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UNIVERSITY OF CALIFORNIA  
SANTA CRUZ

# CLOTH<sup>3</sup>

*A craft-based approach to 3D computer graphics*

A thesis paper submitted in partial satisfaction

of the requirements for the degree of

Masters of Fine Arts

in

Digital Arts and New Media

by

Patrick Stefaniak

June 2021

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Quentin Williams  
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2021



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# ABSTRACT

## **CLOTH<sup>3</sup> by Patrick Stefaniak**

*CLOTH<sup>3</sup>* is an art installation which focuses on cloth simulated cubes that have been rendered in 3 different media: crochet, 3D printing, and videogame. *Unity Primitive: Cube* is a hand-crocheted cube that is a to-scale version of the cube in the Unity game engine. *A few ways of being a cube* is a grid of 64 3D prints of cubes that have been deformed through cloth simulation in the Blender 3D modeling software. *CUBEISM 2: Baroque Edition* is a 2 channel videogame, played on a touchscreen and displayed on a large projection, that has digital counterparts to the other two sculptures. *CUBEISM 2: Baroque Edition* also exists as a desktop version that can be downloaded online and played on a computer at home.

This thesis examines how *CLOTH<sup>3</sup>* proposes an analogy between crocheting and 3D modeling, as methods of figuration that are simultaneously mathematical and bodily. Both involve a process starting from loose fibers or points, which are drawn together into lines, and then woven or connected into faces, which then can close up into a 3D form. It also looks at how aesthetic strategies from both minimal and baroque art are useful in thinking about seriality and challenging the relationship of the viewer to the art object. When combined to a practice of queer videogame design, these practices offer a way of creating joyously in a way that expresses potential ways of being and moving while locked into a rigid grid.

# DEDICATION

*I dedicate this thesis to all of my friends who I've missed deeply.*

# ACKNOWLEDGMENTS

I'd first like to acknowledge my DANM classmates for everything we've gone through together these past 2 years.

To Colleen Jennings for being so organized and helpful while we created our thesis shows.

To my thesis committee, micha cárdenas, A.M. Darke, and Jennifer Gonzalez for their guidance while also going through a particularly difficult year.

To my parents for always supporting me.

To Surabhi Balachander for always pushing me to do better and always knowing me better than I know myself.

To Josie Wenig for being my same hemisphere.

And to all of my friends who have sustained me emotionally and creatively.







# INTRODUCTION

*CLOTH<sup>3</sup>* is a show that focuses on cloth cubes rendered using three different methods: crochet, 3D printing, and on a screen. *Unity Primitive: Cube* is a hand-crocheted cube that is a to-scale version of the cube in the Unity game engine. *A few ways of being a cube* is a grid of 64 3D prints of cubes that have been deformed through cloth simulation in the Blender 3D modeling software. *CUBEISM 2: Baroque Edition* is a 2 channel videogame, played on a touchscreen and displayed on a large projection, that has digital counterparts to the other two sculptures.



Figure 1. An installation view of CLOTH^3

My goal in this show was to expand my practice which focuses on the player's, and often specifically my, bodily engagement with games and computers to include sculptural objects, in addition to the videogames and videos that primarily constitute my previous body of work. To do this I draw on other art practices, described below in the literature review, that rendered the same objects in different formats. The "in real life" (irl) objects in *CLOTH^3* come out of my engagement with games and the body. They carefully expand my practice to include irl methods of rendering in relation to digital rendering, most importantly the both real and metaphorical concepts from textile production. Those examples also, in the cases of Satterwhite and Kanaga's works, demonstrate works that cross disciplines like art,

games, and music. These interdisciplinary works do not just lightly reference, they very deeply consider each of these references and forms to create something new and dynamic.

One of the stakes of this thesis, then, is in this carefully considered mixture of art and videogames, brought together in the Unity game engine which, as *Oikospiel* likes to pun on often, acts as the same kind of Gesamtkunstwerk, or total artwork, that began as a term for how opera could enact every form of creative art inside of one piece. Importantly, this is done in conjunction with an attention to the body. In playing a game we become enmeshed in a system alongside others, usually some combination of computers and other human players. There becomes a slippage between these different bodies, which all move and change in a circular reaction to one another. This prompts players to behave differently than they would normally. A game becomes a place where new movements, configurations, and desires can be practiced and explored. Art is a place where this play can be solidified into concrete objects. This bodily stake is about feeling able to play and be changed by play. My insistence on both art and games is about how they help me understand myself; how I was formed and how I move through the world.

*CLOTH*<sup>3</sup> came out of experimentations where I was trying to think through the idea of textile production as rendering and how that relates to 3D models. While *Unity Primitive: Cube* was started in 2019, before I began my MFA at UC Santa Cruz, most of the other work that led up to this show did not begin until 2020. For the first year of my MFA I was focused on work about holes: hole punching, cornhole,

maps, and the empty interiors of 3D models. I was trying to figure out a practice that could involve irl object making in addition to my digitally based work. I prefer using irl, “in real life”, to physical when talking about my practice because I believe that the digital objects have a physical reality, even if it is different from what we normally think of as a physical object. Irl signals the distinction from the digital without claiming that it lacks a materiality. I went down a rabbit hole of hole punching maps and, while I still like the work, I couldn't figure out how to make it conceptually click into place.



Figure 2. A hole-punched artwork, *The Hole Country* (2020).

After a weekend of wrestling with trying to construct a frame of large wooden beams, and losing, and then having a studio visit, the campus was evacuated due to the approaching wildfire. I spent the next couple of weeks in San Francisco,

wondering whether or not my work sitting in the DARC building would get smoke damaged. I was pretty sure it wouldn't be burnt, but not 100% certain. With that physical distance and the possibility of losing that work I was faced with the question, do I really like that work? Is it the kind of labor I want to keep doing?

I had some yarn and crochet hooks with me. *Unity Primitive: Cube* was, I think, at the point where the sides were all constructed and I was in the process of sewing them together, so I hadn't yet crocheted anything else because that was taking up all of my time. So I started crocheting small sketches of folded, non-euclidean shapes that also sometimes also had parts that were just single lines of crochet chains, yarn, or yarn that had been unraveled. Being once again isolated and displaced, working with yarn just felt good. I had previously worked on a proposal for a game playing with cloth simulations and touch screens or virtual reality and decided that I needed to go in that direction and leave hole punching behind for now. Holes are still very present in this work and in this essay though. Crocheting is built on adding loops to holes in the existing fabric, 3D models are hollow shaped defined by infinitely thin surfaces and are therefore technically holes, many of the 3D printed cubes have orifices, and I was especially delighted to see Deleuze write, "Folds become holes." (Deleuze 1992, 27)



Figure 3. Some crochet sketches (2020).

Coming back to our studios on campus after the fire, I began 3D printing thin surfaces that had been deformed through cloth simulations. These shapes are unusual for 3D printers, which are designed to handle more solid geometries, so it took some trial and error to learn how to get the prints to come out successfully. During this process I realized that one important, missing link in my hole punching work was that it was disconnected from my digital work.

In my 2019 installation, *site holes*, I attempted to bring the two together by projecting a VR headset view onto a screen that had been hole punched and had shapes in the game that either were holes or had holes punched into their surfaces, but there was still something that felt unresolved about the project. Where I see the



biggest strength in what *CLOTH*<sup>3</sup> does, that I will continue into my future practice, is that the irl objects stem from my core interest in bodily engagement with videogames.

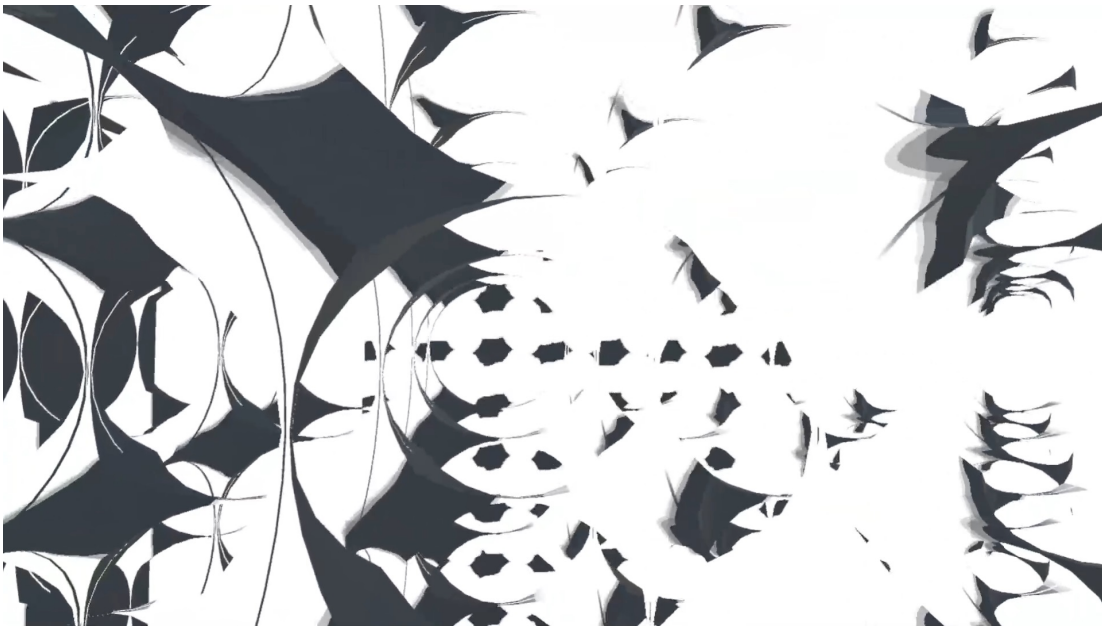
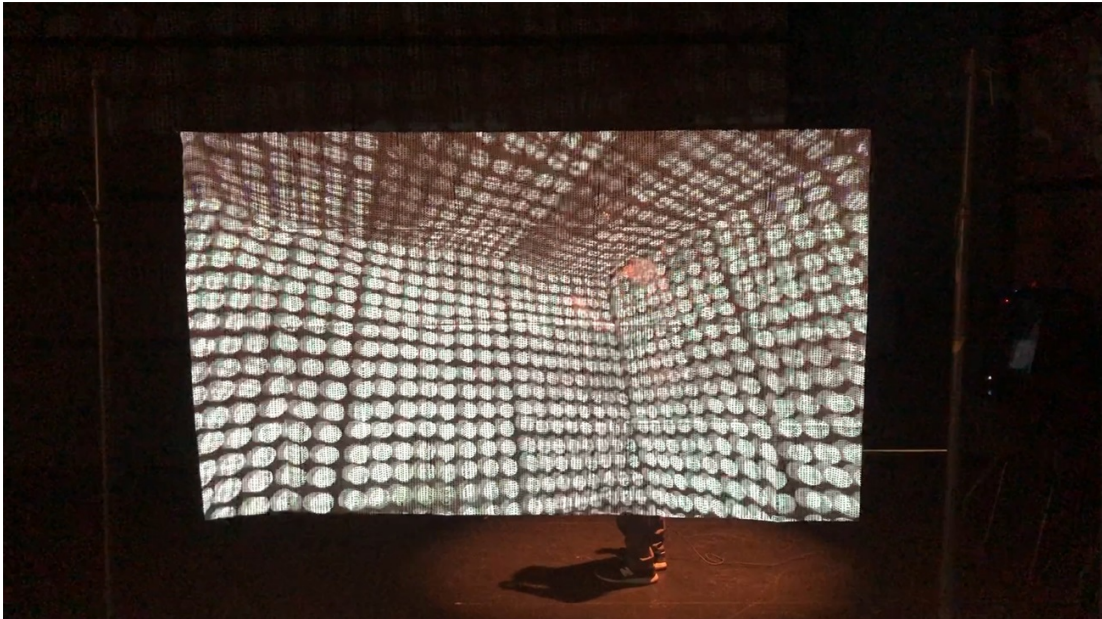


Figure 4. Installation and game screenshot from *site holes* (2019).

I wanted *CLOTH<sup>3</sup>* to engage a variety of audiences and conversations: videogame and interaction designers (especially ones interested in queer games), minimal, conceptual, and baroque art history, computer graphics, textile art, and casual viewers who don't have strong knowledge or experience in any of these categories. What I hope for with this show is that people in any part of this venn diagram of categories can not only connect with those ideas but then get drawn to see the connections with the others. However, I don't think that seeing all of those perspectives is integral to experiencing this show. That would be asking way too much of an audience. In the conclusion of this paper I will discuss the ways in which the piece was successful and struggled to meet these goals.

The format of the show was predetermined by the pandemic to be primarily online. Thankfully we had full access to the DARC building, so I was still able to fulfill my goal of making both digital and irl objects and having a show, even if only UCSC faculty and other grad students got to see it. My goal in doing this was to have work ready to show in other contexts and to use this as an opportunity to take good documentation. It also fits naturally with my practice of releasing games online that can be downloaded to play on desktops.

The downloadable game and online documentation give a way to access the show from a computer, although at a certain remove. But, the whole show is made up of almost doubles and disconnects. The cubes in *CLOTH<sup>3</sup>* circulate between the different materials, interfaces, and rendering engines. If they have any one origin, it is in the computer code, the general idea of a cube, and the art references. This

paper is organized first with a literature review that considers examples of other works which render objects using different techniques or very seriously consider multiple forms of creative work together. I then move to an overview of conversations that informed this work: crochet, phenomenology and perception, minimal and baroque art, and queer videogames. Finally, I will describe the process of creating the three pieces of this show in chronological order and summarize what I've learned from this process and where it will lead next.

# LITERATURE REVIEW

## *One and Three Chairs* by Joseph Kosuth, 1965

This work consists of 3 objects: a chair, a photograph of the chair, and a definition of a chair. "Kosuth didn't make the chair, take the photograph, or write the definition; he selected and assembled them together." (MoMA) The first piece, when reading left to right in the installation, is the black and white photograph, which is mounted on the wall a few inches off the ground. Based on the wall shadows and floor board patterns it appears to have been taken specifically of this chair in this exact location, printed, and then mounted next to it. Horizontal lines in the print almost line up with lines in the chair, for example where the wall meets the floor in the print is aligned with the bottom of the back of the physical chair.

My access to seeing this work is through a photograph which seems to have intentionally taken a photograph of the entire piece at an angle similar to the photograph in the work, but I can imagine that if I were to walk to different vantage points that the three dimensionality of the chair would change its visual relationship to the photo and highlight them as different objects. The chair itself is a relatively plain, brown folding chair. By itself it is not a particularly interesting object. In looking at other installations of this piece the chair changes, which leads me to assume that the specific chair is unimportant. The photograph's specificity of being the chair in the

exact same position seems to change slightly, with a platform being placed underneath the chair in some photographs, but the forward facing composition up against the wall remains constant.

To the right of the chair is a text panel with a printed definition of a chair. Again, in looking at various installations of this piece the same definition is not used, leading me to believe that this specific definition is not as important as that it is just a definition of the word chair taken from a dictionary. The definition on the iteration I was describing above includes, in addition to a description of this kind of chair, chair as a person in an authoritative position and "a metal block or clutch to support and secure a rail in a railroad."(MoMA).

In moving back from the text to the other two chairs, the viewer then realizes that these are just one kind of "chair", perhaps the most common referent to the word. One could ask, "which is the most real chair?" or, "which chair came first?" or some other kind of ontological question. For me, it highlights the abstract nature of the chair- that it is simultaneously 'dumb matter' and a thing which we have come up with a mental category for in order to place it in relation to other things.

The title and installation of *CLOTH*<sup>3</sup> refer to this piece in that it is also 3 instantiations of the same object, in this case a cloth simulated cube. However, rather than taking a functional object as its focus, like Kossuth's chair, its object is an abstract shape rather than a reference to a functional object. A cube is something that, while it can be rendered in different formats, always has the same exact shape

in Euclidean space. *CLOTH*<sup>3</sup> also does not offer a textual rendering of the cube, instead it has two 3D sculptures and one 2D image. Two of these pieces have multiple cubes in them. In Kossuth's piece only the definition has multiple chairs, although arguably it could also be read as referring to the one word 'chair'.

*CLOTH*<sup>3</sup>, however, does have traces of the code that is involved in the rendering process, either in the filament lines of the 3D prints, the crocheting algorithm, or knowing that videogames involve code. Kossuth's chair also seems to have a sliding scale of abstraction, the physical chair is the most concrete, then the image which refers to this specific chair, then the definition is the least concrete. My cubes have a more circular path. Arguably the most non-digital piece is Unity Primitive: Cube, but, as the name suggests, the cube comes from a digital place. The 3D prints were printed by a machine and do not clearly refer to any kind of irl object. Finally, the videogame refers back to the irl objects as characters. If there is any abstract idea of the cube that these all get referred to it is somewhere in the machine, the code, and the general idea of a cube.

### *Incomplete Open Cubes* by Sol LeWitt, 1974

This piece exists in several variations, but for the sake of describing one instance I will focus on the installation in the collection at SFMOMA. (SFMOMA) This installation renders a set of "122 ways of 'not making a cube'" in 3 formats: sculpture, prints, and drawings.(The Met) The 122 ways are based on rules decided by LeWitt,

"Each sculpture is a projection of a three-dimensional cube with some of the edges removed in a way that the structure stays three-dimensional and the edges stay all connected. The minimum number of edges kept is three and the maximum is eleven."(Fabrizi) These not-cubes, then, are every possible permutation inside that rule set.

While this installation has 3 modes of rendering, it is separated into two main sections: the sculptures and the 2D images. The sculptures are arranged on a raised grey bed on the ground which has a grid of squares marked out by white paint. The wooden sculptures are also painted white and seem to be arranged in rows according to how many edges the shapes have, starting with 3 and going up to 11. The grid is 18 rows long by 10 columns wide, so presumably there are certain numbers of edges which have more than 10 options. The rows of cubes which have less than 10 options, like 3, 4, and 11, are center justified in the rows of the grid. From the angle of the photograph of this installation the sculptures are only possible to see clearly on the edges, in the middle they become a visual tangle. But one can imagine, and this is confirmed by both my personal experience and a description on the SFMOMA page, that when one walks around the installation that the lines of the sculpture occasionally snap into place and look orderly and rational.

On the wall around the platform of sculptures is a similar grid of prints and drawings. Each of the 122 not-cubes has an individual frame that includes a photograph of the sculpture on the left and a schematic drawing on the right. The photograph appears to be the white sculpture on a black background, while the

drawing is relatively faint, being made of thin black ink lines on white paper. The drawings are in an orthographic projection, which does not have perspectival distortion, while the photographs are taken with what seems like a typical lense that give the lines of the not-cubes, although they are still quite parallel looking, an eventual vanishing point where they would converge if extended.

The overall effect of this installation takes the seemingly simple form of the cube, applies a rational operation to it, and lets it unravel into complex images. Each way of rendering the not-cubes by itself creates a grid that oscillates between order and chaos. When they are installed next to each other, it is impossible to focus closely on more than one at a time. Instead, they interact on 2 levels: as a large form of the grid, on the wall or on the floor, and on a not-cube to not-cube basis. For example, I might look at a print and drawing of one not-cube on the wall and then try to locate its sculptural counterpart. In doing so, I would probably note its general place on the wall grid and try to map it to the floor grid. I might have to move around the space in order to get an unobstructed view of the sculpture, which doesn't overlap visually with the others around it. I then have to square up this not-cube to the ones I saw on the wall, either from memory or by going back and forth between the two.

This piece, again, offers *CLOTH*<sup>3</sup> a reference of the same object being rendered in 3 different ways. Here, unlike my show or in Kossuth's piece, it is the same exact shapes being rendered all 3 times. Also different is that it is an object that is only partially depicting its referent, these cubes are all incomplete. Although,



even if they were isolated as an individual object, rather than being in the grid, they are all immediately suggestive of a full cube. This could be seen as analogous to *A few ways of being a cube*, which is composed of shapes that are almost all cubes in the topological framework of geometry only. Rather than being incomplete, they have been deformed. They offer that deformation, however, also as a kind of openness—that the simple cube can offer many potentials. The one-to-one matching relationship of the different renderings in LeWitt's piece is present in *CLOTH<sup>3</sup>* especially when the videogame displays the grid of 3D prints, which are arranged in the same composition as the irl instantiation. However, like in *Incomplete Open Cubes*, the different viewpoints offer slightly mismatched vantage points that never perfectly line up with one another.

One other lesson I've learned from seeing LeWitt's work in person, although not this exact piece, was about disappointment. Before then I had only seen his work in books. The sculptures had an affect of platonic perfection to them, as if they were perfectly smooth objects that had been precisely rendered from the schematic drawings. What I encountered instead was an art object that had texture and showed some slight signs of process, age, and wear. In that moment I felt a bit stunned and let down, the image before me did not match up to the images in the books and on the internet. After having had time to reflect on this, I now read that encounter as something built up in my mind by the mythology of art history. I have no idea how demanding LeWitt was of the surface quality of his fabricated sculptures. I now see those 'imperfections' as a kind of humbleness and honesty of the object, as if it were asking me why I expected it to be perfect. They are good enough to get the point

across that they refer to these logical, mathematical, engineering ideas. But, there are still human hands that had to make the drawings and fabricate the objects. I now think about this moment of disappointment a lot while making work that spans multiple disciplines like art and videogames that are both loaded with expectations that often exclude one another. I like to let this moment of disconnect be felt, but then hope to be able to guide the viewer past that and ask why they experienced it in the first place.

## *You're at Home* by Jacolby Satterwhite, 2019

This was a solo show of Satterwhite's work which included video, VR, sculpture installation, drawings, and a merchandise store. His practice is based on a collaboration with his late mother, Patricia Satterwhite, who made many drawings of product sketches and records of song ideas. (Pioneer Works) In his pieces he incorporates that work into 3D environments that are mixed in with objects and ideas of his own. He also includes in these videos videos of himself and others dancing, making gestures, and doing sexual activities that are green screened and then placed in the 3D environments as 2D sprites.

This show also includes sculptural installations which are mounted on a wall that has been wallpapered with tiled screenshots from his videos that create a dizzying effect. These walls have general areas of repeating images that have similar blocks of color, like light blue or gold, red, and grey. Mounted on these walls are

shelving units which contain sections shaped like they could be in a living room or a store, which also have sections of small, rectangular zigzags which, seeming to be of little utilitarian function, additionally add a reading of these shelves as altars. These multiple readings are then played with by the shelving colors, which are sometimes standard functional colors like white or light blue and other times are a shiny gold. On the shelves are small screens playing videos and sculptures that seem to have been 3D printed and then painted and came straight out of one of the videos.

In another section of the show is a more traditional white cube space displaying his mother's drawings and song recordings. Here you can see that the actual drawings are utilized in the videos or, if not a direct copy of the drawing, then rendered with a very similar line style. However, even a faithful translation into 3D space involves some amount of additional creativity to add 3D depth. Similarly, the song recordings are used in a music album he created, which is being sold on vinyl in the shop portion of the show. These recordings appear prominently in each song but simultaneously act as a seed that more musical ideas grow from, often being carried out in the electronic instrumentation and the vocals provided by other singers.

Where this, again, overlaps with *CLOTH*<sup>3</sup> is in its interest in moving between the digital and irl. Here the through thread of the different objects comes from the collaboration of Satterwhite and his mother through his translations and interpretation of her works. While some bits of her work are recognizably preserved in the new media they are so numerous that it is hard to trace one specific object through the installation. The specificity of these instead diffuse into styles, gestures,

themes, and moods. The installations, especially through lighting, also serve to blur the boundaries between the video and the gallery space. I am also inspired by his attention to music and how it can both interact with the digital environments as well as become a work that stands on its own.

## *Oikospiel Book 1* by David Kanaga, 2017

This is a videogame that takes the form of an opera. The game changes between many different interaction modes but most commonly involves the player controlling a dog moving through a space, whether that is a landscape, a computer desktop, or a musical score. Because the plot is somewhat convoluted and difficult to explain, I will quote the description from the download page here at length.

"The Oikospielen Opera is developing an epic global-gaming festival called THE GEOSPIEL, scheduled for the year 2100. The opera's employees, organized by the Union of Animal Workers, are trying to integrate the game dev dogs of Koch Games into their group, but these loyal pups love their jobs and boss Donkey Koch too much! Will there be Unity, or will Multiplicity prevail? Money has awakened-- Pluto has captured the spirit of Orpheus, and Eurydice is lead composer in this operatic RE-FORM of the Adventure Game genre."(Kanaga)

In the game you mostly play from the perspective of one of the dogs while either trying to work on developing the game or organizing other animals into a labor

union. The plot is told in fragments through character dialogue and textual cutscenes and is very disorienting to take in on the first play. Rather than having a linear experience of narrative, a sense of what's happening is built up by these fragments and the themes that are common between them.

The main aesthetic reference point for the game is opera, so the game is structured into acts. The player can move freely between them, using a menu to move to any part of the game at any time. You do not have to complete a level in order to move to the next. There is also a libretto published as a pdf of the story and dialogue, and multiple soundtracks that are based on the same musical ideas in the game.

However, it would be impossible, like in a normal opera, to have a straight recording of the music in the game because it is largely played by the player. Sometimes the sound is more organized like a more typical videogame with a soundtrack playing that gets additional sounds from the player doing things in the game. But more often, the music is reactive to a high degree on the player moving through the space or interacting with specific objects.

For example, in the opening the credits are rolling across the screen like in a movie. In the background are several windmills which, when the player moves the mouse, spin and make a loud whooshing sound along with musical notes that also visually interrupts the text scroll. This is a move, made more explicit in a ticket sales screen on [oikospiel.com](http://oikospiel.com), that ties the labor of the player moving the mouse to the

labor of wind turning the turbine to create energy while also producing music. He literalizes the root meaning of 'opera', which means work, while also punning the play of playing a game with the play of playing an instrument or performing a stage play.

How *Oikospiel* inspires and informs *CLOTH^3* is in its unwavering commitment to thinking together the two distinct forms of opera and videogames. This is done with an intensity that can be off putting to audiences from either discipline, but which I find incredibly exciting. He makes many layered references to videogames like *Zelda*, even flaunting copywrite by stealing entire level designs, opera, labor unions, global warming, and Greek mythology. The intensity and joy of playing the game is enough to sustain someone unfamiliar with one or more of these topics and would pique their interest in learning more.

I also am deeply influenced by his ideas on how game sounds can be treated like musical instruments and open scores to be played by the player, although *CUBEISM 2: Baroque Edition's* music mostly plays itself, and on the idea of releasing extraneous material like a PDF libretto which can give additional context to the work without providing an explanatory function like an artist statement or show catalogue. I ended up not making one for *CLOTH^3* because I felt like the connections between pieces and ideas about rendering were strong enough to support itself and I wanted to see how people read the show without that additional text. This could be incorporated into future iterations of this work.

# HISTORICAL AND THEORETICAL THREADS

In the previous section I situated *CLOTH*<sup>3</sup> within the context of a few modern and contemporary works with similar aesthetic and conceptual goals of rendering objects through multiple media and working across disciplines and forms. In this section I will discuss more diverse strands of thought and show how they are woven together in this project. The threads which cross each of these sections is the labor of having a body and moving through the world. Each of these frameworks help give me clarity on understanding myself, in both a granular, moment to moment basis and in a bigger picture sense of how my identity and work fits in the world.

## Crochet, Textiles, + Craft

I first began crocheting after learning about the *Crochet Coral Reef*, a project begun in 2005 and run by the Institute For Figuring, started by sisters Margaret and Christine Wertheim. (Wertheim) It's a participatory art project about crocheting using a technique, developed by mathematician Daina Taimina, to create shapes that are accurate models of hyperbolic geometry which also resemble coral. What interests me in this project is the simplicity of the craft technique, simply adding an extra crochet stitch in a regular interval, and how it engages bodies as mathematical

entities. With this tool many people were able to create interesting and unique objects while having a hands-on engagement with complex ideas about math and biology.

Jeanne Vaccaro's essay, "Feelings and Fractals: Woolly Ecologies of Transgender Matter" reads this project alongside ideas about trans practices and aesthetics. "[L]eaning on the objectness of craft orients our thinking to the spatial and temporal landscape of embodiment and highlights the force of the hand (rather than the diagnosis) in the worked on, textured, sensory, and amateur labor of making identity in the everyday." (Vaccaro 2015, 5) This extends the body making of *Crochet Coral Reef* to include our own bodies and asks us to think about the daily labor of constructing and maintaining ourselves.

In "Drawing Threads from Sight to Site", by Victoria Mitchell, textiles are posed as foundational, metaphorically and literally, to how we understand and measure space. (Mitchell 2006, 341) What's particularly relevant to *CLOTH*<sup>3</sup> is in her description of the process of producing a textile. First, loose fibers are spun, or drawn into a line of yarn. Then, that yarn is woven, or, in my case, crocheted, into a sheet of fabric. This struck me as being parallel to the way that 3D graphics are commonly constructed: a set of points in a space are connected by edges, which join into faces, which close into 3 dimensional shapes.



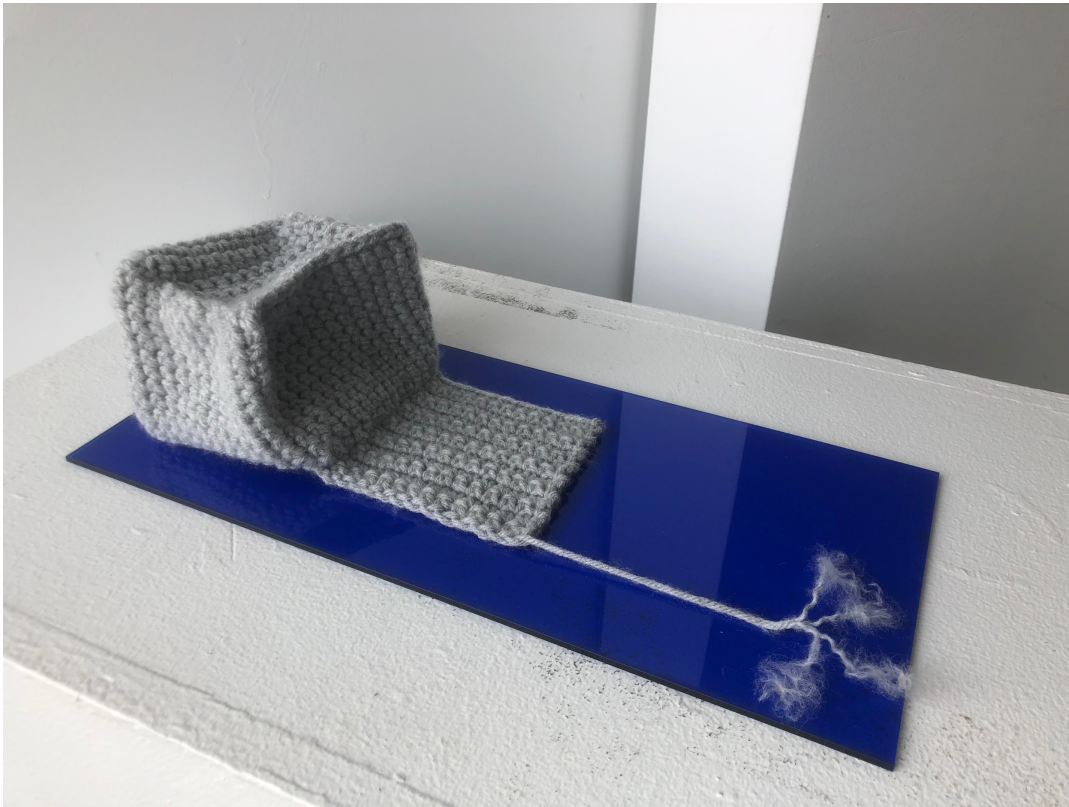


Figure 5. render + unravel (2021).

With these references in mind I was able to start thinking and working through the idea of how textiles are related to 3D graphics and to my practice of paying attention to how bodies interface with videogames. Importantly, it gave me a concrete way to interact with 3D objects that are otherwise hard to grasp, by crocheting those models or making models of things I crocheted. This is what directly led to starting to work on *Unity Primitive: Cube*.

The ties between textiles and computing are also historical. One of the earliest working computers was the Jacquard Loom, a machine that uses punch cards to define weaving patterns in order to create intricate designs without the need

for the lengthy process of setting up the loom by hand. Also, early computer programs had to be wired by hand, similar to physical switchboards for telephones that required operators. This gave working with computers a feminine image, which was only replaced by the masculine presence we see today after this process was able to be done by typing instead. (Plant 2016, 14-23)

I'm particularly interested in these gendered notions of labor in both craft and computing. Rather than, however, trying to say that women should be able to use tech and men to crochet, *CLOTH*<sup>3</sup> proposes that these designations were entangled to begin with and that we should be able to take them in whatever direction we want. The cube, by itself, can be read either as yonic or phallic. In *A few ways of being a cube*, its transformation into other, more specific orifices therefore doesn't signal any specific movement from one gender position to another, not to mention what happens to this reading in the cubes that don't look particularly like any body part.

The feminine qualities in *CLOTH*<sup>3</sup> seem relatively straightforward in the use of crochet and in the decorative nature of the 3D prints. However, there is another way to read my approach to craft, as described by Andrew Jackson in "Men Who Make: The 'Flow' of the Amateur Designer/Maker" where he writes, "Like sport, craft became an emblem of masculinity." (Jackson 2011, 270) In the essay he notes practices of DIY crafting and home improvement projects as fitting into this category, which would put my use of 3D printing into this conversation. This, along with *CUBEISM 2* which also has an amateurish, DIY affect leads me to also be able to do

a masculine reading of the crochet in *Unity Primitive: Cube* because of my very basic skills and the use of crocheting as a means of construction of this large form with no obvious use.

What I've learned since starting to crochet is that it implies utility. In the one and a half years I was crocheting *Unity Primitive: Cube*, I was often asked if I was going to stuff it and use it as an ottoman or as a blanket. Even when I do small crochet sketches, the assumption is that they are meant to be worn, or at the very least they could always be used as a rag. I'm not opposed to intentionally doing work like that in the future, that has some kind of non-art utility, but for now I find it an exciting and powerful association to play with.

Adrian Piper writes about how use relates to art objects, "We are regularly blinded to the mystery of objects in daily life because we so often utilize them as tools or instruments for achieving our ends, or for satisfying our needs and desires." (Piper 1996, 51) Like the lesson most famously illustrated by Duchamp's *Fountain* (1917), the functionality of the object must be interrupted, by, say, taking a urinal out of the bathroom and onto a pedestal, for us to consider it aesthetically rather than abstracting it away in our perception. She then goes on to describe how this supposed goal, of total nullification of utility, is impossible because art has its own functions as tools to stimulate certain kinds of thought or as things that have economic value.

So while I am disrupting the reading of this crochet as being used for its typical purposes, like clothing or a blanket, I also am not trying to drain it of use. Similarly, I am not attempting to elevate craft, or videogames, into high art. A more useful framework for thinking about this comes from Sara Ahmed's who poses, "queer use as when you use something for a purpose that is 'very different' from that which was 'originally intended.'" (Ahmed 2019, 199) This queer use insists on the following the attractiveness of materiality. It can be both a willful act of disobedience and a genuine misunderstanding. As a sustained practice it becomes a stubbornness, a way of moving through the world that doesn't follow the well worn path.

*CLOTH^3* uses textiles, art, and videogames together in ways that cause one another to be used queerly. My queer engagement follows *Crochet Coral Reef's* similarly surprising use of crochet as a tool for thinking and making together art, craft, math, and bodies. It also implies that, like the name of Bonnie Ruberg's book on videogames, computer graphics and textiles have always been queer.

## The Grid

One key feature in *CLOTH^3* is the grid in the tiled composition of *A few ways of being a cube*, in the focus on the cube itself, and in the even stitches of *Unity Primitive: Cube*. This is a common theme in art, especially modern art, and can express a kind of rigidity in a mechanized society or, as Massumi writes, a

positionality in a grid of identification. "For structure is the place where nothing ever happens, that explanatory heaven in which all eventual permutations are prefigured in a self-consistent set of invariant generative rules."(Massumi 2002, 27) He is proposing that cultural studies could benefit from thinking about motion and intensity as a way to think about how people participate in events, rather than what he frames as a stifling matrix of identification.

This frozen grid is also present in how the digital is limited to 1s and 0s, and when, for example, playing a videogame all of the outcomes are inside a predetermined space of possibilities based on the code that is generating them. In an attempt to loosen this, Massumi calls for a thinking together of the analog, which is not bound by 1s and 0s, with the digital in processes like neural net artificial intelligence or in computers that interface with biological elements. (Massumi 2002, 142-143)

*CLOTH<sup>3</sup>* offers textiles as an analogue conversation to the digital 3D models. However, it appears either as *Unity Primitive: Cube* as an even grid of crochet stitches or as forms that are rendered by digital processes of either screens or a printer. Where the analog cloth interacts in a significant way with the digital grid is not in how it's constructed but in how it folds. Even when this fold is being enacted by a digital simulation, it could potentially get infinitely detailed and produce objects that approach biological, analogical complexity. An interesting example of this is the software *Folding@Home*, which asks for users to donate processing power on their personal computers, remotely connected to their database, to run protein simulations

to create new drugs. (Folding@Home) Obviously, these simulations are much more low-tech than that, but I believe that they gesture towards this complexity. Despite that, some of the cubes in A few ways of being a cube seem to be forming into new organisms.

I also find Sara Ahmed's ideas about phenomenology useful in thinking about these folds and grids. In *Queer Phenomenology* she discusses the idea of sexual orientation as also being a physical, bodily orientation. (Ahmed 2006, 1) Someone's ability to move through a space depends on how well they fit in it, the less they do the more they are stopped and questioned. Their path through life has the least resistance when it moves with heteronormative trends. Goal points like getting married and having children, Massumi points out, tend to erase the inbetween of moving from one position to another. (Massumi 2002, 3)

When bodies continually don't follow the well-trodden path, they get used to not getting used to conforming. "In not getting used to it, bodies become expressive. The word *express* comes from press. It implies something that is squeezed out." (Ahmed 2019, 228) These cubes, then, could be read as bearing the signs of having resisted the straight, despite still being composed of rectilinear grids. These folds are simultaneously expressive of the violence of collapsing, especially when the 3D printed cubes start to dissolve with completely flattened faces, and the possibility of folding and regenerating into something new.

## Minimal, Conceptual, + Abstract Art

Minimal and conceptual art deal with ideas of presence and seriality. The artist's hand in making an object was either displaced to a manufacturer or removed entirely. They moved away from figuration as a strategy, which is particularly difficult, and maybe impossible, to get away from completely in sculpture. (Getsy 2015, 5-6) Even presented with something seemingly simple and abstract, like a cube, we always measure it in relation to our own body. Is it 6 feet, the height of a tall person? Can it fit in my hand? Can I climb on it? And even simple shapes like cubes come loaded with bodily associations.

While these works don't get rid of the body entirely, they do loosen the attachment to being read as a specific kind of body. And, as David Getsy discusses in *Abstract Bodies*, that opens up an interesting space to think about abstract trans and queer aesthetics. In that book he looks at artists who were not making work with the intention of thinking about transness, in fact some of them explicitly denied reading their work as having to do with any kind of queerness. (Getsy 2015, 2) Because they are abstract, the objects are nonetheless open to these interpretations. The sculptures' resistance to figuration while still expressing themes of sexuality and gender activates the trans in transformation and allows for desire to circulate in many different directions.

As someone consciously making art with queer content, these examples give me a way to use this history as material, despite the artists' biographies. It also gives

space from the question of identity, which can be limiting in its goals and deployments. CLOTH<sup>3</sup> is particular to me and the materials I used, but it does not attempt to either articulate some kind of universality or to represent any group of people. Representation is important, there's no denying the effects of seeing yourself reflected in a piece of media but, by itself, is just one strategy. It can even lead to unhelpful goals like wanting to see more diverse billionaires or be used to cover up structural changes that are not being enacted. In universities, calls for diversity and representation are often used as tools for not making changes. (Ahmed 2019, 147)

"[T]he transgender body performs self as gesture not as will, as possibility not as probability, as a relation - a wink, a handshake and as an effect of deliberate misrecognition." (Halberstam 2005, 97) Abstraction allows for misrecognition. It slows down the pace of seeing. (Verwoert 2008, 94-95) I can use it to say things that I don't want to articulate clearly, or don't know how to articulate. It lets me create an emotional space between the viewer and the work, and me. (Rawe 2016) This distancing can come off as defensive, as if the work doesn't want to tell you what it's about. While I still risk that somewhat, that space is necessary for the layers of content and emotion to exist. Also, in life many people are willfully ignorant of queerness and many other kinds of social difference. I find it funny and exciting that those people could engage with work that is, in my eyes, full of queerness.

Both minimal and conceptual art function similarly to making 3D graphics in how they are interested in seriality and in writing instructions or algorithms for others to execute. Tony Smith said of his sculpture *Die*, "I didn't make a drawing; I just



picked up the phone and ordered it." (Smith) This puts into question the significance of the artist being the one who actually puts the labor into fabricating their work, although historically artists have always worked with assistants or with other craftspeople to produce work.



Figure 6. A virtual reality installation based on Tony Smith's sculpture of the same name, *Die* (2018).

The labor in CLOTH<sup>3</sup> is dispersed between me and machines. While I had no assistants hired to produce my work, I did also have the aid of a printer, a computer, a laser cutter, and the various manufacturers who produce the material I used, not to mention our technician, Colleen Jennings, who organized work and exhibition spaces, ordered materials and equipment, and hung the gallery lights. My being able to produce this variety of work may be indicative of today's economy which asks workers to be flexible and highly competent across fields, but I also find it

exciting that I can produce works that carry similar affects and complexities to those made by famous artists simply by using a 3D printer, a large projection, or a virtual reality headset.

While I know it's not exactly the same, instead of fabricating large objects out of steel, which require a lot of money to both produce and preserve, I can make seemingly endless forms that can be experienced at many scales in relation to the viewer. Much less bound from those physical constraints, the potentiality of minimalism can explode into something different than its irl, art historical instantiation which new viewers often find alienating, because of its standoffishness, and, understandably, feel left out of the conversation and like that art is not for them. Instead, I hope my work lets people feel comfortable in engaging with that perceived coldness to see that it is about bodily relations, including their own.

## The Baroque

I first started thinking about the Baroque in relation to my work while reading *Neo-Baroque Aesthetics and Contemporary Entertainment* by Angela Ndalianis. The book describes how today's media environment, composed of endless sequels and universes of related content, has antecedents in the Baroque art of the 17th century. (Ndalianis 2005, 5) For example, the palace of Versailles was full of images and references to the god Apollo, a metaphorical stand-in for Louis XIV. "Narrative form becomes dispersed, because each serial example interlaces across a larger story

network; nevertheless, the key iconographic motifs (the franchise) reign in the complex series of stories that unravel along their own distinct paths." (Ndalianis 2005, 51) These stories eventually branch out and unravel to include everything as a way of expressing Louis XIV's wide-reaching power. This plays out across a wide variety of media like sculpture, painting, and architecture, and bears a striking resemblance to media conglomerates today like Disney, which currently produces multiple franchise universes, like *Marvel* and *Star Wars*, in almost any media conceivable including: movies, videogames, tv shows, books, comics, and amusement parks. Each of these serves to place the company, rather than the monarchy, as a central economic power.

That does not mean that Baroque seriality is limited to expressing and enacting capitalistic force. Most notably, there was a movement of artists and writers in Latin America who used Baroque techniques of distortion, metaphor, and seriality to critique colonialism. (Baler 2016, 1) The catalogue for the show *Ultrabaroque: Aspects of Post-Latin American Art*, which first took place at the Museum of Contemporary Art, San Diego in 2000, describes how this work is "[t]he mingling of European and American forms [which] produced an intensified baroque, 'a baroque to the second power'- an ultrabaroque." (Zumdiio-Taylor, Armstrong 2000, 4) This art is expressive of the many layers of culture and power present in Latin America but is highly critical of colonial power, unlike the corporate neo-baroque which celebrates and perpetuates it.

What I found immediately useful in these discussions was a framework for thinking about my videogame work, which could also be described as using "procedures of accumulation, divergence, and fractal simultaneity". (Murray 2008, 5) My games, *CUBEISM 2: Baroque Edition* included, are typically structured as an accumulation of short scenes that have minimal interaction paradigms. While the elements in each scene are generally similar, they are arranged in a way to constantly, slightly disorient the player. Usually, videogames are designed to give players a sense of agency, or power, in building up rehearsed skills to get better at winning.

This skilled player becomes a node of power which helps structure that kind of videogame as being central by participating in the 'gamer' identity which aims to protect and uphold a specific kind of game. Similar to how people will violently defend borders out of a sense of love for their country, this creates an artificial border on what is considered legitimate and is often violently enforced online. (Ahmed 2010, 122) This most notably happened in the case of Gamergate, where women and other marginalized people were attacked for creating games that fell outside of the straight white cis male centric game paradigm. By denying this position of mastery I am also marking my game as in opposition to the mainstream and implicitly critiquing it by creating an alternative.

Where the baroque also enters into *CLOTH^3* is in the focus on cloth simulation. One common technique in baroque art was the trompe l'oeil, which was an illusion of 3 dimensional realism. (Pérez 2011, 31) This was characteristic of an

overall obsession with dazzling, virtuosic performance which seemed to be flaunting the logical, classical rules that preceded it but was actually an intensification of those rules. (Deleuze 1992, 81) One place that this virtuosity could be shown off was in the rendering of cloth in both painting and sculpture. (Hollander 2016, 9) Fabric is particularly hard to realistically depict because the folds are highly textured and express both the materiality of the fabric itself as well as what is underneath it. In marble works especially, like Bernini's *The Ecstasy of St Teresa* (1647-52), this was even more difficult because it is thin and therefore fragile.

I possess no virtuosic skills in sculpting, drawing, or painting. The computer allows me, nonetheless, to render these complex forms. While the technologies I used in *CLOTH^3* have their own material limits, I am able to access these structures without the need for years of specialized training or the anxiety of performing correctly.

Deleuze devoted an entire book to cloth folds and the baroque, following Leibenz's theories of the monad. In this book bodies, souls, worlds, and perceptions fold and unfold endlessly. (Deleuze 1992, 3) Perception and expression, as Ahmed also noted, involves a literal impression on the body. (Ahmed 2006, 17) When placed next to the techniques of *Crochet Coral Reef*, perception and the soul are added to the thinking together of rendering mathematical and biological figures. Art and music could be endless plays but are necessarily bracketed and framed by physical limitations. For example, one could imagine Bach improvising endlessly. But,

eventually he would get tired and have to stop. A computer could play for much longer but similarly has its own limitations.

## Minimal + Baroque

At first glance, minimalism and the baroque look like opposites. One is driven by horror vacui, representation, and decoration and the other favors empty spaces occupied by abstract forms. Historically they are separated by 3 centuries. Why put them together? I wouldn't say that I purposely went seeking to put the two together, it was a natural attraction. My practice has had an ongoing engagement with minimalism as a way of thinking about the bodily engagement of playing a videogame. The baroque entered through the cloth folds, particularly after reading Deleuze and then rediscovering Ndalianis's writing on the neo-baroque.

The strongest connection between the two forms is the emphasis on seriality and variation. Both propose practices that could be extended indefinitely but are bracketed by practical limitations. They also trouble the positionality of the viewer. Minimalism does this by drawing the viewer's attention off of solely considering the object and including its surroundings, including the viewer themselves. The baroque does this by displacing the idea of there being one correct viewing position for a work of art, prompting the viewer to move around the space and experience different vantage points.

Robert Morris makes a distinction between these two modes in his "Notes on Sculpture". "A Baroque figurative bronze is different from every side. So is a six-foot cube. The constant shape of the cube held in the mind but which the viewer never literally experiences, is an actuality against which the literal changing, perspective views are related. There are two distinct terms: the known constant and the experienced variable. Such a division does not occur in the experience of the bronze." (Morris 1966) In this formulation, a necessary ingredient to creating the spatial awareness in the viewer is having an object they know, or think they know perfectly. A figure of a person does not function the same because people naturally have too many variations, we cannot guess what all of a person will look like after seeing them from one angle. This also fails because a figure of a person, being representative and illusory, draws in the attention of the viewer to the sculpture. The cube, being somewhat banal, bounces back that attention. It's too literal.

My choice to focus on the cube, as described elsewhere in this paper, was also for its extreme legibility and familiarity. However, I rarely show a cube that hasn't been deformed, the only one being the grey cube in *A few ways of being a cube* and its counterpart in *CUBEISM 2*. The question raised here, then, is if these deformed cubes are still able to enact the minimal technique of spatial awareness or if they are too interesting. A couple wrinkles in answering this question: while the overall size of *A few ways of being a cube* is 4x4 feet, the individual cubes are, on average, only about 4 inches big. The compositional movement comes from the grid they are placed in and in their relation to the other pieces in the show. How would these cubes function if one of them were displayed alone? Or at a much larger scale?

The other two pieces in the show do engage a larger scale but are interactive. *Unity Primitive: Cube* requires 3 people to see the actualized, but still sagging, cube: two people to hold it up and a third person who can step back and actually see it. *CUBEISM 2*, by using 2 screens, similarly cannot be fully viewed by the person playing it. They can either focus their eyes on the touchscreen or the projector but never both. These moves produce similar effects as the minimal sculpture that Morris describes while allowing for more compositionally interesting objects, primarily because they still refer back to the simple cube.

I also want to note how color plays out in *CLOTH<sup>3</sup>* in relation to the minimal and the baroque. Later in this paper I describe at length why I settled on white and grey, but important to this conversation is that it activates the modalities of both monochromatic, minimal art and the white marble sculpture of the baroque. These white marble sculptures were based on mis-recognition, whether accidental or willful, of the Greek and Roman statuary which had lost their coat of painting, leaving the white marble underneath. "It is, I believe, no exaggeration, to say that, in the West, since Antiquity, colour has been systematically marginalized, reviled, diminished and degraded.[..] [It] masks a fear: a fear of contamination and corruption by something that is unknown or appears unknowable." (Batchelor 2000, 22) This aesthetic has become cemented in the West's imagination as a symbol of white purity, an artistic platonic ideal. So why would I repeat it?



Brian Massumi, writing about perception, offers a definition of purity that does not mean uncontaminated. "'Pure' experience is not in the least reduced or impoverished. It is overfull. It is brimming 'virtually or potentially'. It is the embarrassment of processual riches in which every experience finds itself in its incipency. 'It is a *that* which is not yet an definite *what*, tho' ready to be all sorts of whats.'" (Massumi 2013, 10) This is a purity that has already been contaminated. This is experience before any perception has been filtered out by the brain, a necessary procedure in order for us to be able to make any sense of the world. Rather than being a limit, a thing that is untainted and must be preserved, it is the potential that exists in every moment that could be actualized in many different directions.

While I understand the reading still potentially exists of me, a white artist, reproducing the classical pure white aesthetic, I am excited by this opportunity to instead understand the whiteness as an openness to change, aligned with Edouard Glissant's *Poetics of Relation* "that is latent, open, multilingual in intention, directly in contact with everything possible. (Glissant 1997, 32) When I think about my own heritage I feel thoroughly Americanized. Both sides of my family come from Poland, but I don't know any exact details of who, when, or why, but I am at least a 3rd or 4th generation in the US. While I have a relationship to a few bits of that culture, mostly in food, I mostly feel assimilated into American whiteness. While it would be enlightening to better understand how my family ended up where they did, an attempt to return to or learn that culture would not change this. In this reading, then, the cubes of *A few ways of being a cube* are an openness to being affected by my

surroundings. This is further emphasized in my decision not to polish or smooth the prints, to clean them of any marks they got from the process of removing their print supports, and in not dusting the tiles they sit on. They play the part of classical sculpture and fail at it.

In discussing the paintings of Linda Besemer, Jack Halberstam also notes the tendency of modern art to shy away from color, stating that Besemer's deployment of color in her otherwise minimal art marks it as "dangerously close to the feminine and decorative." (Halberstam 2005, 121) While I agree that this is the case with Besemer's work, David Getsy notes that monochromism is also a technique of signaling queerness in its activation of the homo in homosexuality. (Getsy 2019) In future works it would be interesting to play with this gendering of color, which mirrors the way craft is read. As it is now, the solid grey of *Unity Primitive: Cube* acts to move it away from its crochet associations and towards modern art. This also happens with the videogame and 3D prints, which are typically known for employing bright colors.

To be clear, I do not think that this reframing of purity is only applicable to whiteness or to any specific kind of identity category. My interest in talking about whiteness here is in relation to my own identity, the cubes in *A few ways of being a cube*, the marble sculptures of the Baroque, and many minimal and conceptual sculptures, like Sol LeWitt's *Incomplete Open Cubes*. Whiteness, as it exists in America, is an erasure of our past heritages, a homogenizing force, and the same kind of colonizing and capitalistic power that is described by the baroque. In trying,

for myself, to figure out how to move forward from that in a way that is constructive, rather than spiraling into white guilt, I find the generative and serial practices of the minimal and baroque, as well as the ideas from Massumi and Glissant, useful. Any part of us or our identity is a general location that we reside in, or maybe near. It's important to both be aware of these things and how they affect our way of moving through the world, and how we affect others in our actions, and to feel able to move away from them when we want or need to. This purity as potential is especially activated in my practice in working with the computer, between the digital and irl. I can pay attention to what the computer affords me, like an easy way to render forms, while not being bound to just using the screen.

## Queer Videogames

Ideas from queer videogame design have been foundational to my practice. Anna Anthropy's framework of thinking about games as zines, both in production and distribution, is liberating when it comes to sitting down at a computer and opening up a complicated piece of software, like Unity, and feeling comfortable with producing work that appears as amateurish to mainstream conceptions of what a game should look like. (Anthropy 2012, 9-10) Her analogy proposes games as small pieces of punk expression that can be made cheaply and crudely, in fact take pride in that, and then are distributed to friends or other small social networks.

Both because of the comparison to zines and the text-based game engine Twine being popular when she was writing this book leads this framework to focus heavily on text based games, which can also tend towards straightforward queer representation in the stories they tell. While there is nothing wrong with that, clearly that's not the same mode my work is in. To get a better understanding of what happens in my minimal, abstract games I look to a talk by Merrit Kopas and Naomi Clark, "Queering Human-Game Relations", and the book *Video Games Have Always Been Queer* by Bonnie Ruberg which both search for a queer mechanic in games rather than a queer representation. (Kopas, Clark 2015)(Ruberg 2019, 1) The rationale is that representation in games can quite literally be a swappable image in a game without actually causing a major effect to the underlying system. While this may paint an overly simplified picture, as representation itself can be quite powerful, the goal is to look for more options in thinking how videogames could be made and played differently.

Ruberg's book especially interests me because it makes similar moves to Getsy's *Abstract Bodies*, in that both do queer or trans readings of works that were not made with those intentions. While Getsy is making a point of why a specific moment in art history, when sculpture was trying to shake itself of human figuration, Ruberg's argument is that videogame's necessary inclusion of a human player opens it up to queer desires and therefore they have 'always been' queer. Anyone can choose to not behave in ways that the game intends that instead lines up with their desires and they are always in intense, physical contact with a computer and controller and sometimes other human players.

Brendan Keogh, in analyzing the player experience, pushes these points even further and says, "we can no longer take for granted that videogames have goals, provide challenges, offer choices, or offer pleasures that are solely 'interactive' in nature. Nothing is certain anymore. We must naively go back to the embodied experience of videogame play and see what is there." (Keogh 2018, 6) This is the area that my videogame work works in, looking carefully at the bodily encounter with the interface. This is also why I constantly turn back to minimal art as a reference point.

Art and games have a contentious relationship in common discourses in both fields, with a very common question being, "Are videogames art?" My response to this question now is that it's a bad question, like asking if apples are oranges. No, they are two different fields. Yes, they are both creative endeavors and therefore have many overlaps and porous boundaries. A more generative question for me has been, "How is an arcade like an art gallery?" This puts a specific frame on the question and gives it a physical location that has certain aesthetics, participatory norms, and economies.

Art and videogames have intermingled for as long as videogames have existed. John Sharp attempts to offer a kind of taxonomy to organize these various projects, with the categories: game art, art like Corey Arcangel's *Super Mario Clouds* (2002) which uses videogames as artistic materials but do not produce playable games; art games, videogames that have an artistic aesthetic, like many indie

games, but which fail to interact meaningfully in contemporary art discourse; and artist's games, which is a synthesis of the other two categories of games that are both interesting to play and to talk about in art contexts. (Sharp 2015, 8)

I find these distinctions useful in thinking clearly about how the two disciplines interact with each other but object to the attempt to create a seemingly preferable category that neatly intersects them both. I find it productive to think about how my work is received differently by these two audiences not only to engage them but to also use the other one, whichever they are less familiar with, to challenge their conceptions of both. I also find it interesting when something takes ideas from both disciplines and then fails to seem attractive or legible to either, using the two points to slingshot off into some uncharted territory.

But, as stated elsewhere, I want to be careful about how I use alienation in my work. If nobody feels like they can access it then it will fail to do anything. Moving forward from *CLOTH*<sup>3</sup>, crochet and craft will remain important touchstones for how I make both digital and irl work. Following Anthropy's zine analogy, I have started thinking about game development as a craft process. I had already been thinking of my videogames in terms of accumulation, and the crocheting metaphor gives me a concrete image to base it on.

I think that anyone can learn how to use software like Unity or Blender if they are taught how to do at least one fundamental action, like placing objects in a scene or building a model up from points, lines, and faces. Like using a single crochet

stitch, this one action could be done many times to accumulate into an interesting object. Further learning in the software can then be built off this foundation, as it not only allows but encourages play and experimentation through repetition and variation. Like Unity Primitive: Cube or Crochet Coral Reef, a single stitch can build up to many different kinds of objects.

My videogame practice is this, but with a frame being built up around a specific tool. For *CLOTH^3*, it was the cloth simulation. For the first *CUBEISM* game, it was the digital cameras in Unity. Doing this allows me to create genuine moments of discovery and play in the software, being surprised by what a tool does instead of trying to force the tool to build what I want. This becomes a play of desires between me and the machine, revealing things that both of us want to create.

In deploying abstraction as an aesthetic strategy, I don't fall into the trap of being put in the position of educating the audience on queerness. However, queer concepts, like those of math and computer graphics, are present and available for play and manipulation even if the viewer isn't conscious that that is happening. Play is a very powerful form of learning. For example, children who don't yet have the capacity to sit and listen to a lecture or read from a textbook learn primarily from playing. (Bernt-Santy) Children are not thinking, "by playing with these blocks I am learning about physics and math," they are just accumulating experiences. For me, art making is a form of play that facilitates both concrete skill learning, like coding, as well as learning how to engage with theory. While I have read books and blogs about how cloth simulations work, I chose not to try and rebuild these systems for my work.

To me, the point of this practice is, following the queer games ethos, to use what tools are readily available. I don't have to understand complex mathematics or computer engineering to access those ideas as material. Similarly, players and viewers of my work don't have to understand these either, or even necessarily know that they are playing with these concepts. What's most important is that they feel welcome and able to play.



# DESCRIPTION OF WORK

Having situated *CLOTH^3* in related works, which demonstrate ways of rendering objects through multiple methods and working across disciplinary forms, and in the conceptual frameworks of craft, phenomenology, minimalism, the baroque, and queer videogames, I will now provide a narrative of how I created this work. I'm approaching this in a chronological order, because the show unfolded piece by piece, each referring to one another and creating a circuit of relations. Through this narrative I hope to show how these works similarly follow the trajectory of thought in the threads described above, starting with the crochet of *Unity Primitive: Cube*, moving to the minimal, conceptual grid of *A few ways of being a cube*, and ending with *CUBEISM 2: Baroque Edition*.

## *Unity Primitive: Cube*

I want to start with this piece because it was the first one I produced and also became the organizing point for the show. When I first wrote my proposal I was generating a lot of ideas around cloth simulation, games, and textiles. I knew that what I was writing about was beyond the scope of this thesis show, but I still thought I would be producing and including much more of it than what is here now. In trying to edit down this long list of pieces I kept asking which pieces I was most excited to include. *Unity Primitive: Cube* emerged as a focal point in part because I had just

finished crocheting it, after about 1.5 years since starting, and because I had still not figured out how to best display it.



Figure 7. *Unity Primitive: Cube* (2021).

This piece is a hand-crocheted 1 meter cube made with grey, acrylic yarn that rests on a clear acrylic base that is 4 foot square. The original impetus for making it came when I was still new to crocheting, reading about *Crochet Coral Reef*, and thinking about the relationship between the act of fabricating textiles and how computer graphics are constructed. I thought, "haha what if I made a to-scale version of the Unity cube?" After getting a 1 pound skein of yarn from the craft store and doing some quick math on how many stitches would scale up to a meter in length (16

stitches was 10 cm so 160 would be 1 m) it quickly became clear that the joke was on me. But the length and scale of this piece is what makes it feel so special to me. I spent dozens of hours, usually watching tv or talking to friends, crocheting each side which would very quickly grow to the size of a blanket. It was always sitting on top of my body while I was working on it, constantly moving as I worked across a row and then flipping it to start the next. The fibers in the yarn caught the fibers of my clothes, the couches I was sitting on, and the hair from me and sometimes cats.

My original intention for displaying *Unity Primitive: Cube* was to suspend it from the ceiling so that it would float in the air, possibly even being moved up and down by computer controlled pulleys. This would have dramatized the action of a computer rendering a shape to the screen and emphasizing its dependence on the computer to be instantiated- as soon as the screen turns off it stops existing in that form. The pulleys would lift the cube off of the ground and show that the lump of crocheted fabric on the ground is actually in the shape of a cube, only to let it fall again and become folded material once more.

The cube is to remain hollow, with no stuffing or inside skeletal support, because 3D models are similarly all surface, with no inside depth or volume, and also to allow for folds to occur. Interestingly, many people asked me if I was going to stuff it and what it would be used for. Crochet, along with other textile crafts, has a strong association with use value, specifically in relation to our bodies. This cube, if it were stuffed, I was told, would make a great ottoman or foot rest. As it is now, it could be used as a blanket or to cuddle with, which I have done a few times.

While I'm still interested in this idea, after crocheting this piece for so long and sewing it together the idea of hanging it from the ceiling felt cold and violent. I wouldn't say I anthropomorphize this cube, but I do feel a physical connection to it and want to see it thrive. I also wanted other people to be able to experience the weight and softness of holding it. In response to Michael James Becker's trellis project I have actualized this idea as a small sculpture by building his clear acrylic trellis kit and suspending a small cube I crocheted from it using clear fishing line so that it appears to be floating in the air.

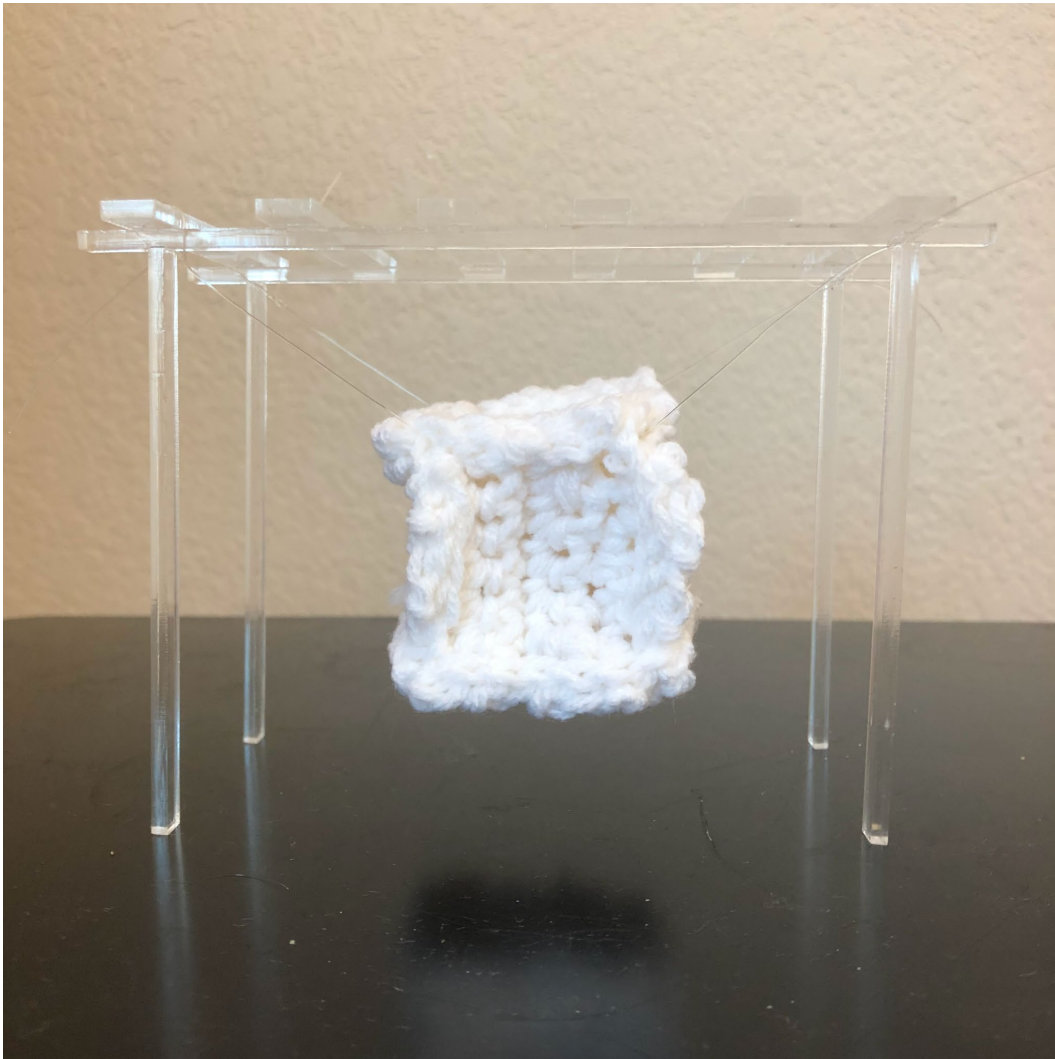


Figure 8. My response to Michael James Becker's participatory trellis project.

Eventually I came to the solution of having it sit in the gallery so that visitors can have this experience while also performing the role of holding the cube up to reveal its cube shape. However, it takes two people to hold up the cube, each person holding two corners, and even then it is difficult for either of them to have the proper perspective to see the full shape. On top of that, the third person watching this happen can see that, while it is a cube, there is a lot of sagging that is impossible to

stop from happening. The weight of the fabric far exceeds its structural integrity and it would require some kind of rigid frame or internal skeleton to make into a rigid cube. Picking the cube up becomes an intimate and communal act where visitors must work together to support the cube for others to see. They become the supporting frame or the rendering engine that allows the form to temporarily exist and then must carefully set it back down on its base.



Figure 9. *Unity Primitive: Cube* (2021) being held up by 4 people.

The base the cube sits on is a sheet of 4x4 foot, clear acrylic. This decision came from thinking about how to display *A few ways of being a cube*, which will be discussed in a later section, and how to make strong visual connections to the two

pieces. I printed the initial cube in *A few ways* grey so that it would reference the grey crochet, which references the default color of models in Unity. I chose a clear acrylic base to further differentiate that square from the others without further disrupting the white color scheme. The clear acrylic could be read as an interface, like the touchscreen, for the object to be seen in relation to the ground. In *Unity Primitive: Cube* the large sheet of acrylic physically separates the cube from the ground but remains only barely visible. It is still a plinth, but only barely.

Some people read the acrylic as signalling to be careful and to not step inside the square, but other people either didn't notice or thought it was meant to be utilitarian rather than precious and were unafraid to get on it. This large sheet of acrylic, during 2020-21, is impossible not to connect with the protective sheets that suddenly popped up in every store and restaurant. I like this association as a small nod to what's been happening, also because part of my turn to focus on this work was in part because of being isolated and wanting to think about the haptics of touchscreens and textiles. These sheets simultaneously keep things clean, either blocking our breath from reaching a worker or the cube from gathering whatever is on the floor, and serve as interfaces for us to continue interacting.

### *A few ways of being a cube*

*A few ways of being a cube* is a grid of 64 3D prints, measuring 4x4 feet in total, the same dimensions as the base of *Unity Primitive: Cube*. Each cube has

been deformed using the cloth simulation tool in the Blender 3D modeling software. All the prints but one are printed in white PLA plastic and sit on a square of white acrylic, the initial, undeformed cube is printed in grey PLA and sits on clear acrylic.

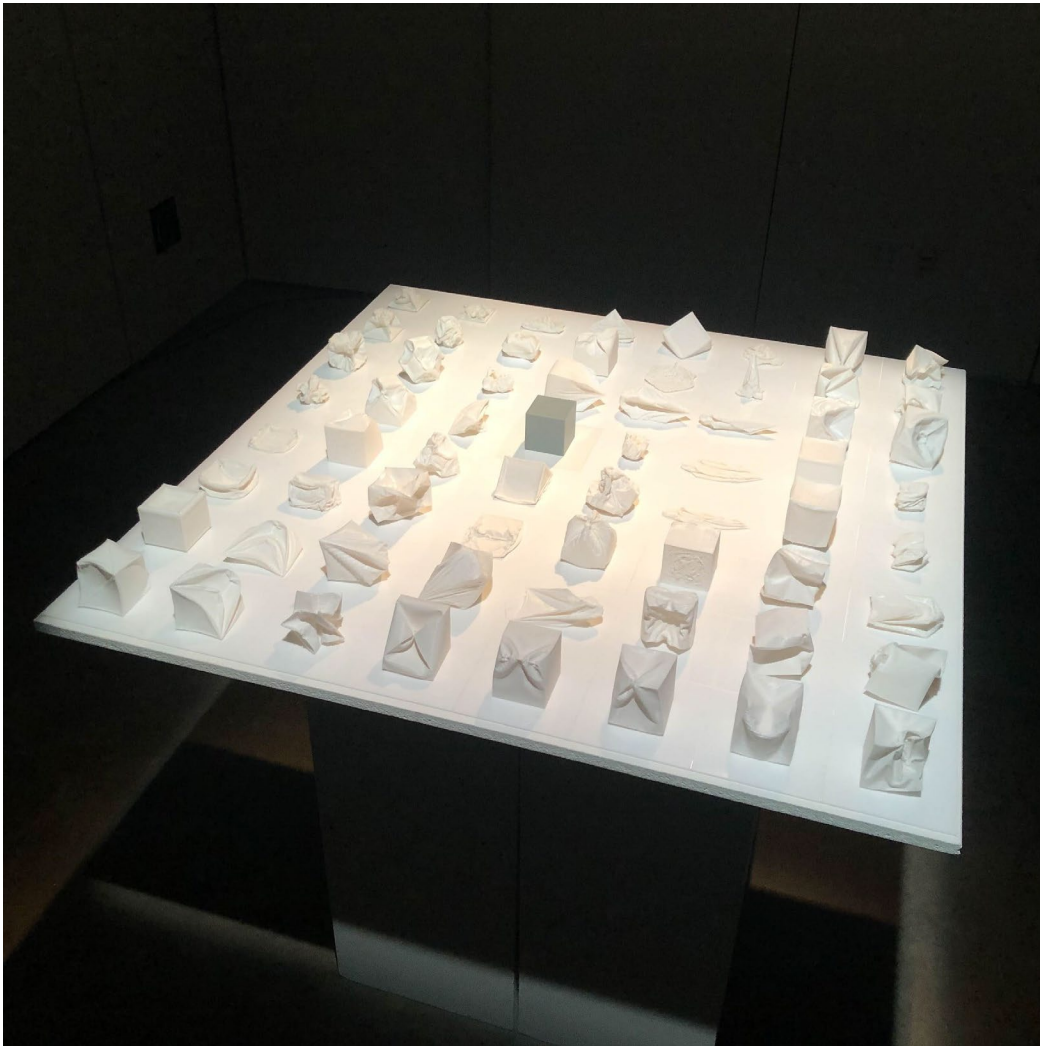


Figure 10. *A few ways of being a cube* (2021).

This was the next piece I made for *CLOTH^3*. I had been experimenting with making 3D prints of forms that were deformed through cloth simulation, which proved to be a little tricky because of the way the printer works. 3D prints, for most



commercial printers, work by building up small layers of plastic on top of one another. This requires the form to be sitting in a way that makes a decent amount of contact with the flat printer bed, so that it doesn't slide around, and either for the shape to have no parts that dangle, and would therefore have no support for laying down plastic, or to print temporary supports for these overhangs. The shapes I was printing were flat planes that had been folded in organic ways, which makes them difficult but interesting to print for exactly the reasons just mentioned.

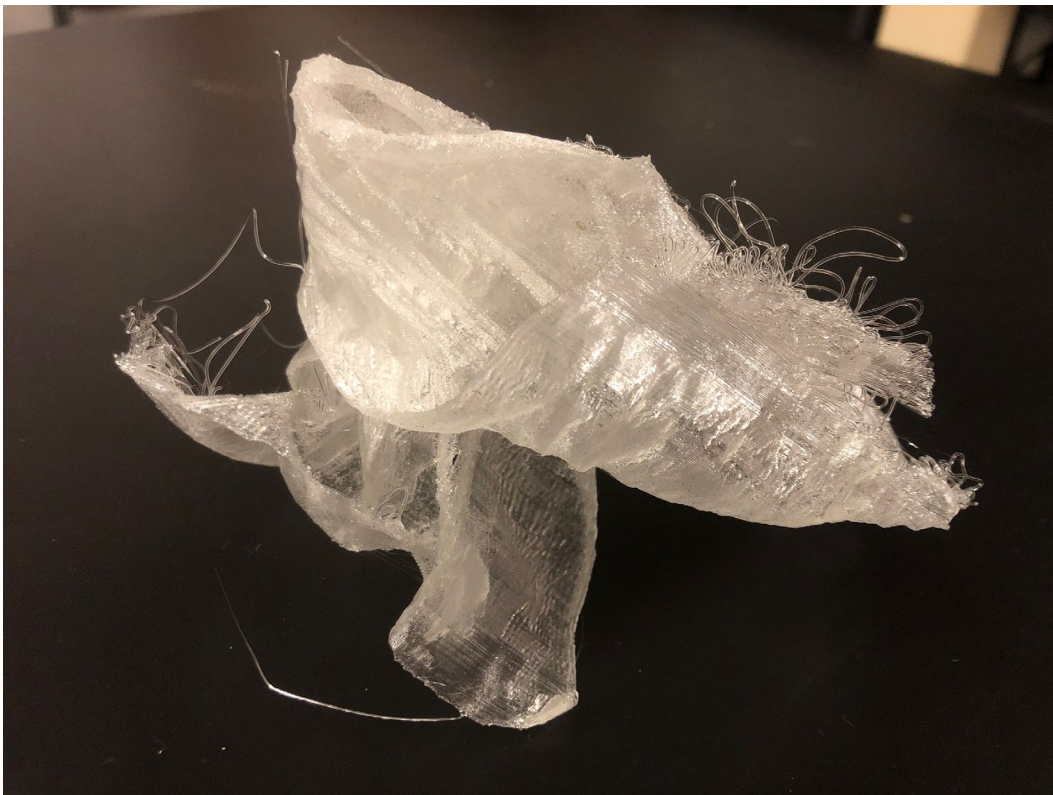


Figure 11. A 3D printing cloth simulation sketch.

Another problem I encountered from these sketches was legibility. These shapes were interesting to look at, and maybe even beautiful, but it was hard to tell what they were and why they looked the way they did. After deciding that the cube I

crocheted would be in the show, that suddenly made it clear that the 3D prints also needed to be cubes. This allowed me space to deform the cubes to the point of being completely unrecognizable since, contextually, it would be clear that they are still cubes.

I initially started without a specific plan of how many prints I would make or how they would be laid out. In Blender, I would take the default cube and subdivide the faces. This was done because the cloth simulation runs by considering each edge of the geometry as a point in the mesh of the cloth, and having each side be one whole node would not allow for any bending because they are large, solid shapes. However, it is also a very processor heavy technique, so if I added too many subdivisions to the geometry the program would crash. This allowed me to make prints that had enough resolution for the subdivided mesh to not be immediately noticeable, although if you look closely at the prints it always is. To show traces of this process, I decided to make some of the prints noticeably lower resolution, so that the squares and triangles of the geometry stick out much more. These are most obvious at the folds of the shapes that were caused by the deformation, since if a fold does not perfectly line up with a division then it creates a jagged, tooth-like edge.

After subdividing, I would pick points on the mesh that would act either as pins, that would stay in place, or as sewing points, which would be drawn together. I then had to decide if the cube would be deformed by gravity, or just by the sewing force, and if there would be a ground for the cube to fall on. The variation in cubes comes from these decisions, playing with the small variety of options in this

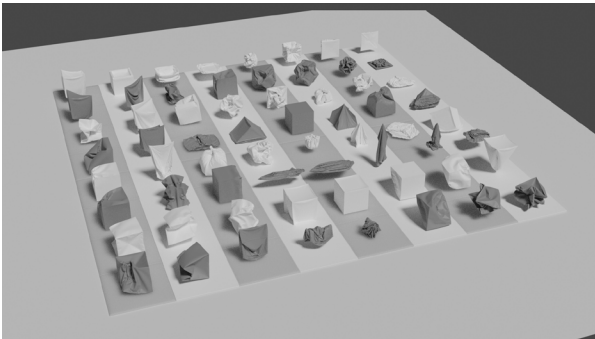
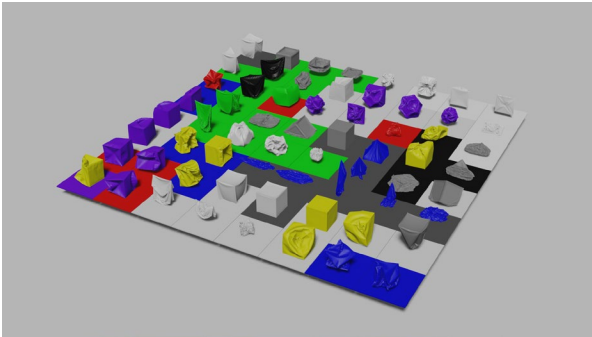
framework and only slightly altering the properties of the cloth elasticity to produce results that I found interesting. Sometimes I also found multiple stages of the animation to be compelling, so I also took snapshots of them to be shown in sequence.

In starting to get a sense of how many cubes to make, I was thinking about what would be enough to feel like a lot without becoming impossible to complete for this thesis, especially while feeling unsure that there wouldn't be another major disruption. I landed on 64 cubes in an 8x8 grid for this reason, but also because it is also a cubed number (so is 8). I then realized that this is also the configuration of a chess or checkers board, which I like the association of thinking about play, strategy, and movement between spaces, as well as the art historical examples like Duchamp and Fluxus artists like Yoko Ono.

Once I finished creating all 64 3D models, I began arranging them inside of Blender to decide on the color and composition. I initially wanted to use all of the colors available with the standard 3D printing filaments, thinking about the similar constraints minimal artists like Donald Judd worked with in what was available from the manufacturer. I wanted these colors to give legibility to the cubes by visually signalling which ones were in sequences together. This ended up creating compositions that were visually too dazzling and also felt unsatisfying aesthetically.

Following the chess board idea, I then tried limiting the colors to just two that alternated diagonally or in rows. I was noticing how much the color choices affected

the visual flow from cube to cube. This included also altering the color of the pieces of acrylic they were sitting on, and seeing if altering those colors in ways separate to the print colors would work.



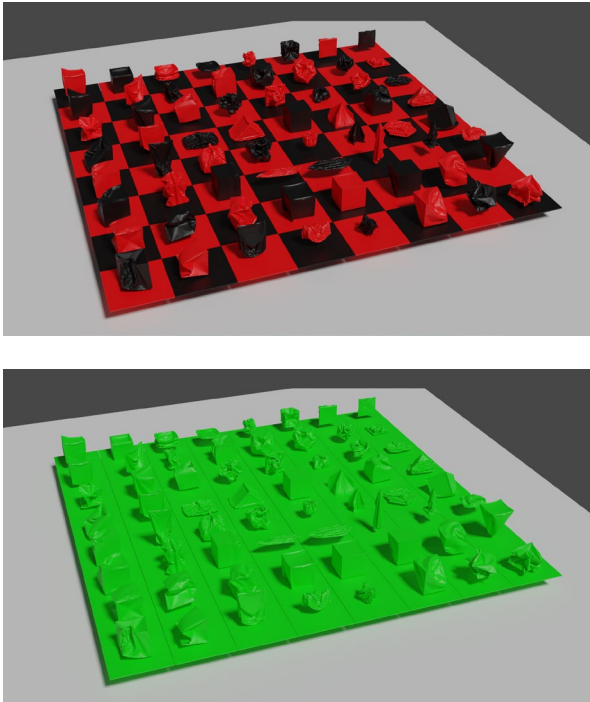


Figure 12. A few color sketches made in Blender.

Ultimately, I landed on doing almost all white for a few reasons. A monochromatic choice allowed for the shapes of the cubes to dictate the visual flow of the piece, which is much more compelling than having large color blocks. Painting the cubes was also out of the question for me, since the materiality of print is important conceptually to tie it to the crochet. For this reason I also opted out of doing any sanding or adding any polish. This is also why I decided to leave strands of filament on the cubes, although I had to carefully clean off the support structures, which was sometimes difficult when they were nested deep inside small folds. These strands also become little hairs, adding to the reading of them as organic bodies. The white especially resonated when I realized it looked like the marble sculptures I had been looking at by Bernini and Giovanni Strazza.



Figure 13. A close up view of *A few ways of being a cube* (2021).

However, leaving all of the cubes as white brought me back to the question of legibility. While many of them do look like cubes, I didn't want to risk someone looking and not immediately understanding what they are. There are already enough shapes and relationships that slowly reveal themselves as you look that this gesture felt useful as a hook to facilitate that exploration. It also made very clear that this cube is the same cube as *Unity Primitive: Cube* by both being grey and on clear acrylic. I didn't want the clear tile to stick out too much, though, so I painted the table underneath white.

I decided to use acrylic after my experimentations with 3D printing cloth simulated forms. As I described earlier, one recurring issue I ran into was that the printed form needs to have a strong contact with the flat bed of the printer in order to not move around. As one solution, I began adding the base as part of the print. While I still think this is an interesting solution to play with in future pieces, having the base and object made of the same material gets to be a bit too visually similar.

I started trying the acrylic as a base because we had it in the lab. I immediately was drawn to how its shiny surface reflected just enough to be interesting but not too much to be distracting, and the contrast of its surface with the matte PLA was exciting. When trying to figure out the colors of the prints I was similarly playing with the tile colors, since they come in a set of colors almost identical to the plastic. I used the laser cutter to make the acrylic squares to get the lines of the grid, but also as a practical reason that our laser cutter would not be able to accommodate a 4x4 foot piece to etch lines in.

When composing the positions of the cubes in the grid I wanted to not have any definite center, front/back, or up/down. The goal was to create movement between the cubes. I kept cubes that were in the same action sequence together and in a straight line, unless that sequence went in two directions then I allowed them to branch on the board. What I mean by this is, for example, in one instance I let a cube fall to the ground. I then took that cube from its halfway point, where half of it is still cube shaped and the other half is flattened, and then rotated it and let it fall again. By doing this there become local moments of cohesion that offer more clues to the

viewer about what is happening, but without letting them ever take over visually or fully answering the question.

What I couldn't fully get rid of in the physical manifestation of *A few ways of being a cube*, which isn't an issue while in the 3D modeling software, is the gravity keeping these cubes on the table. Obviously, many of these cubes only have so many orientations that they can sit at since they are curvy. With this in mind I tried to vary the directionality of the prints as much as possible. While these gravitational forces can only be seen, and when not pulling down can also read as being caused by wind or bulging, when put next to the experience of lifting up the heavy, crocheted cube start to gain some of their own weight.

Another effect that happens between the two sculptures is the idea of trying to recreate the printed cubes with the crocheted one. In the little bit of this I've seen and tried it proves difficult, since the crochet stretches in very different ways than the digital cloth and cannot be frozen in place. Maybe in the future it would be interesting to try and construct cubes that more similarly match in that way, but for this show it adds to the connections and disconnections between each piece.

This back and forth also carries the sexual residue of the prints over to the crochet. As part of what I enjoy about the latency of queer abstraction, *A few ways of being a cube* doesn't immediately announce that many of the cubes are yonic, phallic, and anal. When I started making these shapes I did not expect it to happen, and I didn't have to purposely search for them because they kept naturally



happening based on the set of operations I was playing with. I think that this, along with presenting them in a grid which would suggest a rigid formalism, led to the effect of most people, if they spoke about it all, telling me they saw sexual shapes as if they were projecting that onto the cubes, as if this was unintended and embarrassing to the piece.

I also experimented with the placement of the cubes in their squares. This didn't deviate from what I decided about which cube goes in which square, since that involved placing and balancing many sets of cubes, but was more about positioning them off center. My hope in doing this was to, like the color blocking, visually suggest groupings and create different moments of togetherness and separation. What I found, again, was that this disrupted the cubes from creating the movement. The display needed to highlight their shapes and varieties, the grid and the monochrome color let the forms speak more clearly.

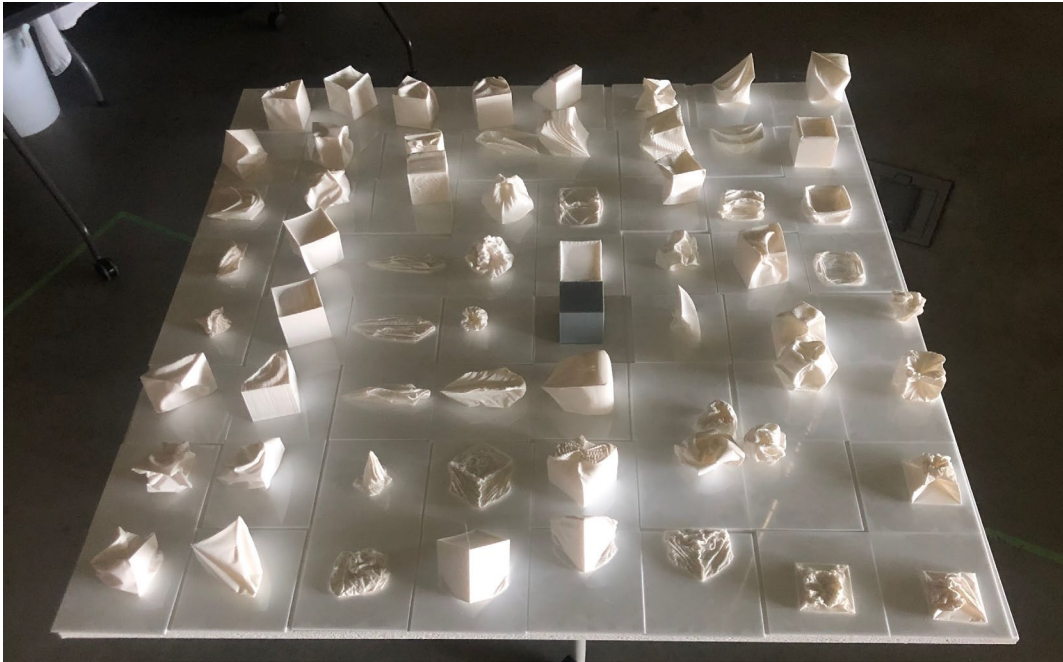


Figure 14. Playing with the positioning of the cubes and tiles in the grid.

After spending so much time carefully placing these cubes, there was no way I was going to be able to let visitors pick them up to look at them. Doing that would lead to cubes not only being set down in different orientations, but also in different positions. This decision creates an emphasis on looking as a mode of interaction, more in line with an art object you would typically encounter in a gallery or museum.

## *CUBEISM 2: Baroque Edition*

*CUBEISM 2: Baroque Edition* was the last of the 3 pieces to be made. It is a videogame which, in the installation, plays on 2 screens: a touchscreen that the player interacts with and a large wall projection behind the screen. The game

consists of a series of short levels which alternate between a grey, cloth simulated cube, a digital counterpart of *Unity Primitive: Cube*, and the same table of 3D prints as *A few ways of being a cube*. In each level the player can touch the screen to interact with the shapes. That sounds vague because part of the piece, and how I approach videogame design, is that the interactions shift every level. In some, you can rotate the camera or the object by swiping your finger. In others, you can move shapes, or pinned points on the cloth cube, by dragging them across the screen. In a few you can click to cycle between shapes. The levels progress on a timer, regardless of if they are being interacted with.

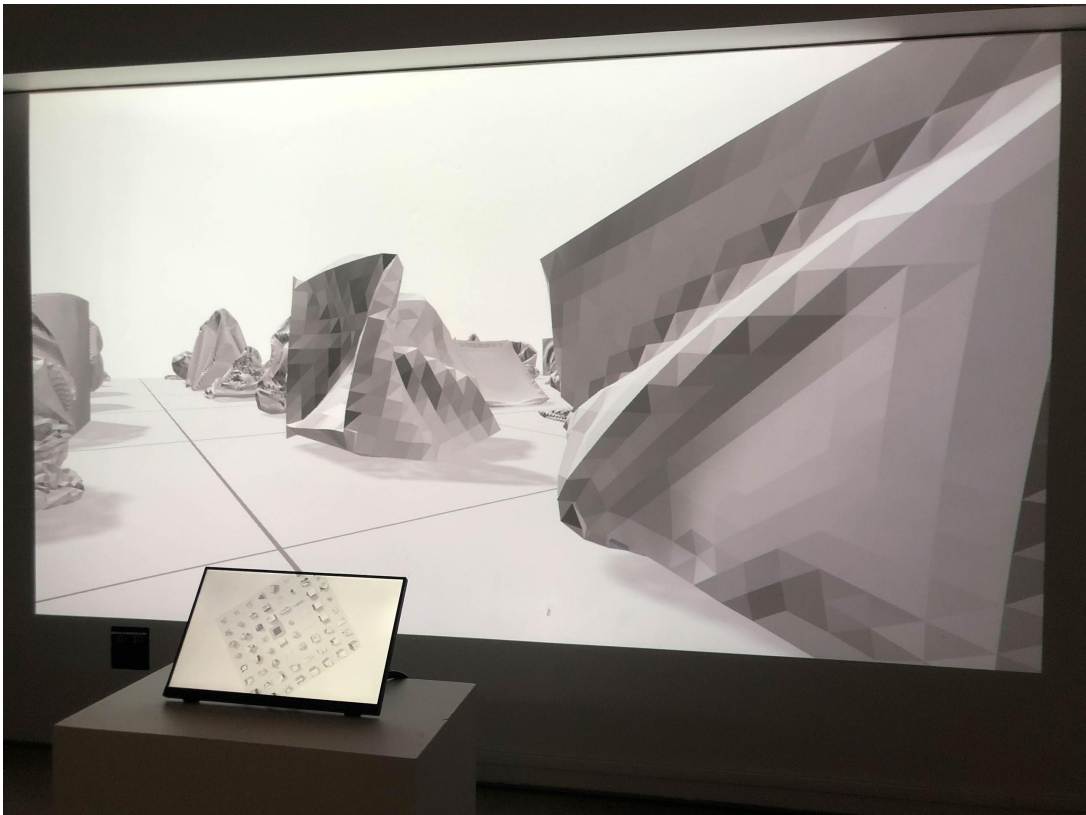


Figure 15. Installation view of *CUBEISM 2: Baroque Edition*.

In developing *CLOTH^3*, the videogame is the part that I was most comfortable with and confident in since I have been working with Unity for several years now. In doing my MFA I wanted to continue figuring out how to incorporate irl objects and installations into this work, something I only started doing with my BFA thesis, *inter-pedestal*. What was successful about this process was letting the irl objects come first, which themselves came from thinking about the videogame engine, and then circulating them back into this game as characters. Initially, I had only planned to have the cloth cube in this game, but at some point I realized that I also had 64 other characters to play with in the 3D prints.



Figure 16. A view of *A few ways of being a cube* being mirrored in *CUBEISM 2*.

My process for creating games starts by setting the frame that I have to play in, similar to the constraints I set for what operations I could do on the 3D printed cubes in Blender. I knew that I wanted for the player to be able to touch the cube and move it around, so a natural frame would be the cloth simulation tool in Unity and sticking to playing with its options and settings. After some initial testing I found that Unity's built in system was too limited for what I wanted, and seemed to have

unresolved bugs. Instead I purchased a plugin called Obi Cloth which has sufficiently advanced options.

Within that plugin the two things I played with were which points on the cube were going to be pinned in place and moved by the player's touch and how elastic the fabric would be. There are more options in the software, like tearing, but I wanted to keep my frame limited and faithful to the physical object. However, the digital cubes obviously differ from the crocheted one. These tend to feel more floaty, even when they are also being pulled down by gravity. The effort to move them is considerably minimal in comparison, but the range of possible movement is much smaller. The faces of the digital cubes also sometimes intersect themselves and get knotted in ways that are impossible with crochet.



Figure 17. A view of the cloth simulated cube in *CUBEISM 2* and *Unity Primitive: Cube*.

The 3D printed cubes in the game, on the other hand, remain as rigid objects. They are the exact same models that I used to print from. After seeing but not being allowed to touch *A few ways of being a cube*, these levels give visitors a chance to not only examine them from multiple angles and move them around, but in several levels also let them launch into space, only to continuously pop back onto the digital table. In the game the cubes tend to function much less in relation to each other, like

in *A few ways of being a cube*, and more often are seen as individuals or jumbled up into a pile of objects.

Part of the decision to use a large projection with a smaller touchscreen was to play with the scale of the objects. The irl sculptures are not able to shift in scale, other than visually by moving closer to or further away from them. On the large screen the player can not only see the cubes blown up, which then makes the texture of the cloth simulation grid more apparent, but can also see inside them. These shifts allow the cubes to be seen at body, architectural, and occasionally microscopic scales. They sometimes prompt the player to go back to the sculpture and look at it from new angles.

This 2 screen setup is also reminiscent of a common museum exhibition paradigm, where a touch screen sits in front of a large display, which we did often when I worked as a Creative Technologist. In these exhibits the touchscreen usually serves as a wall text, sometimes further interacting with the display by affecting lights and sounds. The content on the screen would give context to the object sitting behind it. In *CUBEISM 2: Baroque Edition*, the screen and projection are almost always showing the same scene, just from different angles. Rather than this touchscreen informing the scene behind it, or the objects behind the viewer in the irl space, it acts as a point of circulation for the whole show. This game was made after the irl objects, and those objects came from the computer.



It's hard, maybe impossible, to focus on both the touchscreen and the projection at the same time if you are playing the game. This disjunction is made clear in one level where the touchscreen is black, but still interactive, and the player must look up at the projection to see what's happening. The game is still precisely responsive to touch, but the one-to-one relationship between touch and image gets temporarily distanced in the space.

The music is another element that seems unusually separate from what's happening on the screen. Usually in my games I try to tie the sound in directly to what's happening in the game. In this one I wanted to play with making generated music, using another Unity plugin called Audio Helm, which has a synthesizer that can be driven by code live during a game. My aesthetic reference points were Minimal, Baroque, and serial music, although I don't think I ever make accurate renditions of any of them. The two synth patches I used with the program were a simple sine wave, which I thought also sounded a bit like an organ, and a more staccato sound I made in the Helm tool that attempted to sound like a harpsichord.

I then made programs where, in the Unity editor, I could specify the play speed, number of simultaneous musical lines, the root note, and scale steps. This gave me an easy way to get a wide variety of sounds and moods with only a few systems. The programs either played randomly up and down the scale, staying within a certain range, played in loops that would occasionally shift, or played according to the rules of 12 tone music, where all 12 notes must be played before any can be repeated. These systems felt especially cathartic for me to design

because my relationship to making music was formed through band class in middle and high school, where I was taught how to read sheet music, I played trombone, and eventually realized I didn't know how to do anything other than that. I hadn't been taught any understanding of how to make my own music. Being able to create this system that would play music that played with classical rules, even if in an elementary way, has helped me reconfigure that knowledge I gained from 7 years of trombone and band class into material that I can now work with.

The music in each scene is generally not directly tied to what's happening besides being tied to the position of the objects. In the installation this wasn't immediately noticeable, although I think it did give some very subtle variety and player feedback. As a desktop game, especially if the player is wearing headphones, the change in sound position is much more clear. The music, then, sends a mood for each level. Some of these I felt very specifically, like in a scene where the projector shows a slow rotation of the inside of a cube blown up to architectural proportions, which has a slow, deep synth sound that reminded me of an organ in a cathedral. Many of the levels have music that was less directly inspired by the level and came about more from playing with the music programs I made and seeing what was interesting, much like the process of selecting the 3D prints.

There is only one level where the sound play is directly related to the gameplay, where the player can rotate the table that the 3D prints sit on which then sends them flying into space. They then are returned to a point just above the table, and each time that happens a note is played. Like the one scene with a blank

screen, this points to the disjunction in the music with the levels. While I'm not sure that the Baroque music reference came across, people did respond to the moods that were created by the sounds. The same balance happens in *A few ways of being a cube*, which generated conversations about minimalism and Sol Lewitt but rarely, if ever, seemed to prompt in someone to think about Baroque sculpture.

That's partly why I put the word Baroque in the title of this game, to prompt the association. I also chose to reference a previous game of mine, *CUBEISM* (2015), to make a riff on sequels and the serial nature of the Baroque. *CUBEISM* was the first game I made in this format, which started accidentally when I wanted to just play with the camera views in Unity. I started with just one cube and put multiple cameras layered on top of each other to get simultaneous views of the same shape on the same plane and realized that it, by itself, was interesting. In *CUBEISM 2: Baroque Edition* I only one time have multiple camera views on the same screen, and in fact the method I used in *CUBEISM* no longer works with Unity's new rendering engine. Instead the simultaneous views come from the two different frames, as well as the associations with the sculptures in the show.

The desktop version varies both in being only one screen and also in being played with a mouse rather than a touchscreen, which only offers one touch point, instead of potentially 10, and the need for a cursor on the screen. Many of the same scenes are there, but a few did not translate well from the touchscreen and were removed. One significant difference in the interaction is that a mouse is always

present on the screen, unlike a person's finger on the touchscreen, which gives the opportunity for a few levels where the cloth cube feels stuck to the mouse.

# CONCLUSION

Overall, I think that *CLOTH*<sup>3</sup> was successful on many fronts. Maybe most importantly, people who came to see the show said that they found it all interesting to look at, wanted to spend more time with it, and even wanted to purchase parts of it. As a baseline goal for making art objects, this by itself has been a rewarding response. As part of trying to build this work into a sustainable practice I need to figure out how to build an audience and sell pieces. *A few ways of being a cube*, for example, is too large as a full piece for a casual person to buy. This is why, in addition to just experimenting more with these forms and ideas, I have started working on smaller sculptures stemming from *CLOTH*<sup>3</sup> including: different scaled 2D and 3D prints of the cubes, smaller crocheted cubes, and making molds of the prints to cast in white chocolate to be eaten.

I'm starting to understand more how all of these different things can be part of the same body of work without worrying about putting them all into one show or project, and how the flexibility of scale and medium can be used strategically to support the whole practice. When I wrote my proposal for this thesis project I crammed a lot of ideas into one paper. In thinking about the exhibition space we have in the light lab I thought I could have somewhere around 5 or 6 pieces. Not only would that have been difficult or maybe impossible in the time frame, but also I didn't take into account how much space is needed for any of these pieces to breathe in the gallery. I also now feel like that proposal was the beginning of a much larger

body of work concerning the relationships between textiles and videogames, and this show was just the beginning of that.

Another step in this work I already began thinking about is doing a similar move of focusing on a single form and using the cloth simulation tool in different media, but instead of doing a cube making it a flat plane that is the same dimensions as the screen. This both makes a more clear connection to cloth, since a cube made of cloth isn't something we see normally, and also turns the surface of the screen into the point of interest, which will vibrate between being read as a window into a space, how 3D graphics usually operate, and a flat surface.

From there I want to figure out how to approach working with shaders, the code that is what determines how objects are drawn to the screen. What's difficult in thinking about that for me is that it's not a tangible object, like a cube or a screen, that can have an obvious irl counterpart. I hope that making the screen work will help me figure that out, but for now what I'm thinking is either about light projections and painting, which are both decorations of surfaces. This also could interact with the idea of spinning, which is the process of turning loose fibers into a line of yarn because GPUs, the graphics cards in computers, also spin in order to draw to the screen.

Another direction I see being fruitful is in thinking about muscle fibers, exercise/bodybuilding, words 'modeling' and 'posing', and 3D character rigging. What little I know about how muscles work is that they are fibrous and expand and contract

based on electrical impulses, and that for them to grow they get somehow broken down or worn out. I think there could be interesting work to be made involving rope simulations, which work similarly to cloth simulations, and character rigging where bones and joints are defined in order to create movement in 3D figures. There's also something here similar to Vaccaro's idea of crocheting and craft as a metaphor for the labor necessary to build a certain kind of body and identity.

To go back to the question of if this show was a success, one topic I was keenly interested to see how people responded was the bodily and sexual nature of the cubes. As I've stated earlier, I don't think it's necessary to see this element, or any specific other element, for the show to work. In fact, I like that there are things people don't see, or maybe don't want to see. I'm also, though, not hiding it. To me that content seems obvious.

But to tally a score, people who saw my show brought that up, they talked about Sol LeWitt and minimalism, interaction design, computer graphics history, and textiles. The one that didn't seem to be immediately obvious was the Baroque. Maybe this would change with titles and a wall text present, which I didn't have in the gallery.

Another thing that I didn't anticipate was the lighting in the space. I haven't lit a show before, so I wasn't sure what to look for or think about. What became immediately clear was that the temperature of the lights were different from the touchscreen and projection, which were very cool. Those particular machines didn't

have much wiggle room to make the white warmer without losing image quality. In the future, I want to make sure to have the time and ability to have those match more accurately because it would enhance the connections between the three pieces. I had the prints oriented the same way that they appeared on the projection most often, but it would be even stronger if the lights were also positioned similarly in the game and in the gallery. I also failed to consider the lighting on the cube when it's being picked up and held. As it is now, it looks good on the floor but when it's up in the air the sides are not being hit by the light. I also did not consider how the lights would hit on the floor, *Unity Primitive: Cube* has a circle around it and A few ways of being a cube has square shadows.

I'm very happy with how this show turned out. I think the balance of all of these somewhat disparate topics worked in a way that viewers were able to feel invited to interact, both physically and conceptually, while seeing and making new connections. This welcoming affect is something I want to hold onto, especially since I have an ongoing interest in the alienation as a feeling or strategy. I think the difference here, and with other things I've made that do this, is that the work is about being comfortable with those alienations or disconnects. The art installation can create a space where we sit with something unfamiliar and listen to it or start a conversation with it. I'm not trying to deliver a lecture or prove some kind of mastery.

I just want to feel through the conceptual, historical, and sculptural material, feel more able to create or express with and in relation to my body and identity, and hopefully help other people feel the same way. CLOTH<sup>3</sup> uses the serial strategies of



baroque and minimal art to propose craft and play as ways of giving us agency to morph and move despite being locked in grids of identity and power. The grid can be, rather than a restriction, a set of rules to be gamed. The cube can be transformed dramatically and still remain a cube.

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