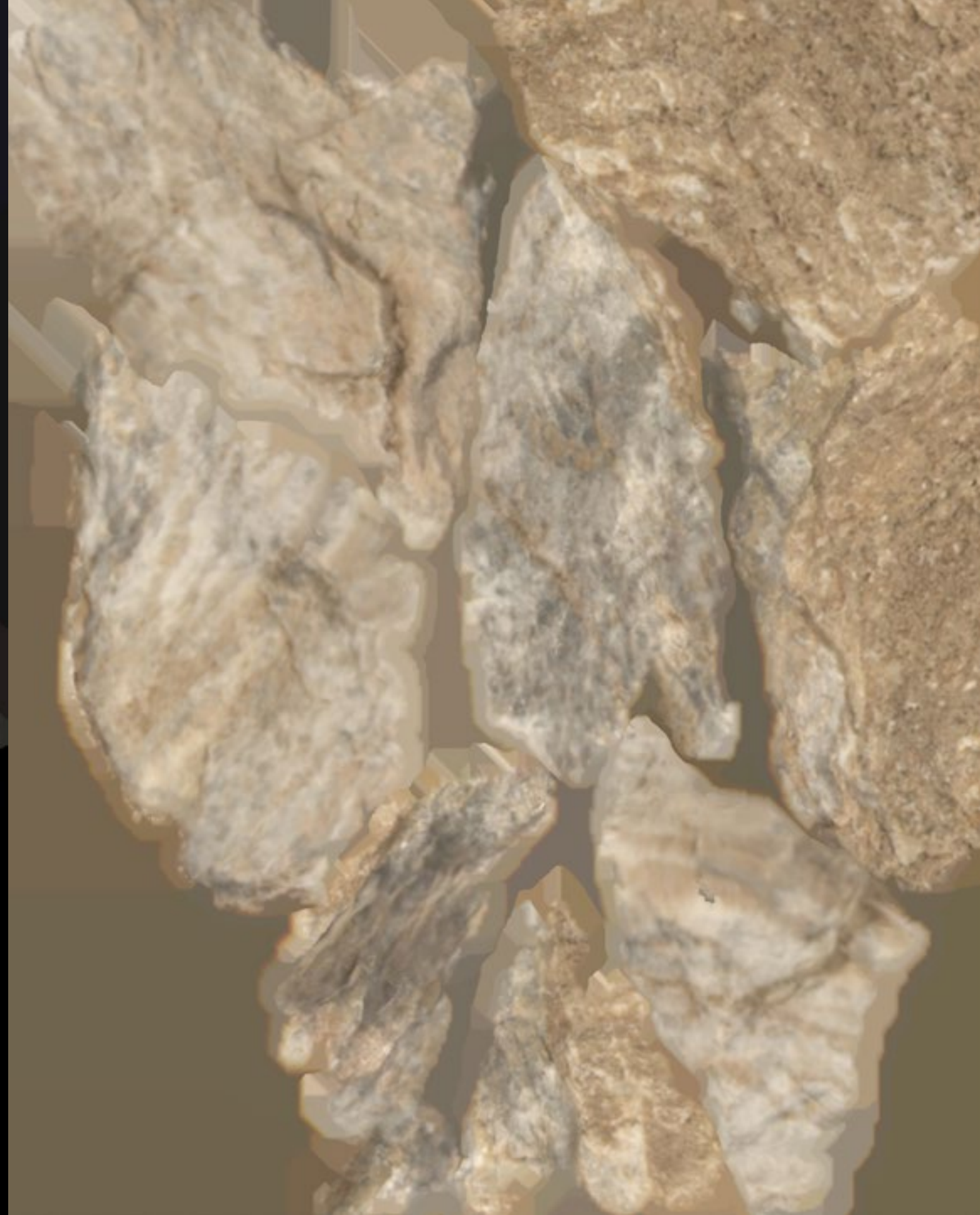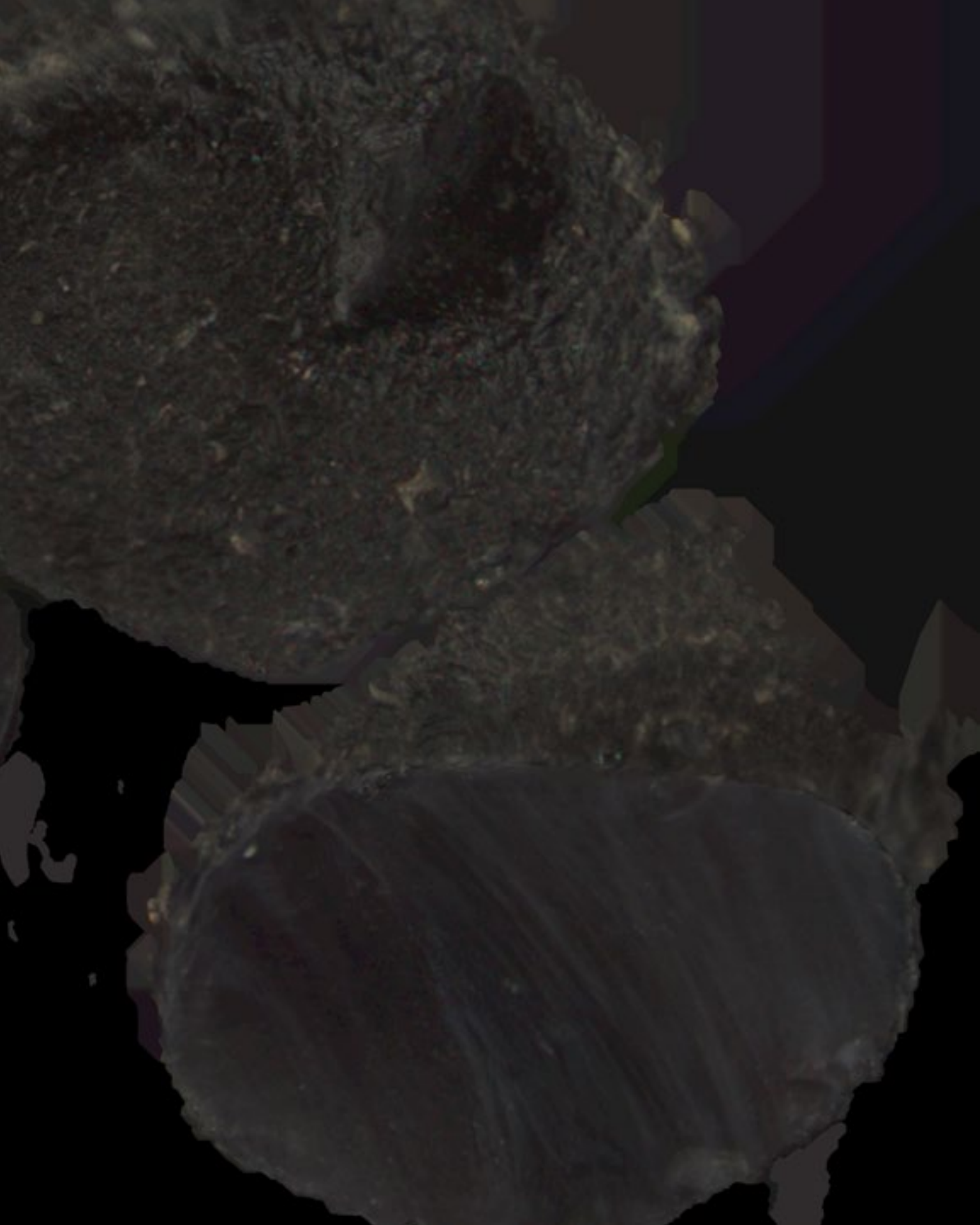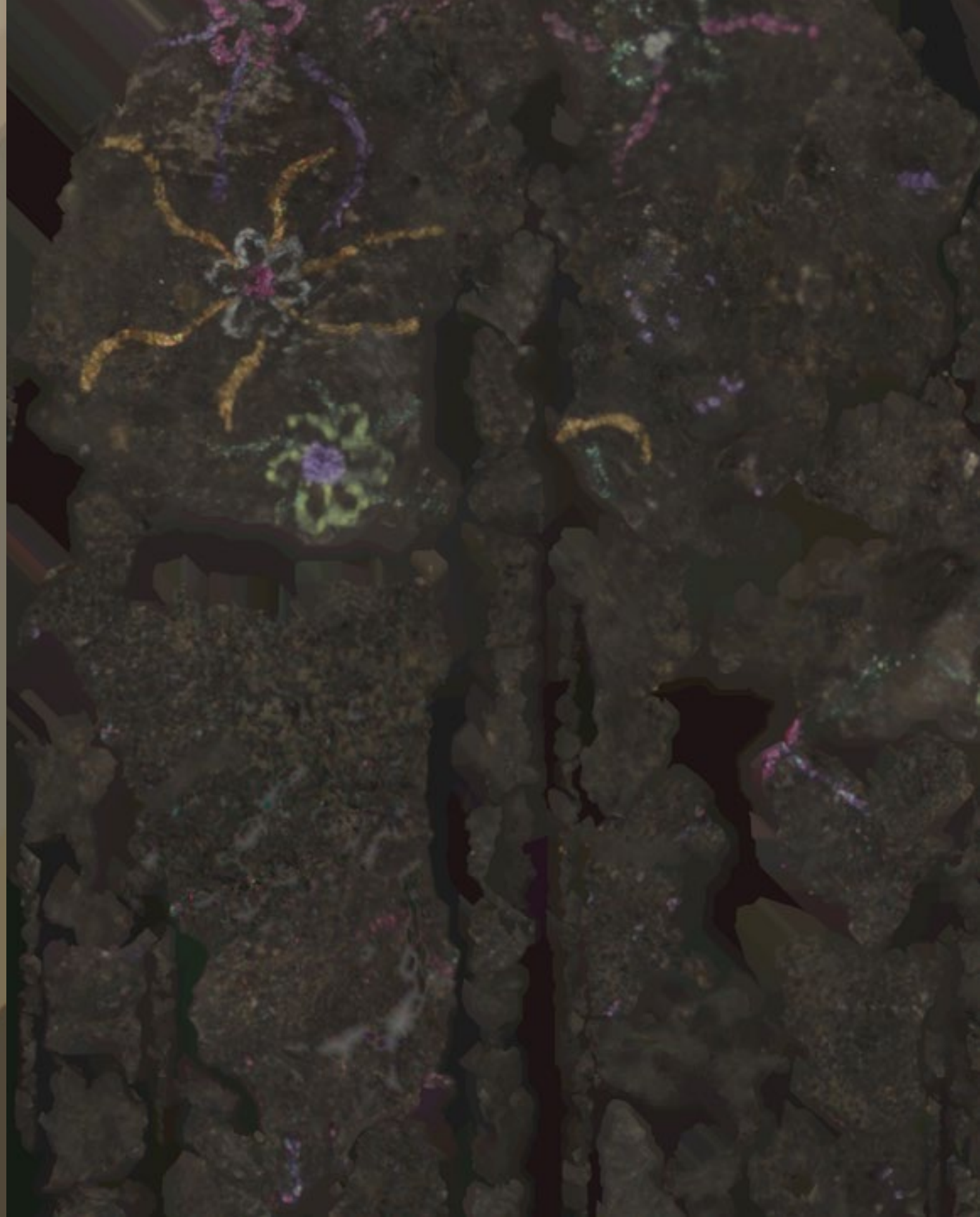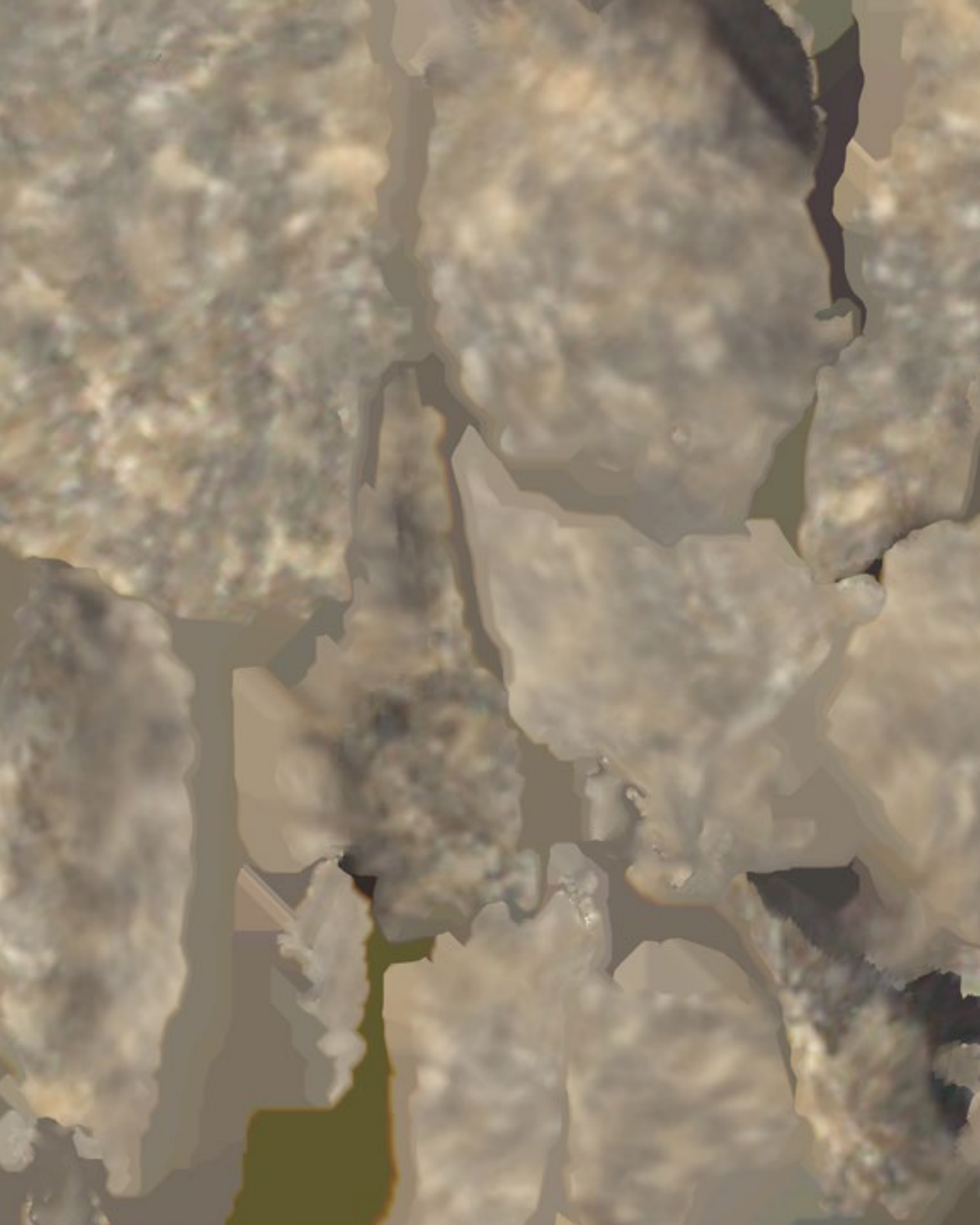
recording session with contact microphone

Recording session with hydrophone

The soundscape of Virtual Reliquary was synthesized from sound recordings of the rocks in different recording scenarios. An ambisonic microphone captures spatial audio of the rocks' surfaces rubbing against each other. Contact microphones record impact and friction between the rocks directly through their surfaces. A hydrophone records the sounds of the rocks in water.

Each situation yielded different sound qualities and granular synthesis drew these nuances out of the raw recordings. My process began by removing extra noise caused by microphone feedback or my own handling of the microphones and selecting interesting moments for further development. Soundgrain, a graphical interface that allows users to draw trajectories within a sound sample to control granular synthesis, allowed me to create densely textured sound samples. These short granularized samples produced a series of longer granular recordings by manipulating the synthesis with other audio effects, like polyphonic frequency shifting and resonant filters, in real time in Max/MSP.

Recording session with contact microphone

This sonic material creates a densely varied soundscape for the virtual rocks to exist in by placing individual sound files around the virtual environment. Some shorter sound samples are associated with individual rocks, while longer recordings are staggered throughout empty spaces to provide an ambient background for the rock soloists. The result is a kind of spatial mixing as visitors move through the virtual environment. This process inspired me to continue my sound research by developing a concept album called rock music.

field recording kit

Rock music is an experimental sound project that synthesizes the sound of stones. All audio elements were made by interfacing with rocks and manipulating the results. Different sonification modalities characterize each track, while spatial audio techniques optimized for binaural listening create an immersive 3D soundscape where the inanimate environment comes to life.
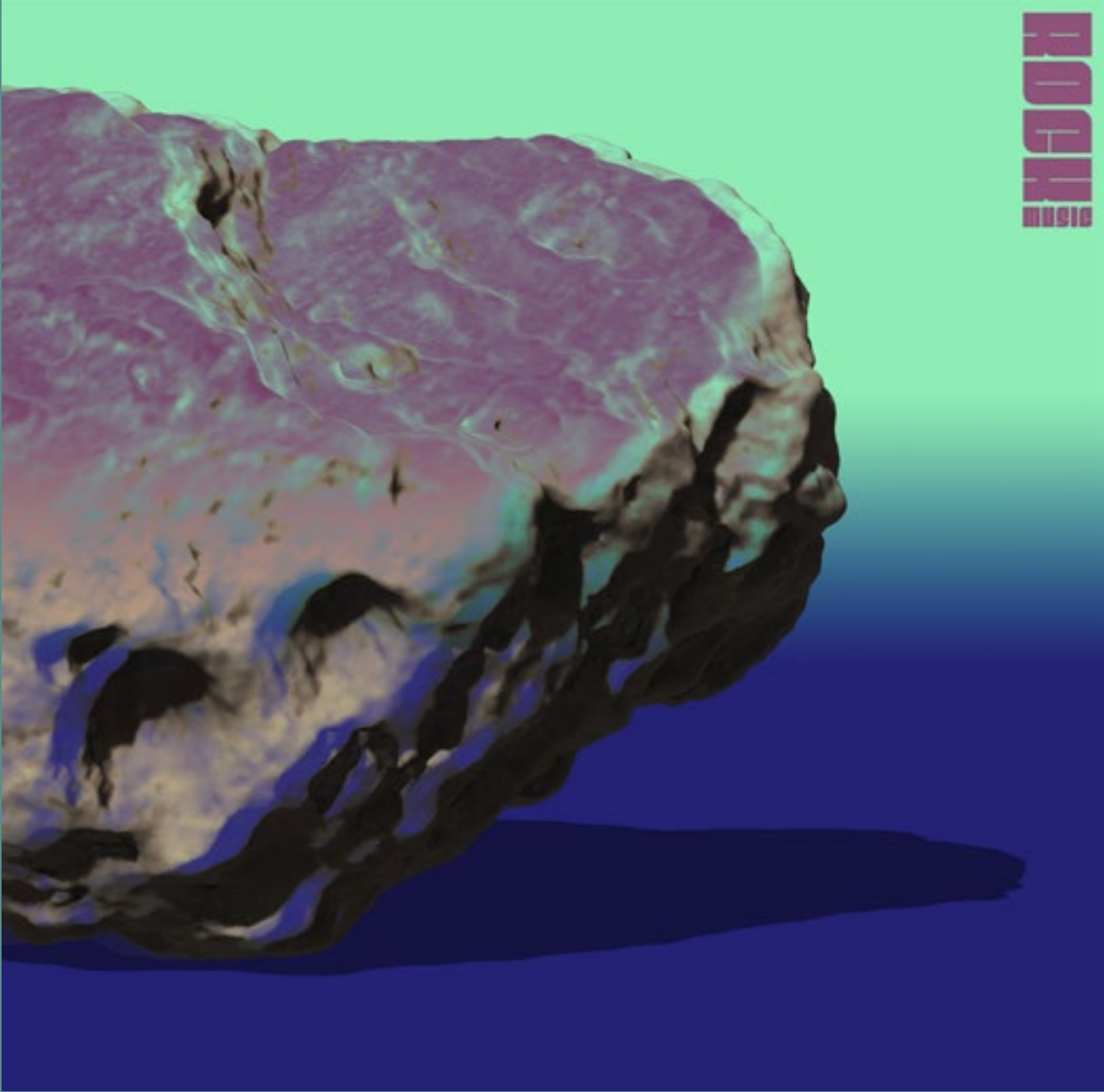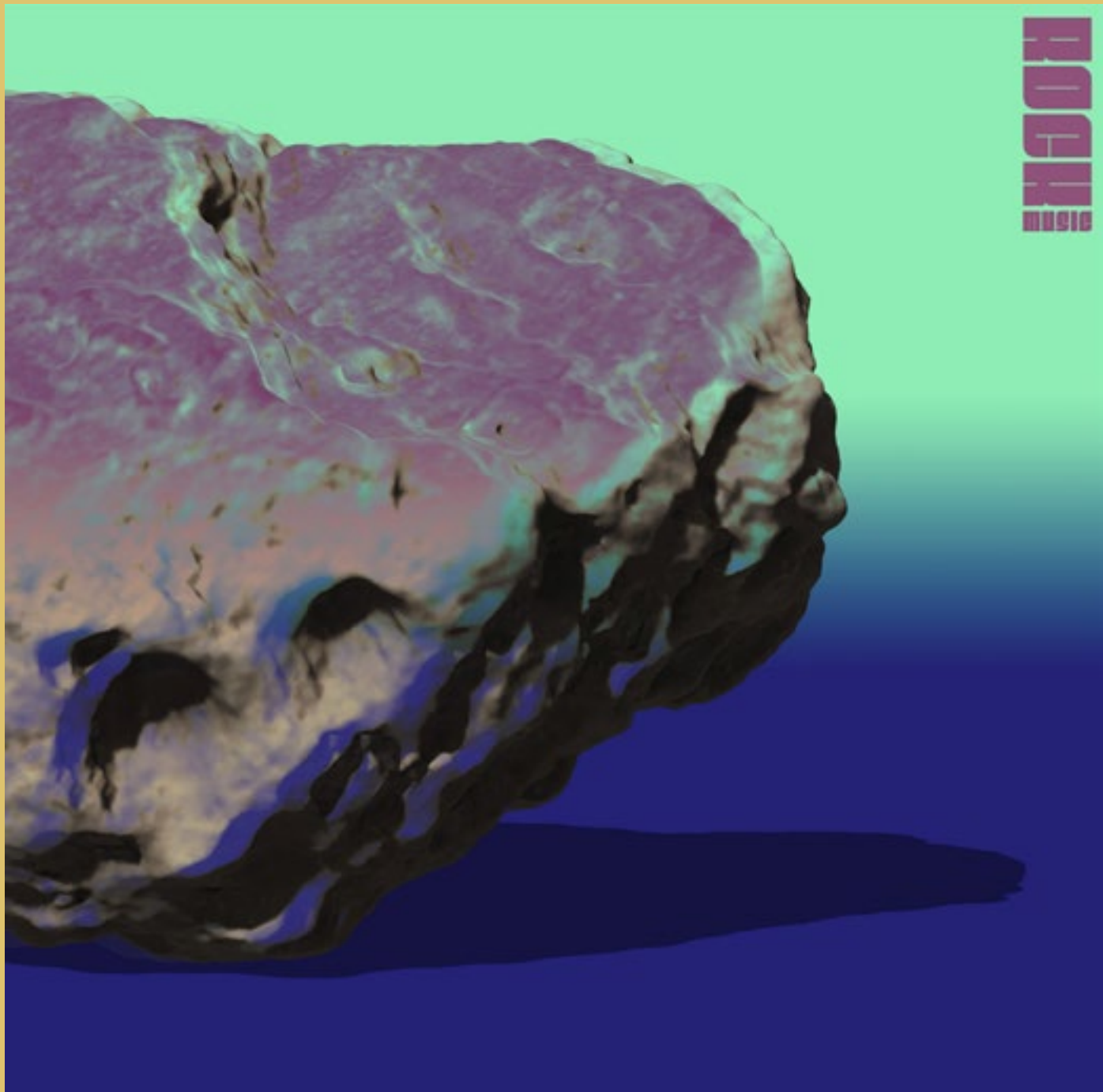
rock music

1. rock music (intro)

The introduction takes listeners through the process of synthesizing raw recordings of rocks into noises that sound far from natural. Field recordings using a contact microphone capture environmental noise using inanimate objects as the transducer.

For this component of my research, I was interested in discovering if there are noticeably different sound qualities between natural and human-made materials through a sample of eight structures dispersed around Providence, RI. While the structures themselves didn't produce any sound, they did pass along environmental noise to the microphone. In some record-ings, you can hear the sound of cars, birds, or children laughing.
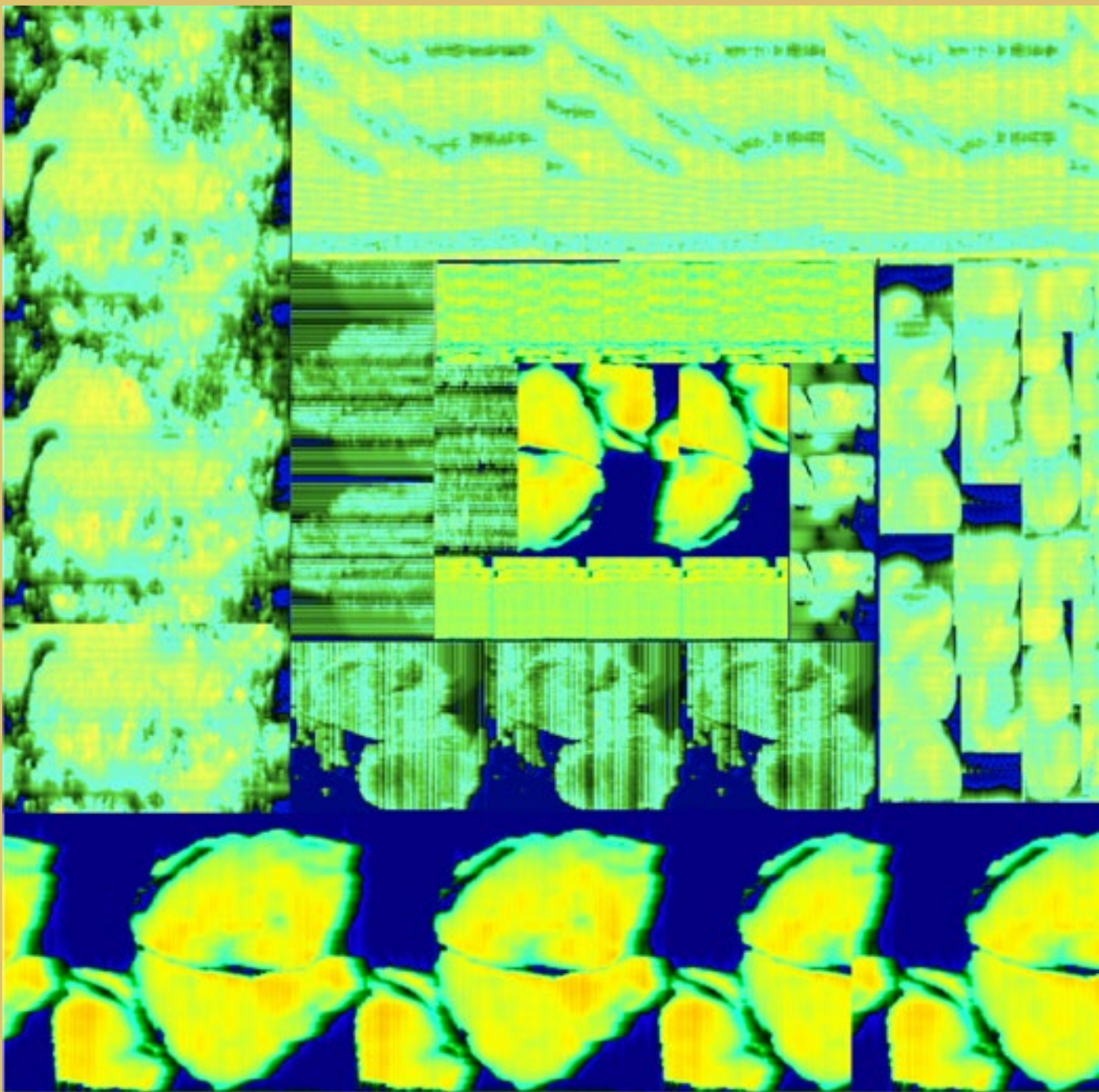
2. spectrotechno

This track uses images created by 3D scanning rocks to generate sound. Spectrograms are pictures of sound, but sound can also be generated by 'playing' images in a digital audio workstation. Sonifying the texture images of 3D-scanned rocks creates complex, computer-generated audio that corresponds to the physical characteristics of the rock. These samples are then composed algorithmically in a live-recorded mix.

After 3D scanning the rocks for virtual reliquary, I became very interested in the texture files that are generated by the scanner. Using a spectrogram player allowed me to create sound with the rocks in a completely different way, without even touching them. It was very interesting to me that these samples were completely computer generated. First, the 3D scanner creates an image that is a flattened version of the surface of the rock, to be used as texture information by a 3D modeling program. Then, the spectrogram player correlates pixels to audio frequencies within a certain set of parameters dictated by the user.

This process produced 15 different sound samples with a wide range of frequency information and an electronic, granular quality to them. From there, I played these samples in an ambisonic drum machine based on the Euclidean algorithm. The algorithmic approach allowed me to change the parameters of the drum machine in real time, while maintaining a loose sense of rhythm. 'Spectrotechno' is one of many recordings produced through this method.
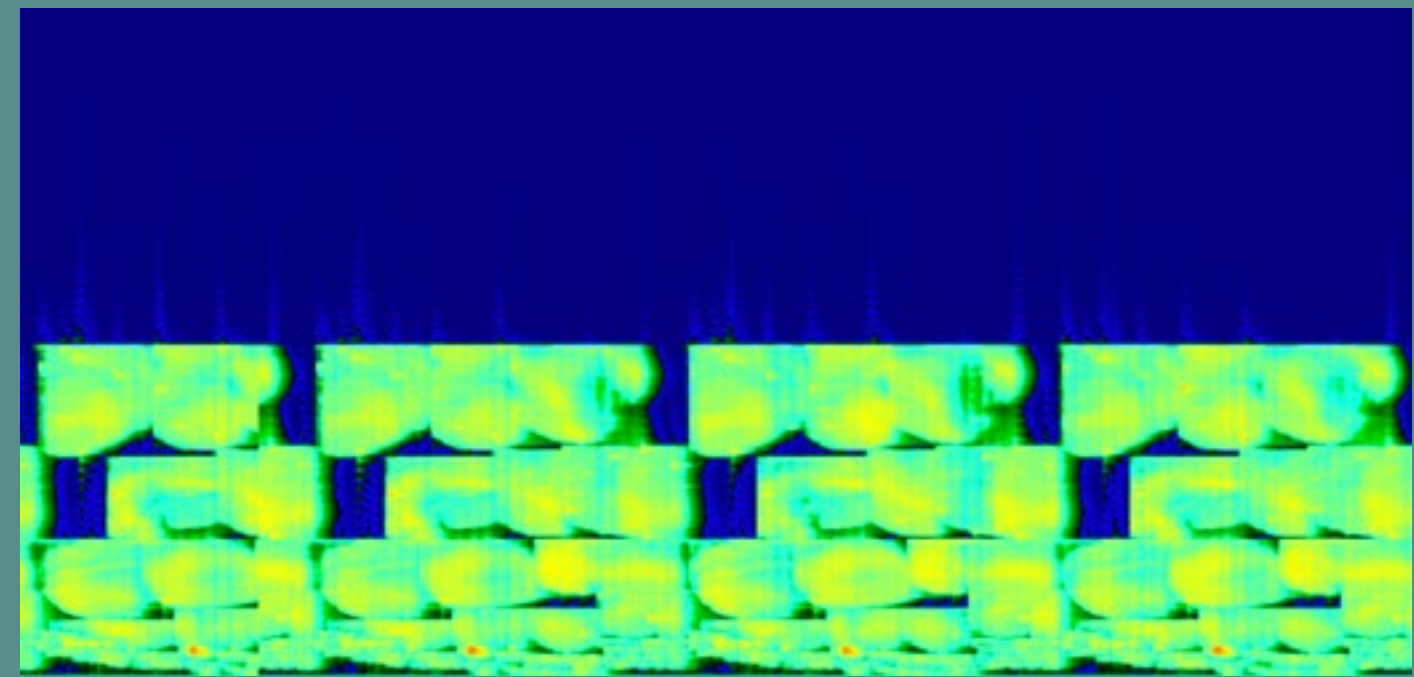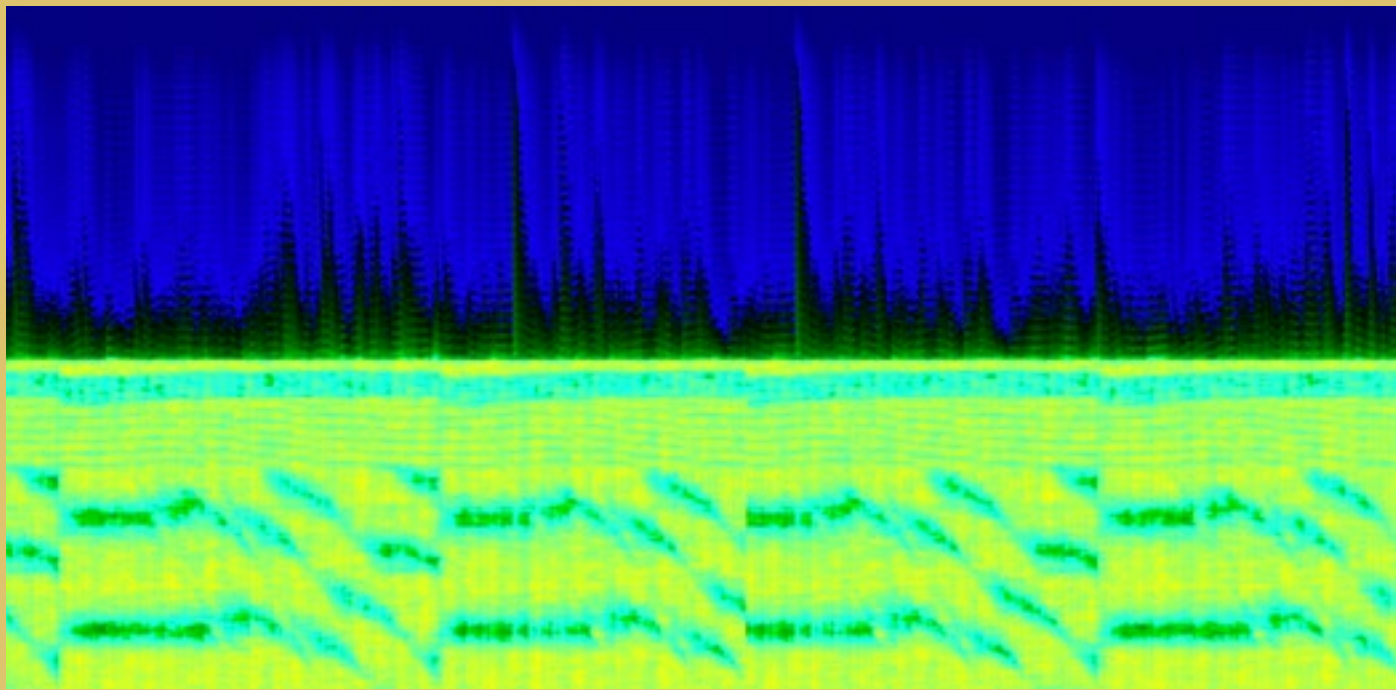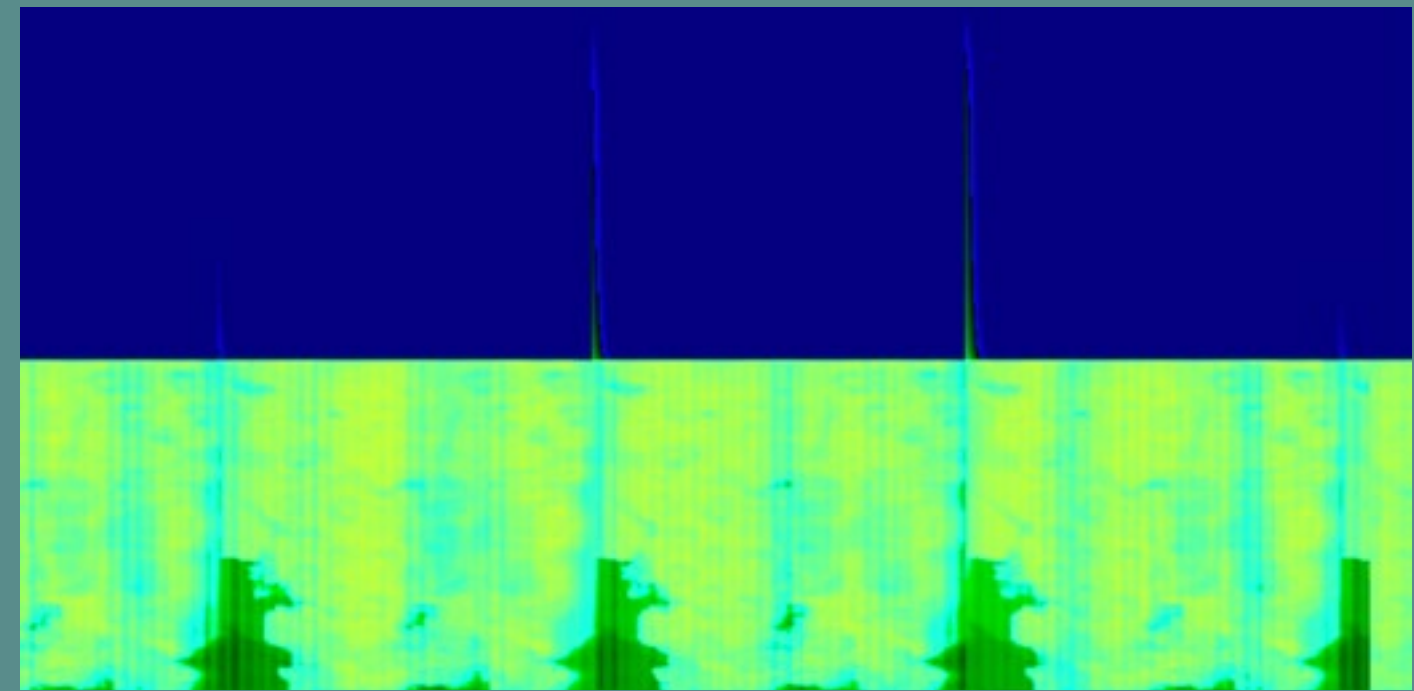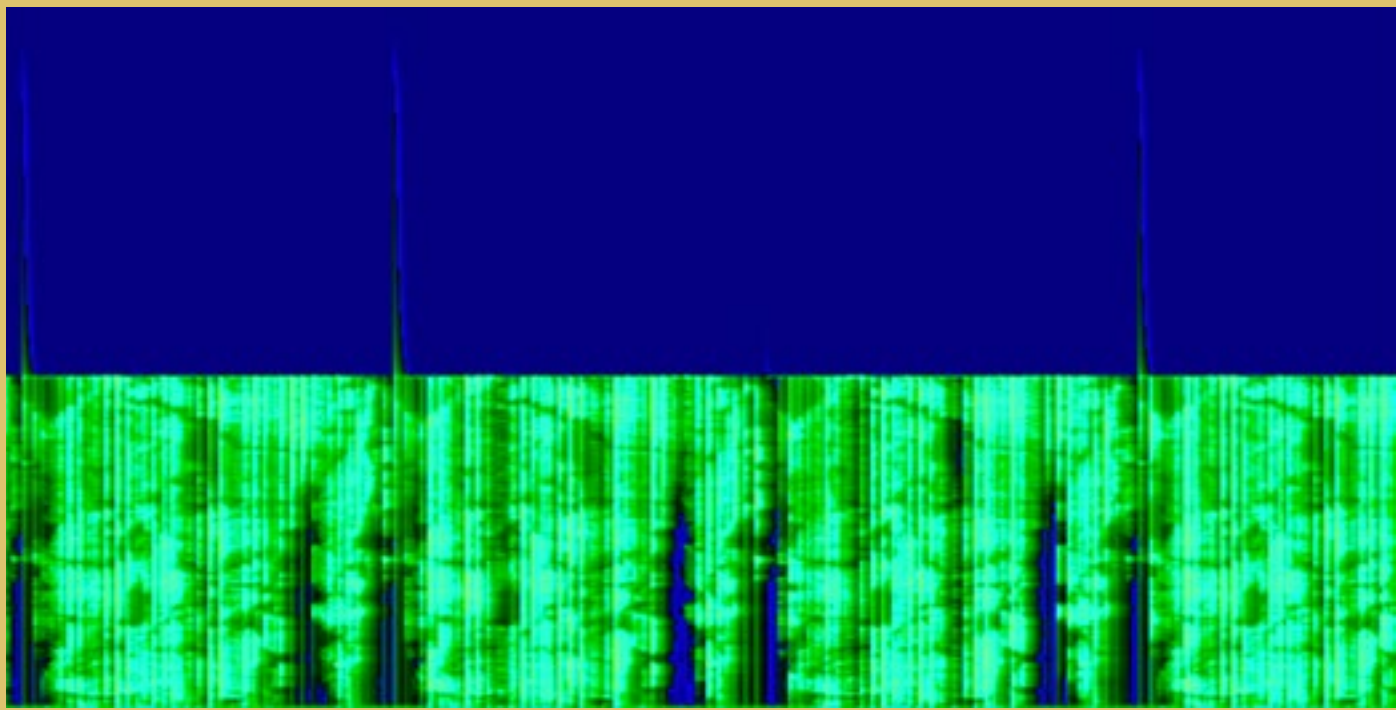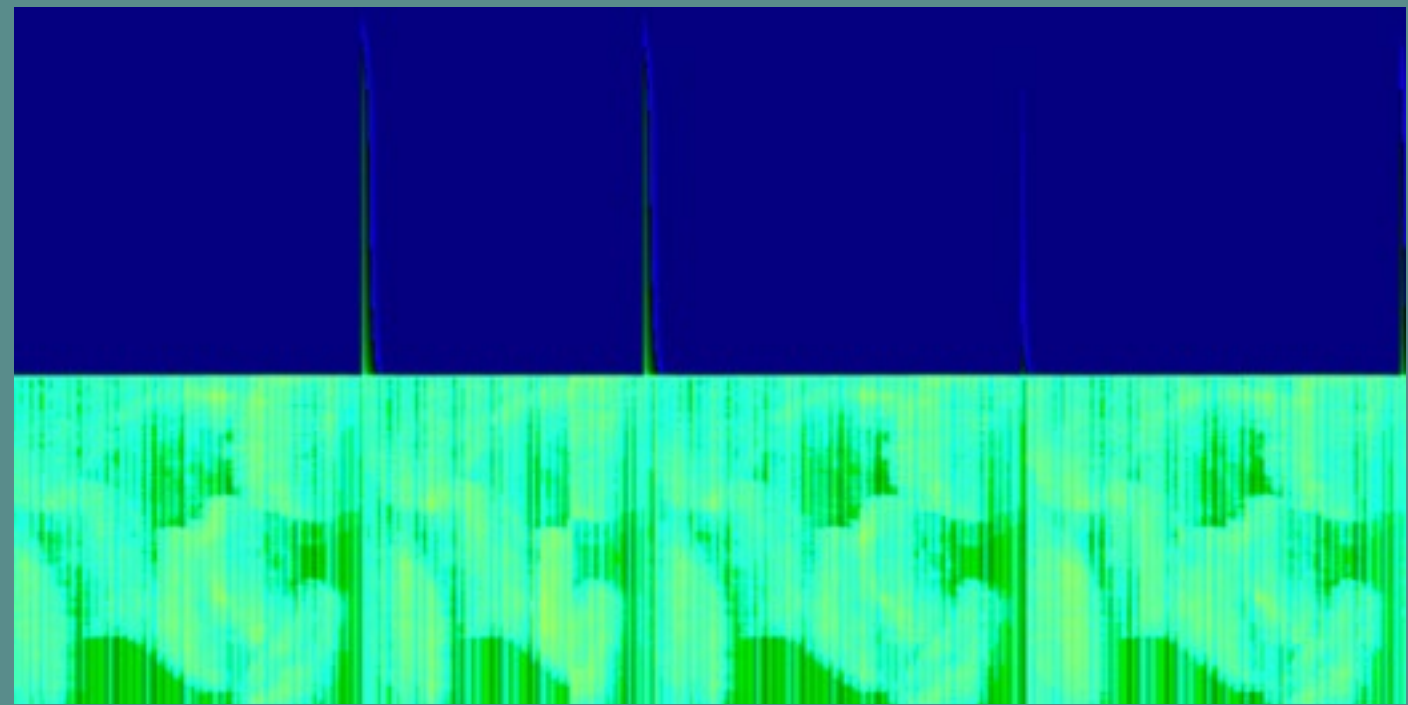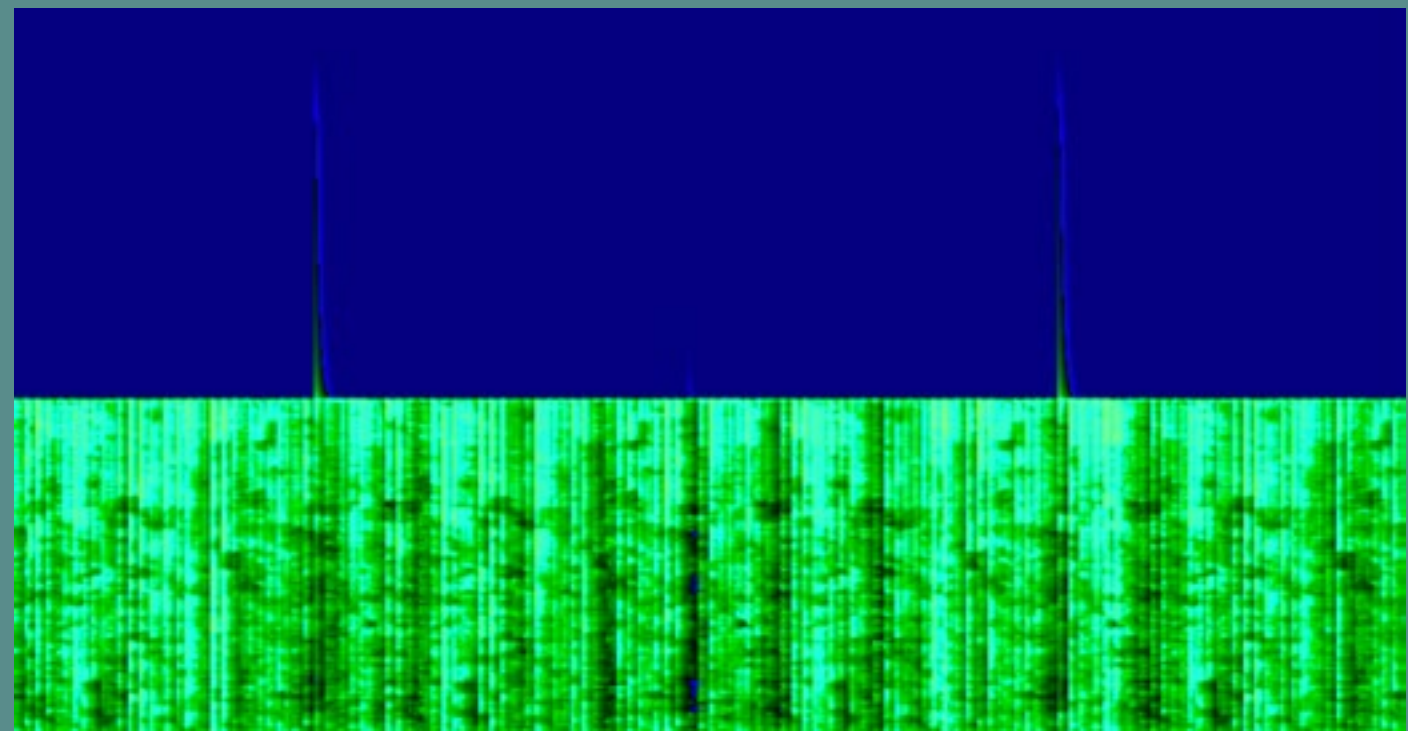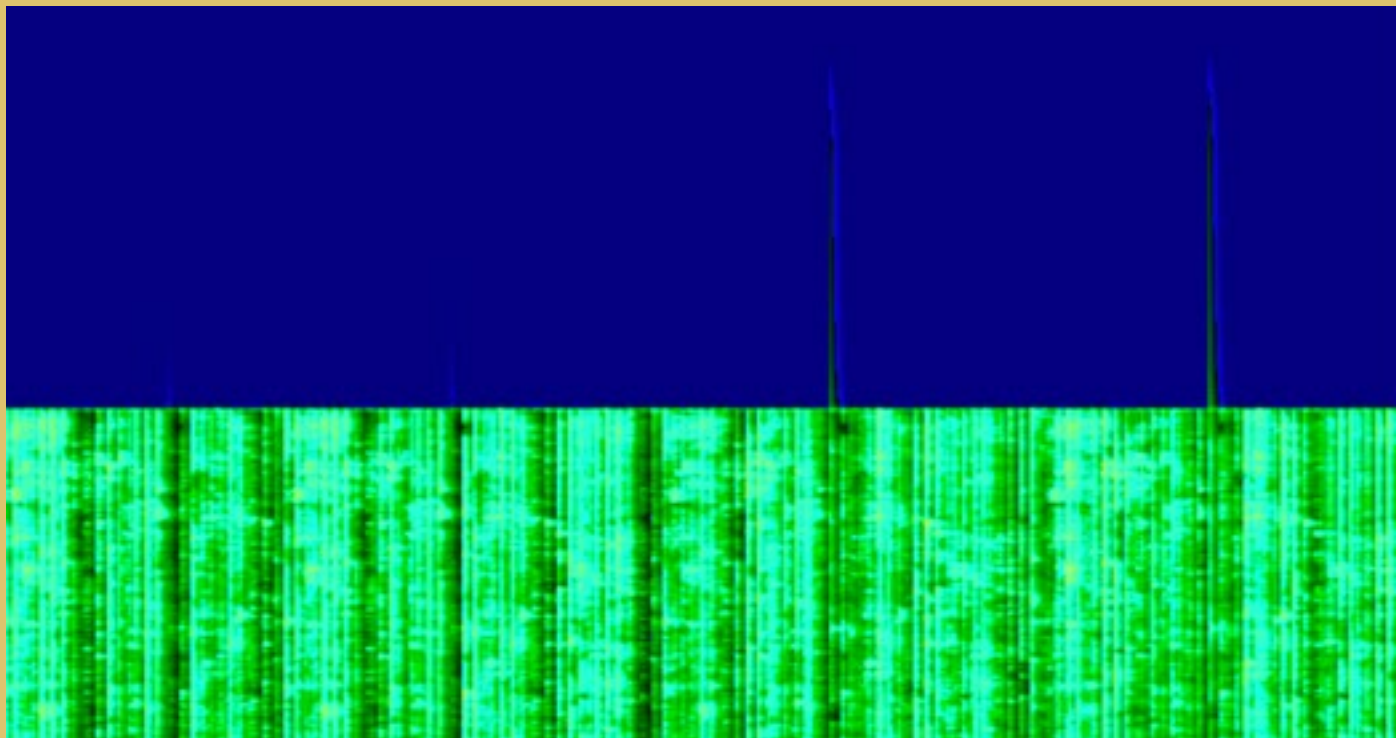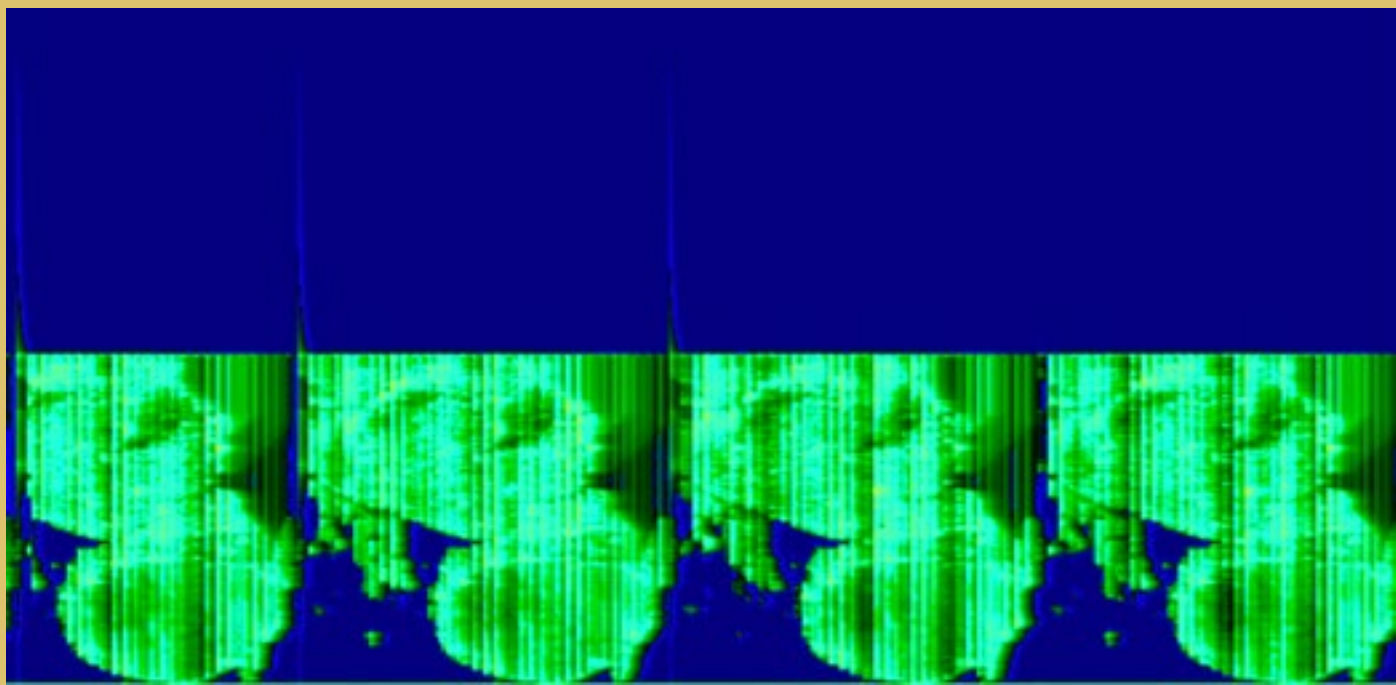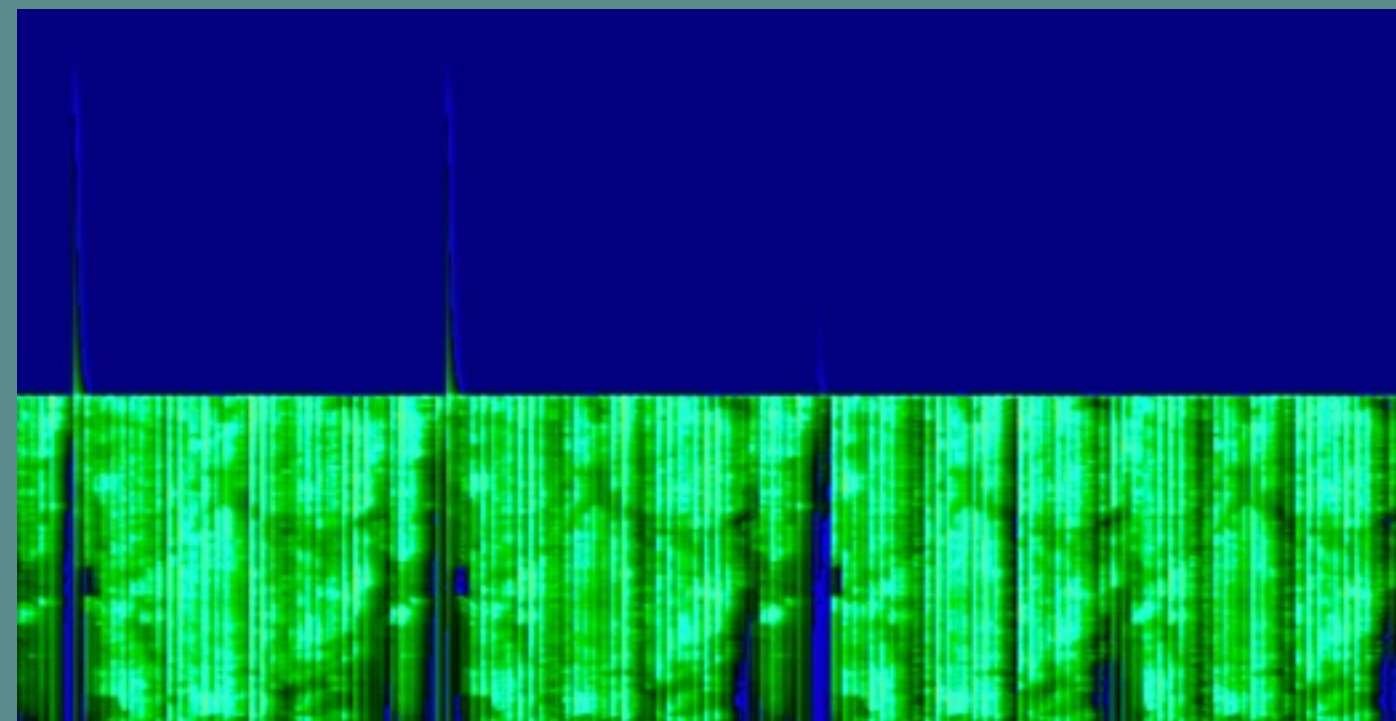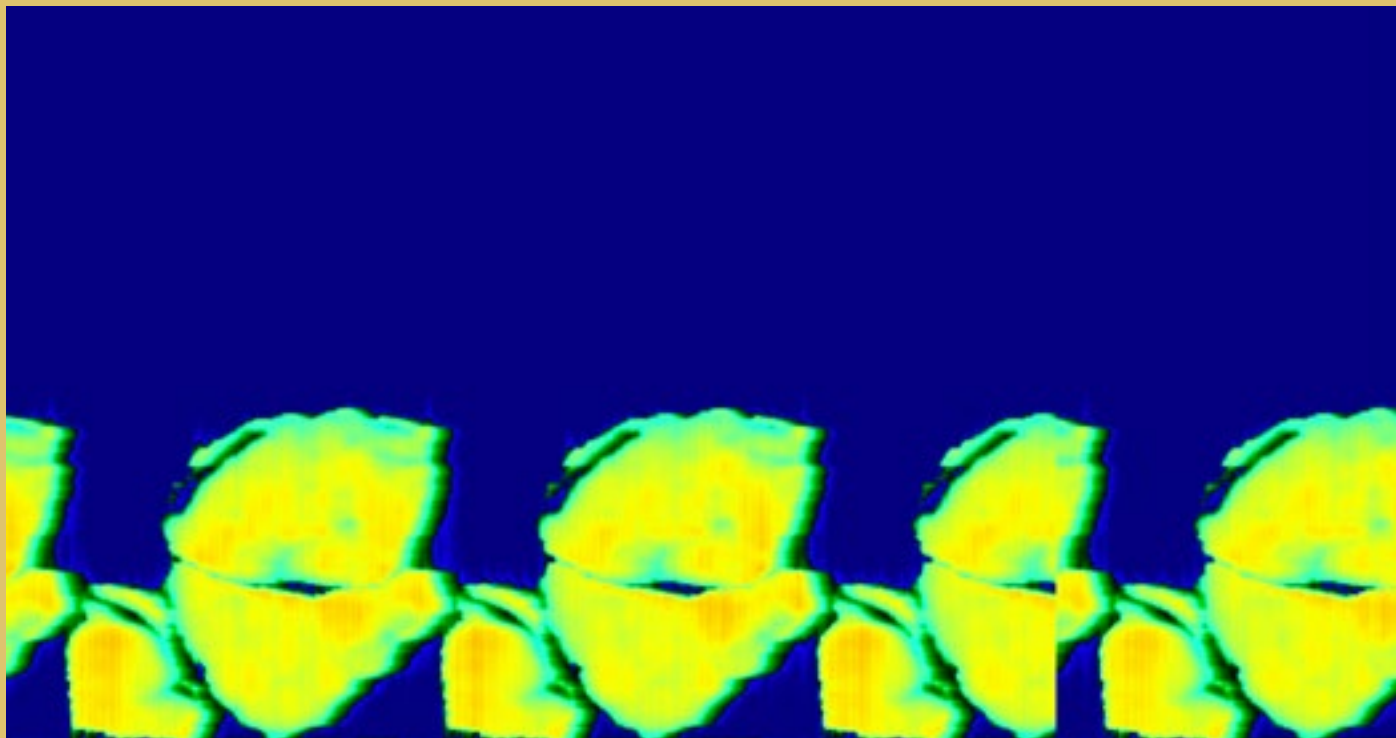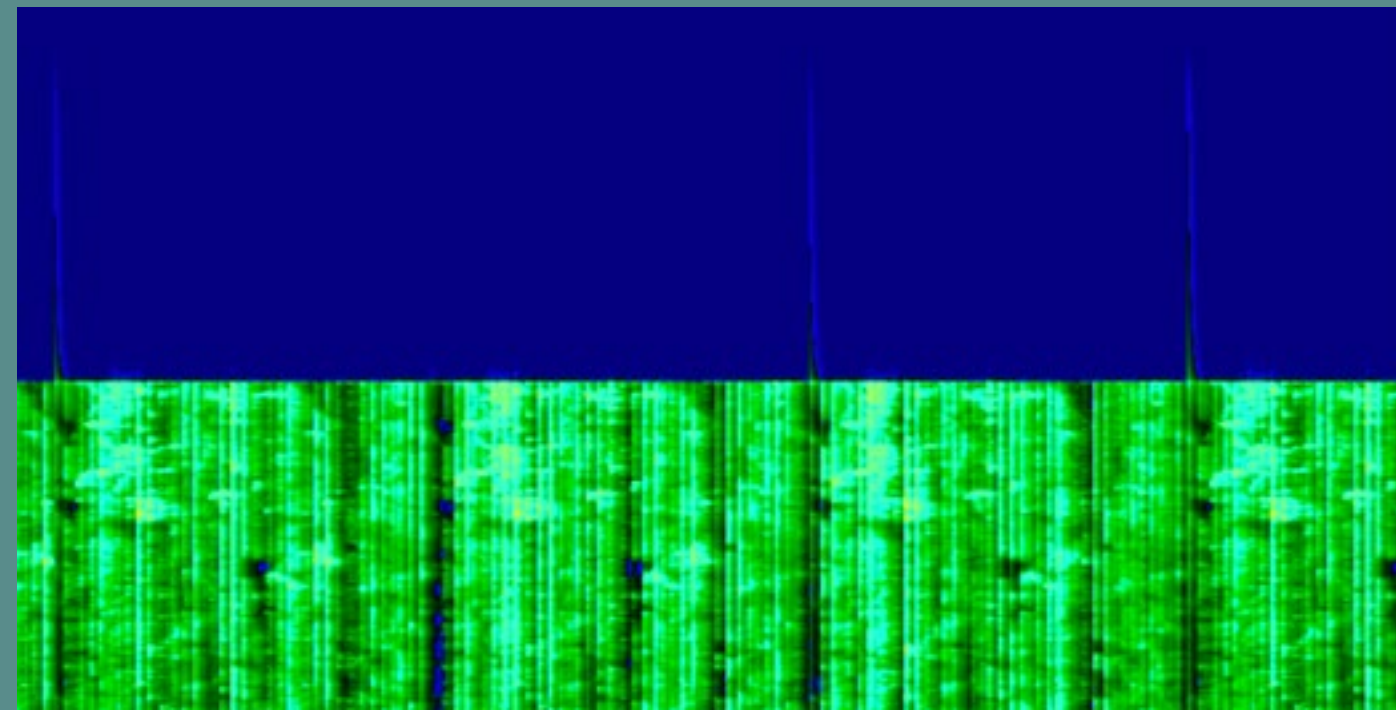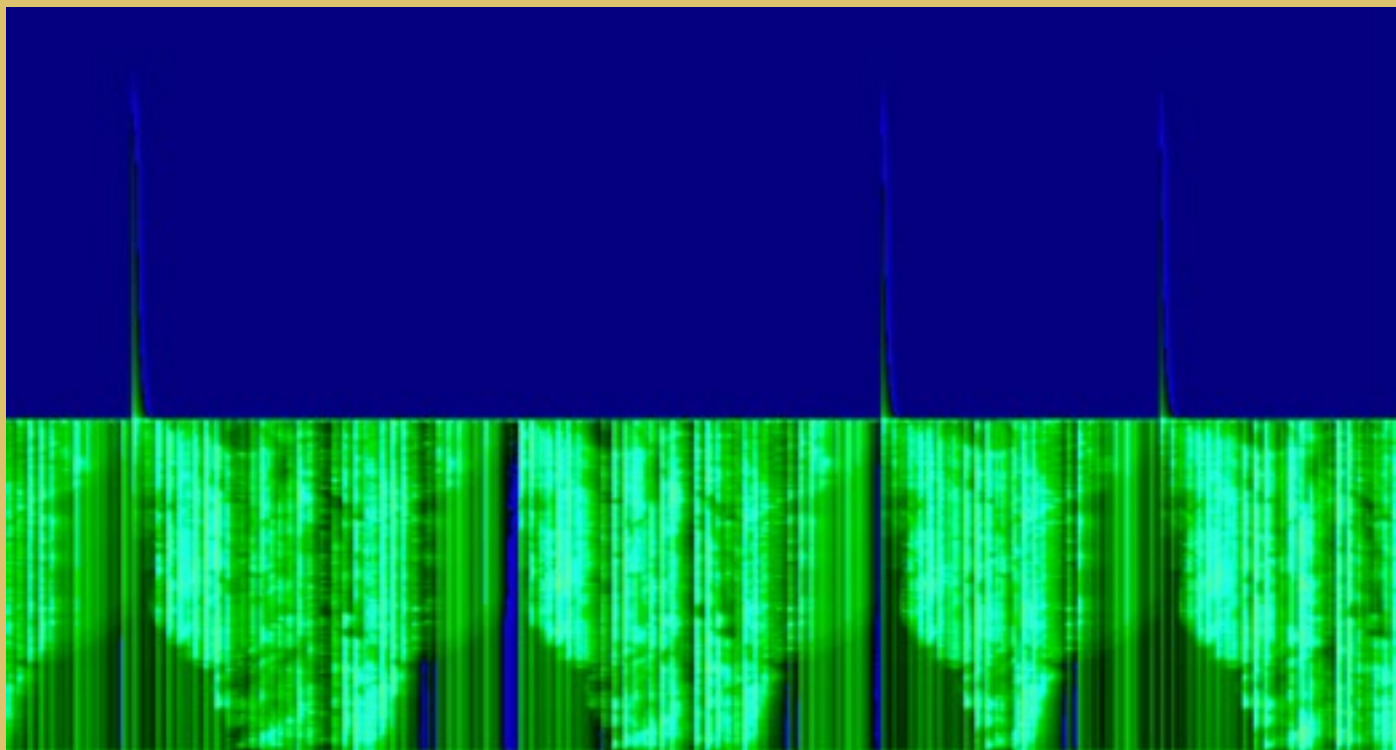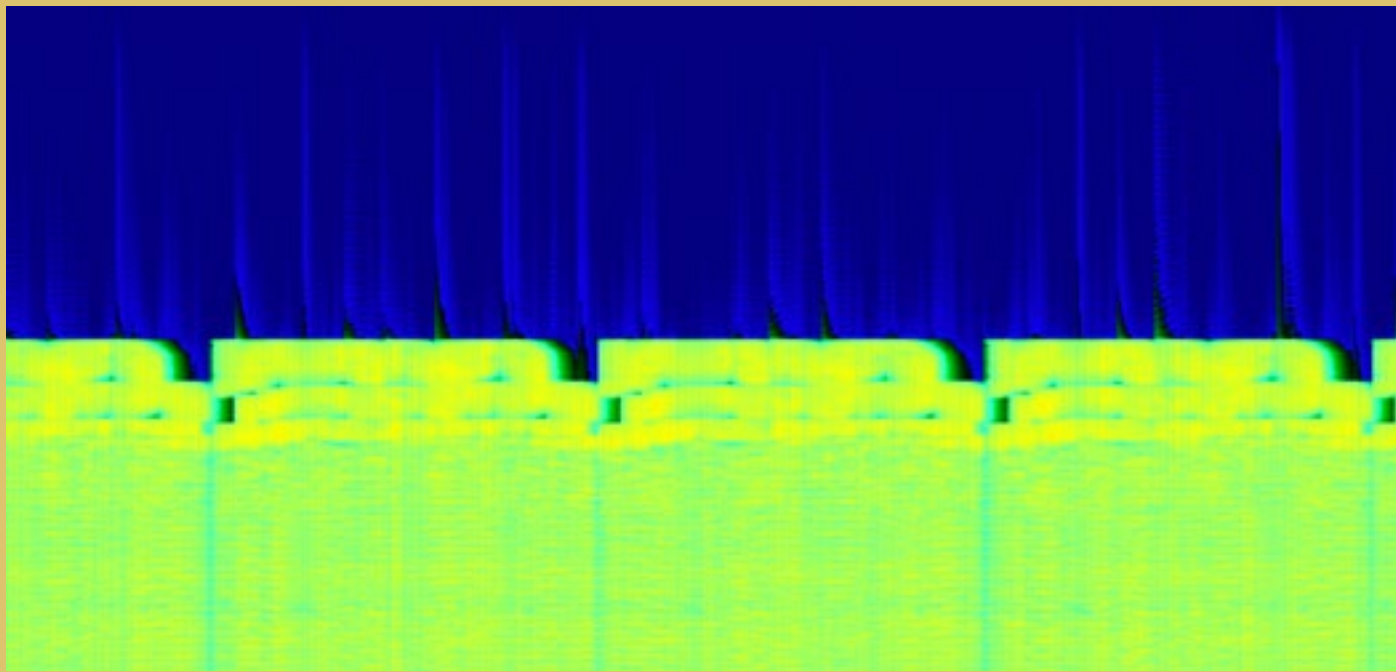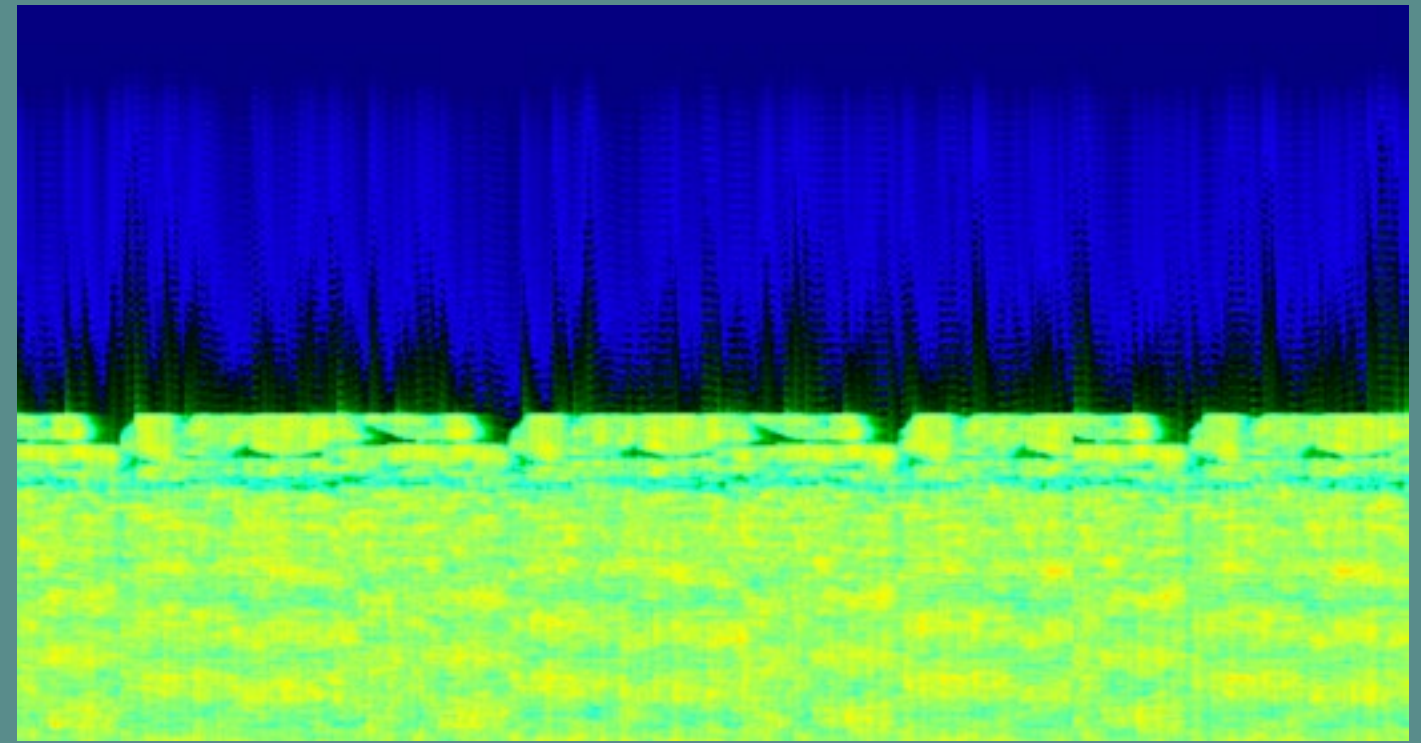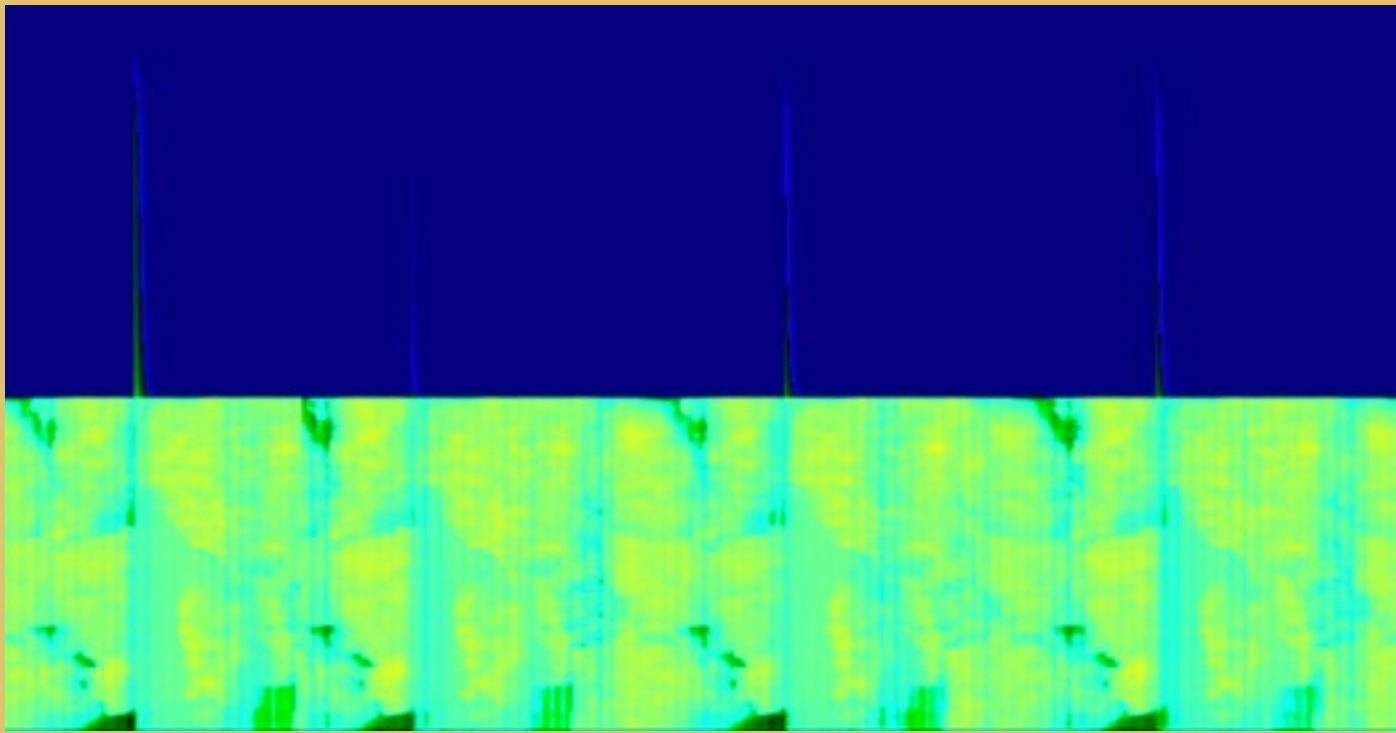
3. virtual reliquary

This track is a mix of the many different recordings made for the Virtual Reliquary project. Contemplating the fact that rocks and minerals are mined from the earth in order to make the technologies we use every day, this ballad evokes the geological transformation and turmoil taking place inside computers. The sounds are synthesized from recordings of small rocks taken with a contact microphone and hydrophone in controlled environments. Movement and friction between rocks build an immersive 3D soundscape with high order ambisonics.
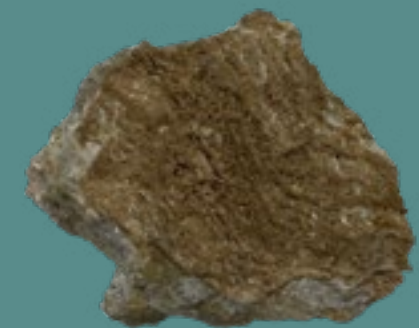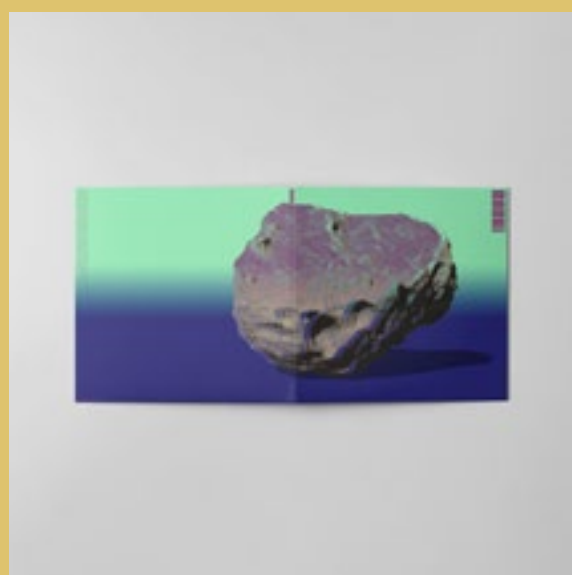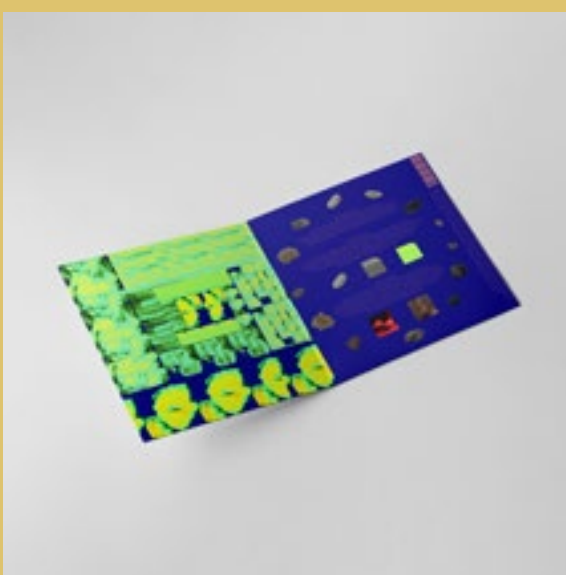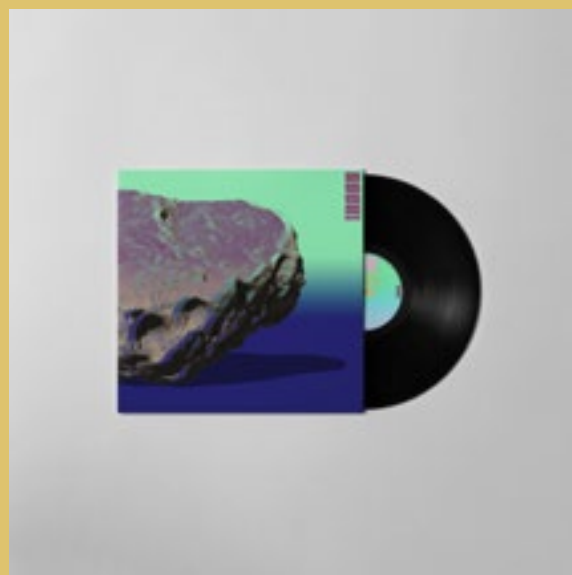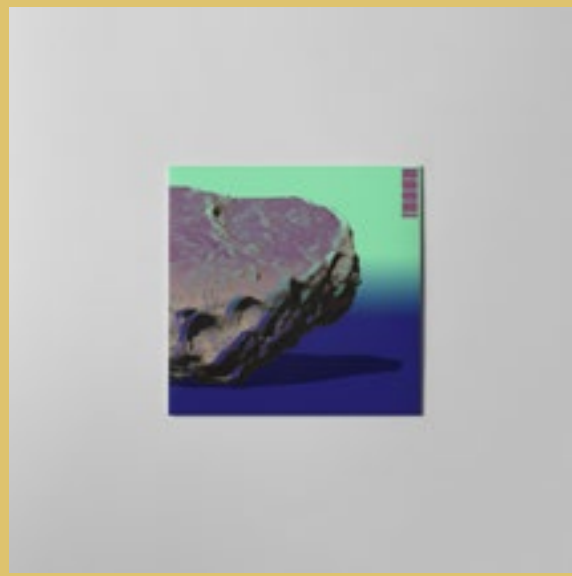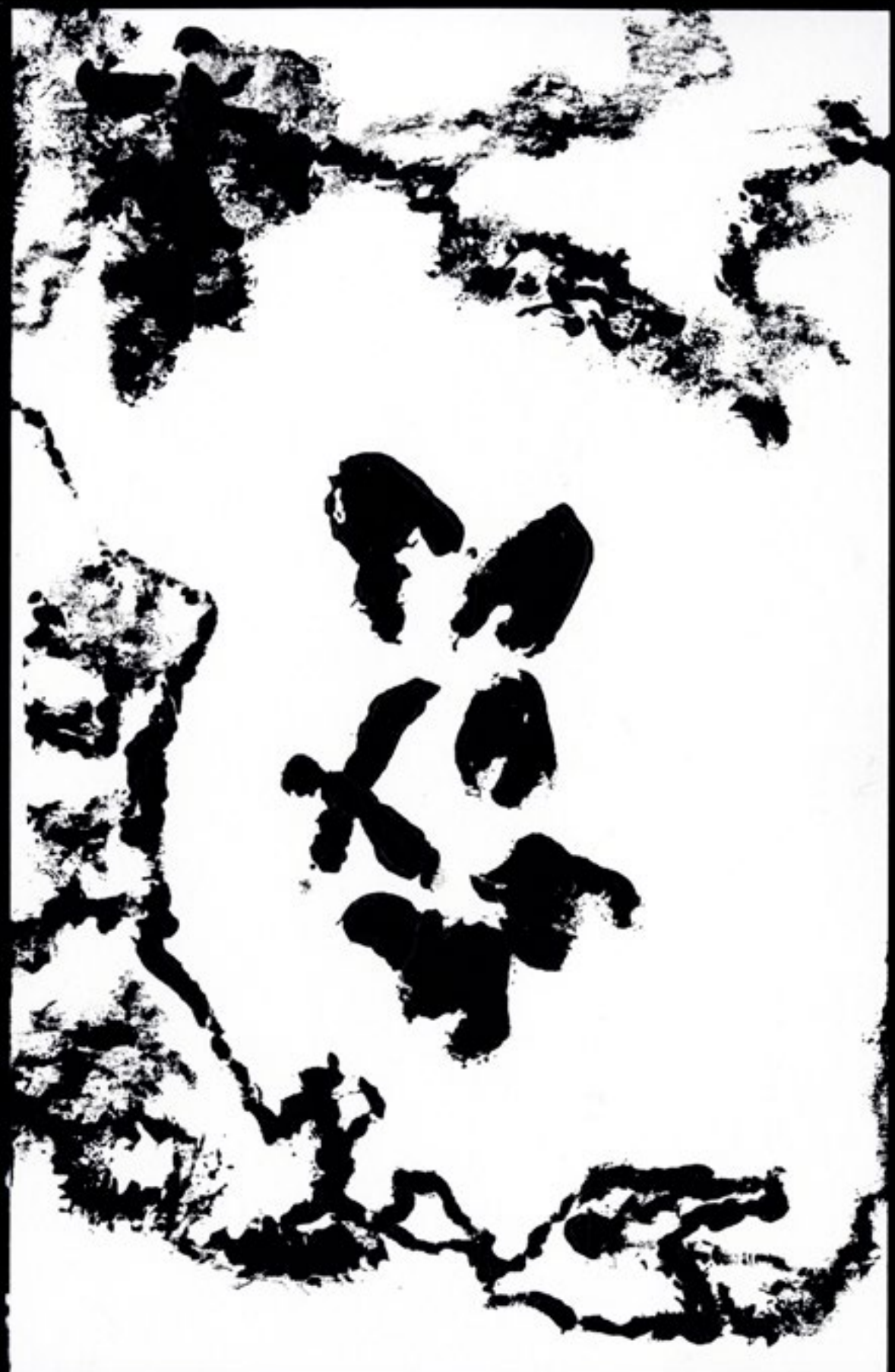
After interfacing with the rocks digitally, I decided to make a series of monoprints by pressing the rocks into ink and manually imprinting their surfaces onto paper.
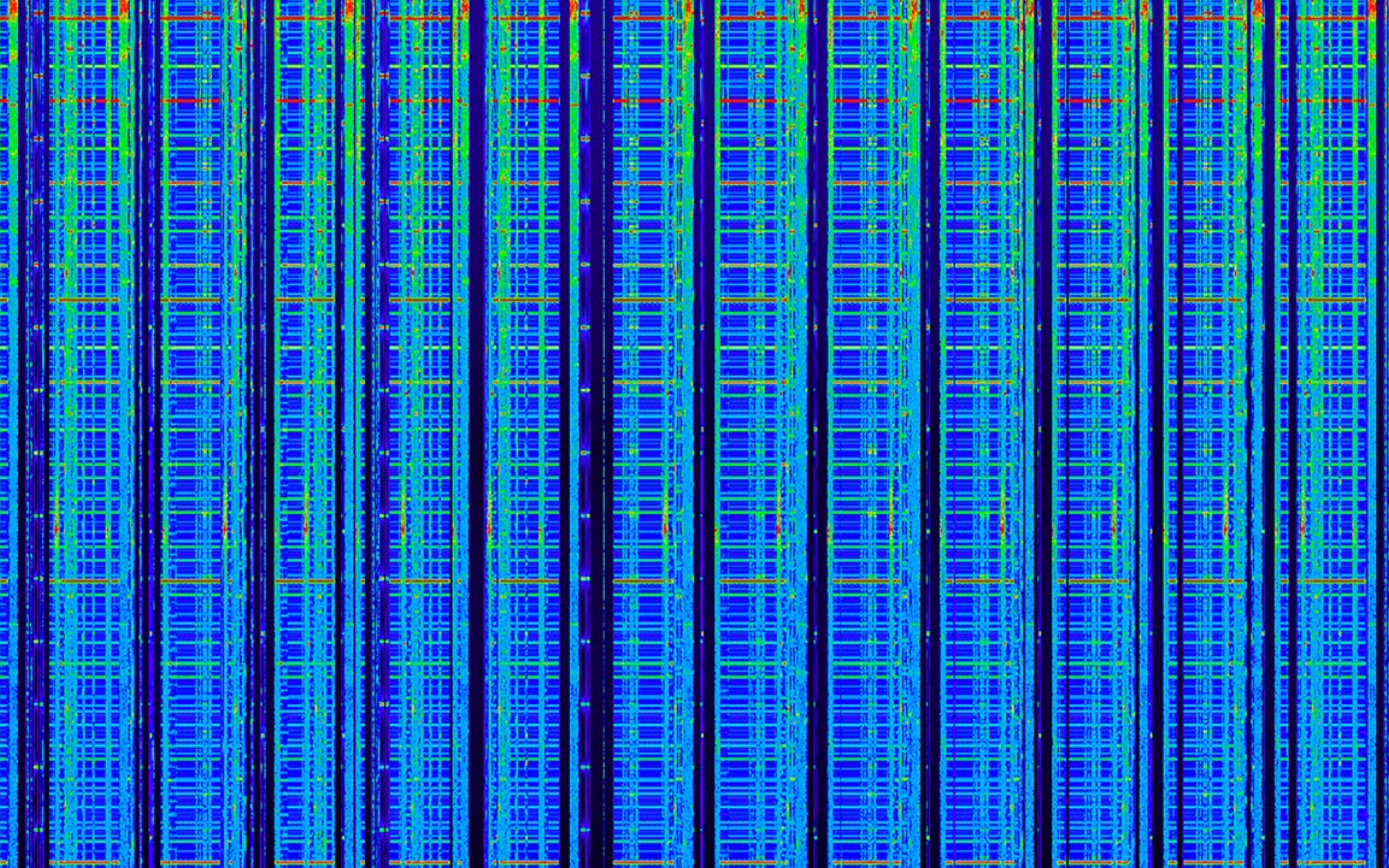
Cyberflesh

The system that connects me and my digital self is illusive. Mind and machine meet at the body's boundaries. Information flows between body and machine through invisible electromagnetic waves. This is the bridge and the abyss.

26 Donna Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century," in Simians, Cyborgs and Women: The Reinvention of Nature, (Routledge: New York, 1991), 149-181.

27 Arthur Kroker, Body Drift: Butler, Hayles, Haraway. (Minneapolis: University of Minnesota Press, 2012), 2-3. I am leaning on the concept of 'drift' to describe the instantiation of a separate digital being that corresponds to an individual's own fleshy body. Kroker identifies the hybrid nature of bodies living in multiplicity. The cyberflesh would constitute one such instance of the body, produced by and contained within technology.

28 Siri Hustvedt, A Woman Looking at Men Looking at Women, 455.

While Donna Haraway's cyborg is an organic, hybrid being enmeshed and intersected with technology,[26] what I am referring to as the cyberflesh is the separate and separating drift of information about an organic being into the digital world.[27] It is the evolving, enveloping container and display of data about an individual received from the physical world. While a body implies permanence and stability, the term flesh allows for softness, vulnerability, and a permeable boundary with the environment that is cause for change.[28] For the cyberflesh, the environment is memory cells inside of the computer, the cables that weave the global internet network, and the electromagnetic waves that connect everything in between. My cyberflesh allows my mind to enter the network while maintaining my identity and my corporeal form. It offers self-preservation in the form of data. Data becomes the key to immortality.

My cyberflesh is my memory embodied in data. It displays me and hides me. The cyberflesh feels immaterial to my corporeal senses, but it exists physically as a network of information, stored as polarity charged electrons on hard drives around the world. The cyberflesh is empty: it is a surface wrapped around forms built by computers. My cyberflesh is immortal: it will long outlive me, existing in fragmented multitudes while my body decomposes in the earth. The cyberflesh is unalive: it doesn't breathe though it requires air for its survival. It survives glitches, distortion, and failure. It will decay and transform as it is subject to erasure, deletion, and corruption, but it will persist and insist upon its completion and accuracy. The cyberflesh is a mirror and a portal and a double and a medium and a bridge and an agent. My cyberflesh takes me places and keeps me still. It activates my personhood and reduces me to my form. My cyberflesh waits for me to log on and give directions. It is also active when I am sleeping, interacting on my behalf, interfacing as a placeholder– always on, always available, in uniqueness and multiplicity.

My cyberflesh is virtual, imaginary, physical and real. This digital self would not exist without me, and in many ways, for people all over the world, I would not exist without them. She enters the places where I do not go and helps me be there. There exists a reciprocal cybernetic relationship between my digital self and my physical existence on earth.[29] My cyberflesh is my virtual antennae for sensing through computers. She is a playground and a laboratory. She is a practice round and the final word.

29 What Katherine Hayles dubs the 'second wave' of cybernetic theory concerned itself with self-organizing systems that evolve based on feedback from within the system and with its environment. N. Katherine Hayles, How We Became Posthuman, 132-140.

Meshing with Myself

One of my artistic aims is to escape the flattening effect (both on the body and identity) of the screen. So I render my likeness in a new way: 3D scanning. The 3D scanner is able to capture my form with more precision than images ever could; the amount of detail is uncanny. However, the scanner is designed for engineering applications, not for capturing a living, breathing body. Because of this, the 3D scan of my body is littered with digital artifacts and additional layers, especially around my chest cavity, revealing the body's resistance to being captured and the faulty transcendence offered by technology.

This 3D scan allowed me to work through ideas about what happens to the body when it becomes a configuration of digital information. I came to think of the scan as an embodiment of my digital double and began to play with distortion and multiplicity as a way to represent digital identity. Duplicating my body allows me to stage interactions with myself that would never be possible in the physical realm. It allows me to show love to myself and express complex emotions about who I am. These gestures are an act of restoration amongst a multiplicity of bodies and identities. It is enmeshing with my cyberflesh and relishing in my form. These are the kind of affordances granted by the existence of a digital double.
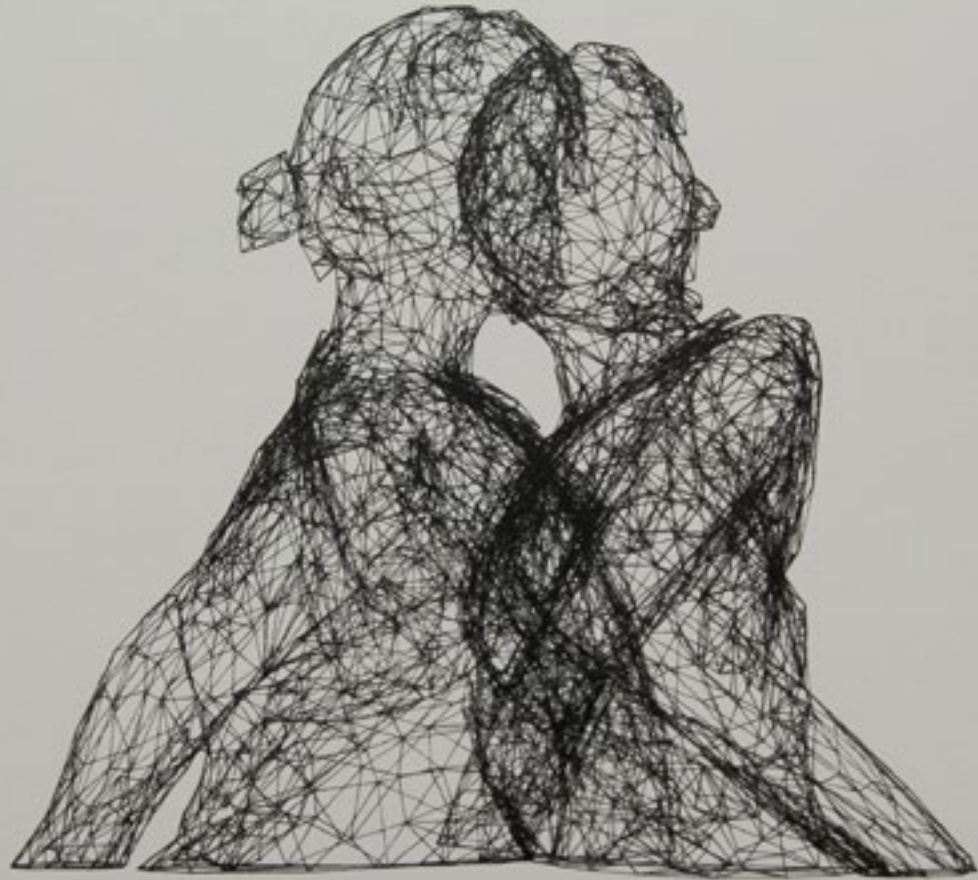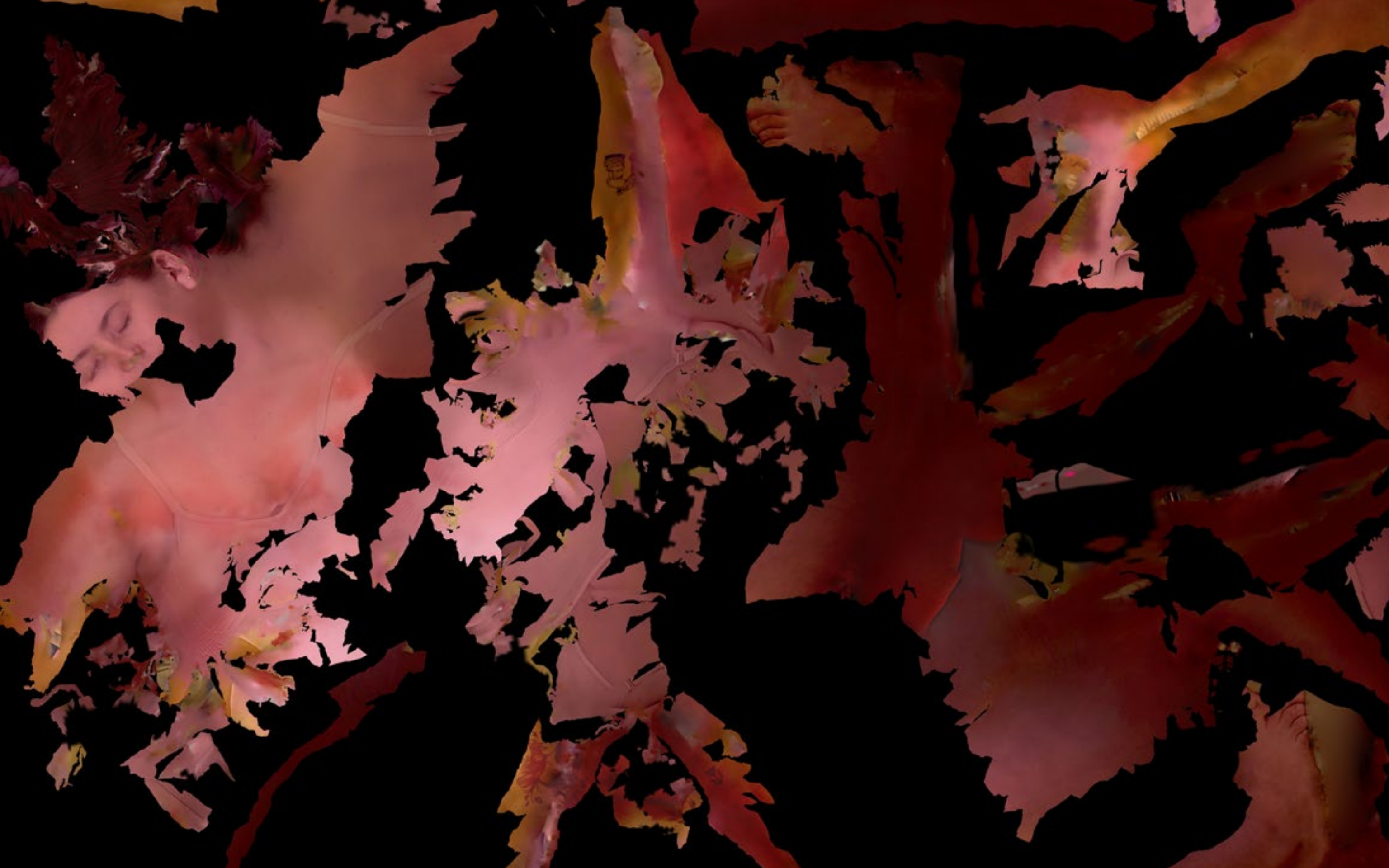
Meshing with myself #4
Pen plot drawing on paper
8.5 × 11″

Meshing with myself #1
Pen plot drawing on paper
8.5 × 11″

a puzzle made with the material file of my body scan

1

2

3

4

5

6

7

8

9

1
Cast gypsum
5 × 5 × 3"

2
Sandcast aluminum
2.5 × .5 × .5"

3
Mycelium
4 × 5 × 3"

4
Sandcast aluminum
2 × 2 × 1"

5
Sandcast aluminum
2 × 2 × 1"

6
Cast plastic
5 × 5 × 3"

7
Cast gypsum
2 × 1.5 × 1"

8
Melted PLA
7 × 4 × 3"

9
sandcast aluminum
2 × 2 × 1"

How can technology engage the body more fully? I'd like to expand the range of motion in gestures that control technology. Let me move my entire arm rather than just my thumbs. Let me dance across a keyboard with all my limbs rather than my fingertips. The interface is not the screen, but the skin.

Virtual reality is perhaps the prime example of the current limits of embodied technology. It is immersive, sensorial, and utterly convincing. And yet, it is also limiting and boundaried in the ways it puts the senses in a physical and virtual box, behind headgear, tied to one point in the room by a leash. On the other hand are immersive art experiences, which throw images on the walls and hide every trace of the technological mechanisms that make this possible. Visitors roam free from restraint, but there is typically no real engagement of the body. The interface is much the same as staring at a screen. Some installations like this even provide comfortable seating on the floor, mimicking the way we consume television in the home: reclined, sedentary, and passive. I'm interested in finding a third path, one that lets the body be free and engaged. I'm experimenting with ways to acknowledge the presence of the viewer and, in turn, engage their bodies in relation to my work. Let them play and discover the interaction with no prescribed rules or instructions for behavior. Let it be a game of the mind and body working together to discover something new and simultaneously, something familiarly human.
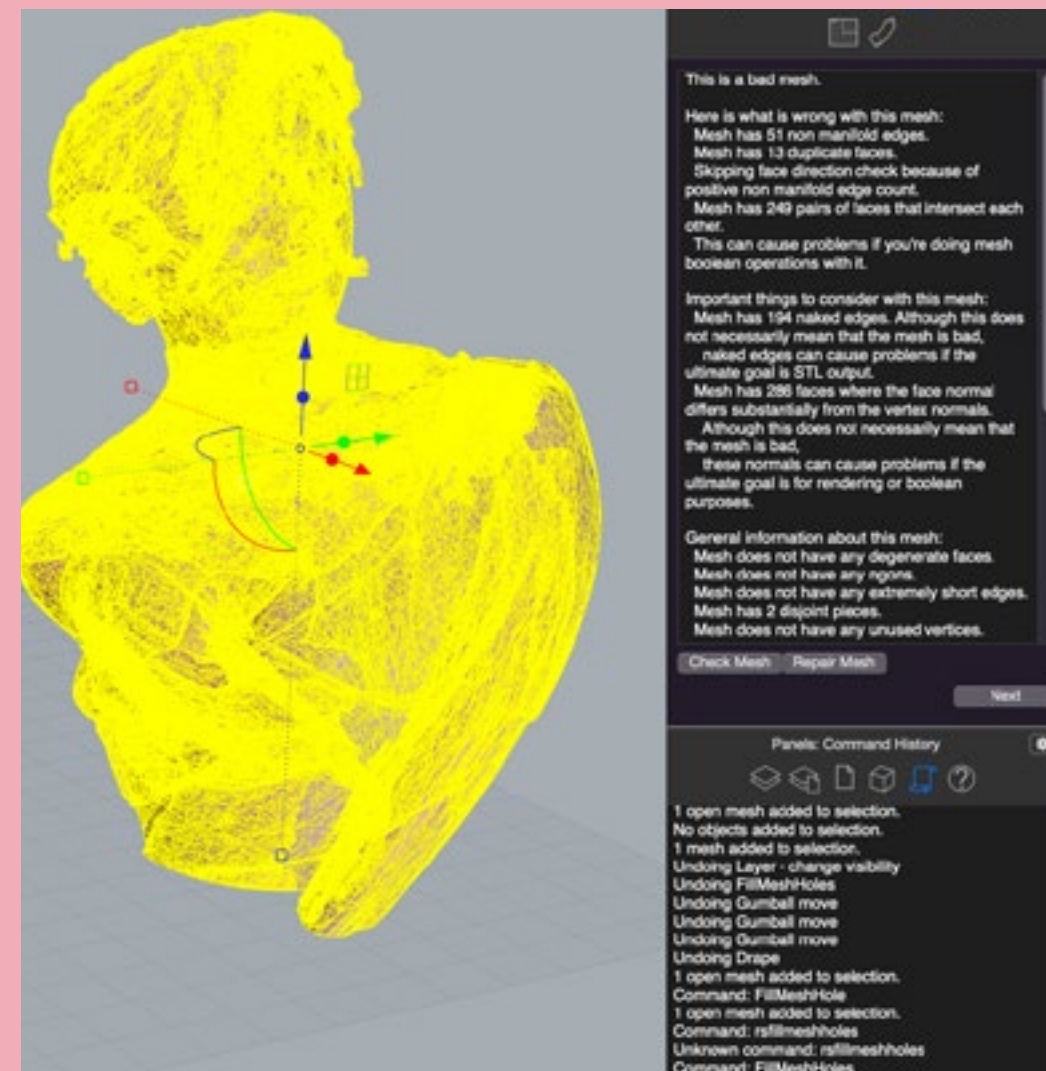
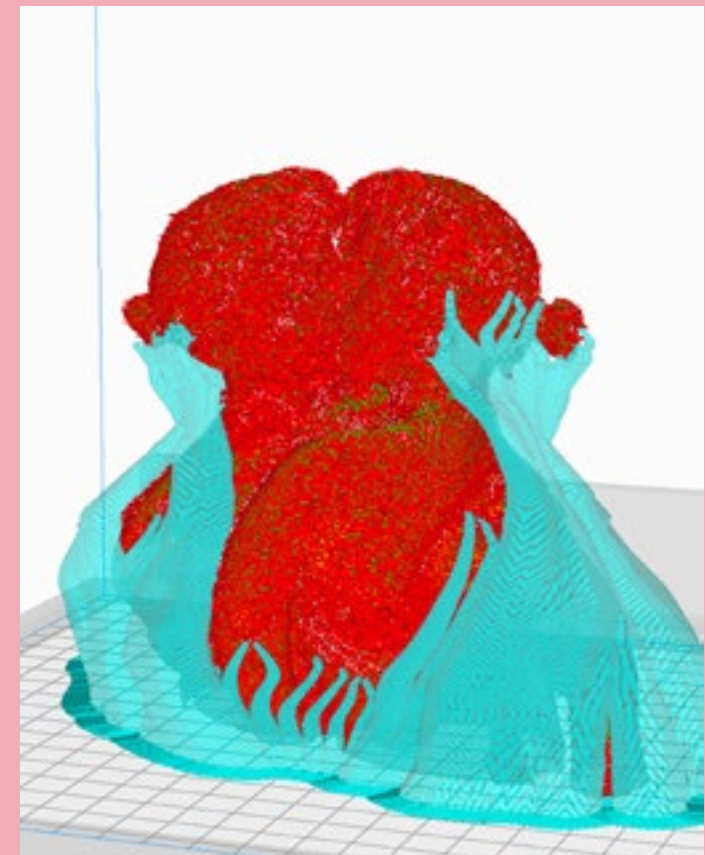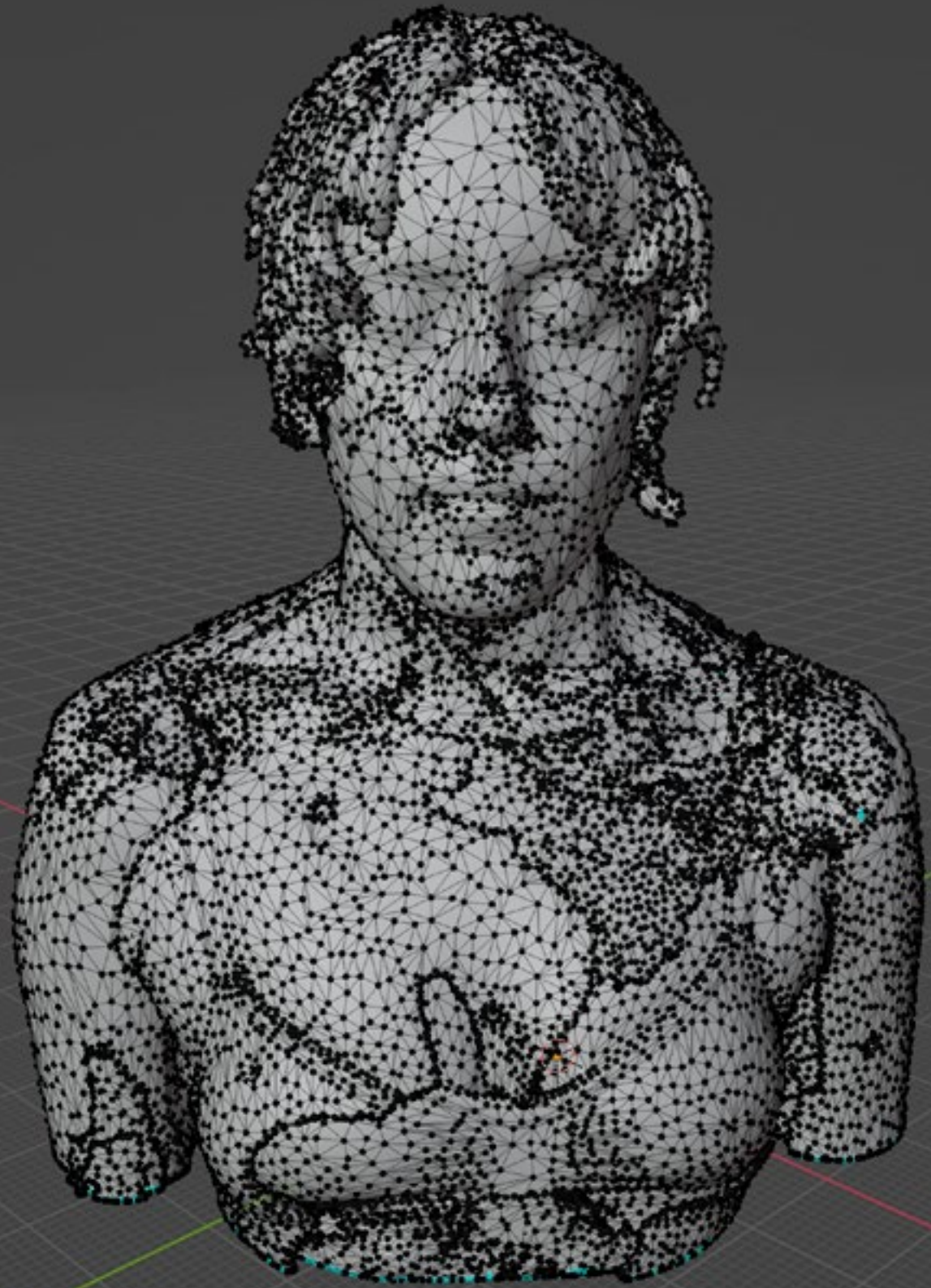hugging myself

Rhino render landscape

stepping on my face

Bad mesh

3D prints in PLA and resin

G-code preview in Cura
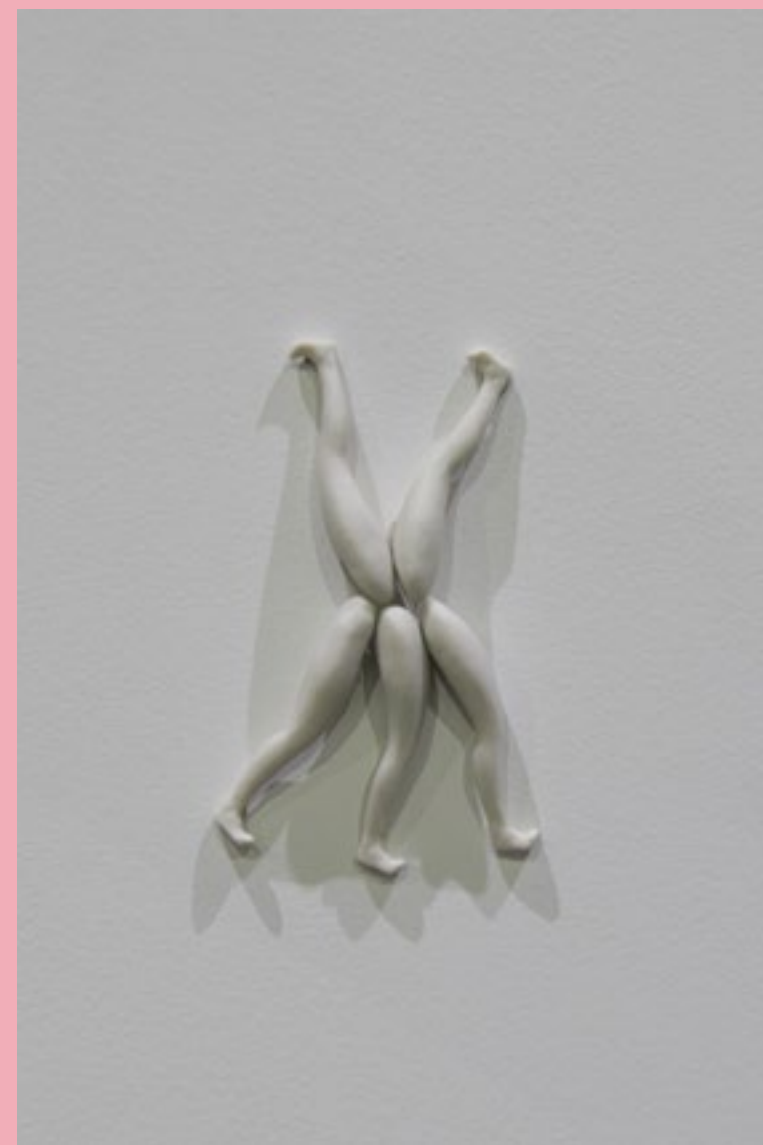
Installation view

CNC'd aluminum
2.75 × 2.75 × 1.25"

Sandcast aluminum
2.6 × 0.5 × 0.5"
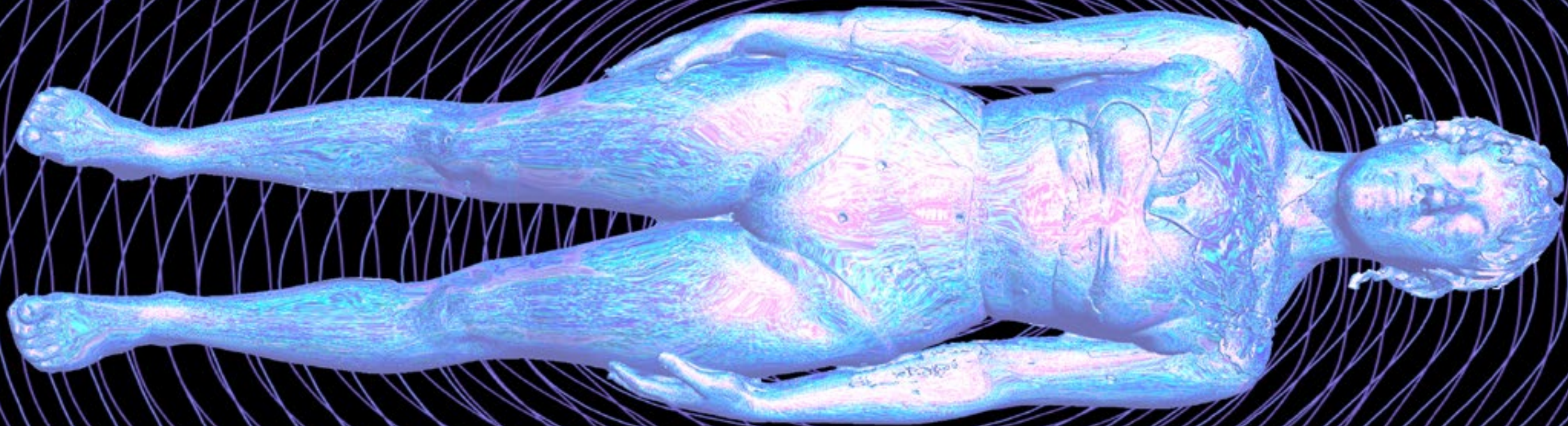

Porcelain
5.25 × 3 × 0.5"

CNC'd aluminum
2.9 × 2.75 × 1.25"


Cast plastic
3 × 2.75 × 1.5"

The Me I've Made For You

My thesis project is an interactive audiovisual installation using computer vision and custom software created in Max/MSP Jitter. The work represents the psychological and physical effects of living in the digital age. It imagines a digital double that is always available for interaction, but remains trapped within the infrastructure of technology. The viewer's movements generate their own experience of the work, luring them to embody a fractured connection with the other that lives within the screen. This relationship paradoxically entices interaction while defying visibility.

The installation consists of a custom frame, embedded screen, and a computer vision system. The program uses infrared depth images from the Xbox 360 Kinect to sense the viewer's position and proximity in the exhibition space. On the screen, a 3D scan of my body breaks into pieces as the viewer approaches, while the sound is synthesized and interpolated as viewers move through defined zones. When no one is detected, the system continues to have a life of its own.

The interaction draws on my own experience with social anxiety, both in person and online. I have fear of being watched and concern for how I am perceived by others. At the same time, this visibility is validation of my identity and confirmation of my personhood. Seeing myself doesn't offer the same kind of recognition. In fact, I get an uneasy feeling when I see myself represented on screen; it takes away from my being here in the present. In some ways, this project is a kind of exposure therapy for being exposed. If digital identity is ontologically fragmented and flattened by its need to be seen, this project says that once left alone, it can put itself back together again.
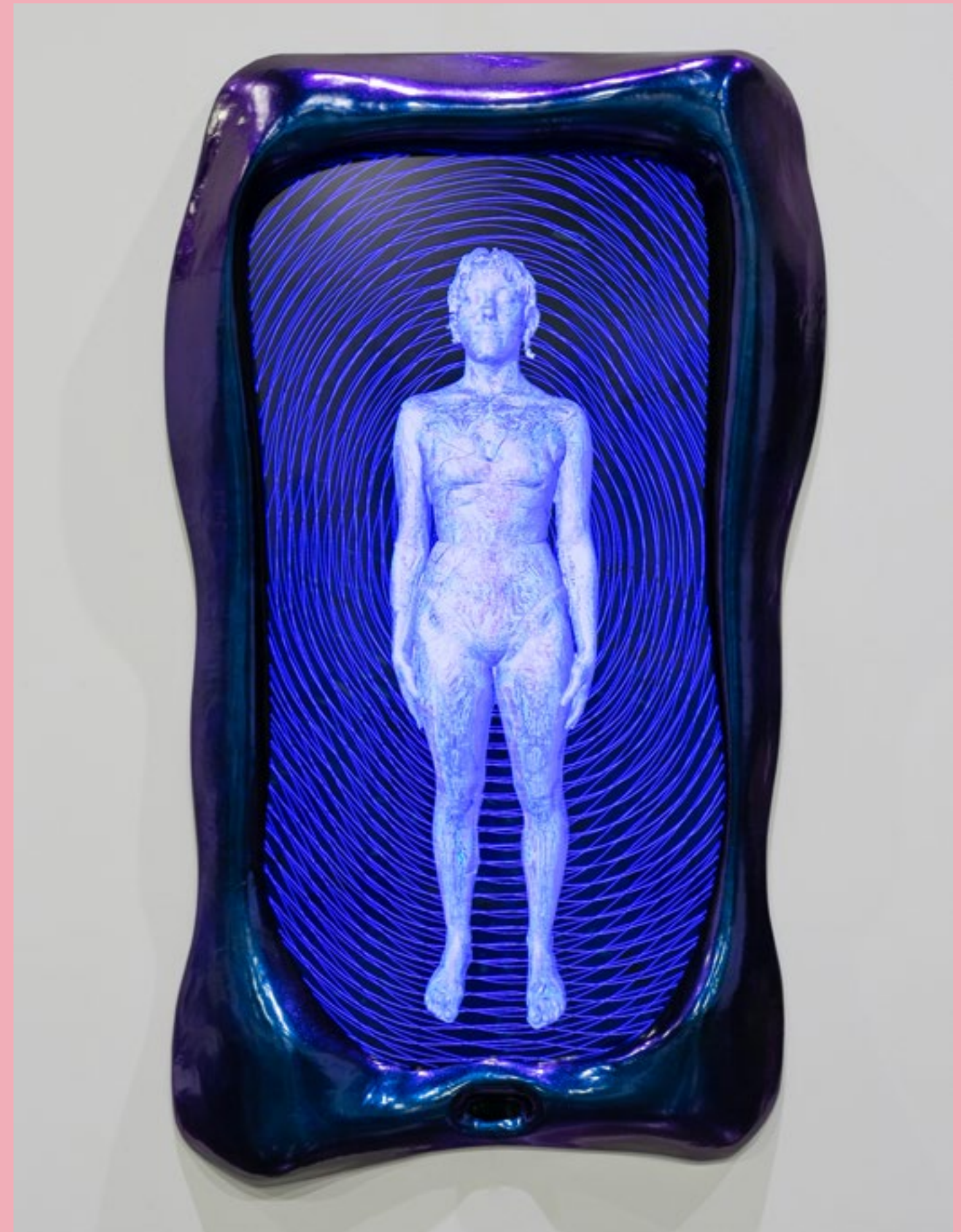
Bibliography

Baudrillard, Jean. Simulacra and Simulation. Translated by Sheila Faria Glaser. Ann Arbor: University of Michigan Press, 1994.

Benjamin, Walter. The Work of Art in the Age of Mechanical Reproduction. Translated by J. A. Underwood. London: Penguin, 2008.

Brennan, Teresa. The Transmission of Affect. Ithaca: Cornell University Press, 2004.

Berger, John. . Penguin: New York. 1977.

Cycling '74. "What is a Matrix?" Accessed December 10th, 2022. https://docs.cycling74.com/max8/tutorials/jitterchapter00a_whatisamatrix.

Deleuze, Gilles. Difference and Repetition. London: Continuum, 1994.

Donnell, Radka. Quilts As Women's Art: A Quilt Poetics. Vancouver: Gallerie Publications, 1990.

Enns, Anthony. "Spiritualist Writing Machines: Telegraphy, Typtology, Typewriting." communications +1, 11, 4, no. 1 (September 16, 2015).

Ernst, Wolfgang. Digital Memory and the Archive. Minneapolis: University of Minnesota Press, 2013.

Giannachi, Gabriela. Archive Everything: Mapping the Everyday. Cambridge: The MIT Press, 2016.

Gibson, William. Neuromancer. New York: Ace Books, 1984.

Hayles, Katherine N. How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics. Chicago: University of Chicago Press, 1999.

Haraway, Donna. "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century." In Simians, Cyborgs and Women: The Reinvention of Nature, 149-181. Routledge: New York, 1991.

How Not to Be Seen: A Fucking Didactic Educational .MOV File. Hito Steyerl, 2013.

Hustvedt, Siri. A Woman Looking at Men Looking at Women. New York: Simon & Schuster, 2016.

Ihde, Don. Embodied Technics. Automatic Press / VIP, 2010.

Kroker, Arthur. Body Drift: Butler, Hayles, Haraway. Minneapolis: University of Minnesota Press, 2012.

Leone, Massimo. "Wrapping Transcendence: The Semiotics of Reliquaries." Signs and Society 2, no. S1 (2014): S49–83. https://doi.org/10.1086/674314.

Mcluhan, Marshall and David Carson. The Book of Probes. Corte Madera: Ginkgo Press, 2003.

Meta. "About Meta." Accessed May 17, 2022. https://about.facebook.com/?utm_source=meta.com&utm_medium=redirect.

Nelson, Maggie. Bluets. Seattle: Wave Books, 2009.

Overbey, Karen. "Seeing through Stone: Materiality and Place in a Medieval Scottish Pendant Reliquary." RES: Anthropology and Aesthetics, no. 65/66 (2014): 242–58. http://www.jstor.org/stable/24871254.

Russell, Legacy. Glitch Feminism: A Manifesto. Penguin Random House: New York, 2020.

Steyerl, Hito. "In Defense of the Poor Image." e-flux Journal, no. 10 (November 2009).

Weiser, Mark. "The computer for the 21st century." ACM SIGMOBILE Mobile Computing and Communications Review 3, no. 3 (1999): 3-11.