



SPACE  
KITCHEN



# **SPACE BETWEEN**

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Rhode Island School of Design  
Masters of Design Interior Architecture*

A Thesis submitted in partial fulfillment of the  
requirements for the degree of Master of Design in  
Interior Studies [Adaptive Reuse] in the  
Department of Interior Architecture of the  
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# Acknowledgements

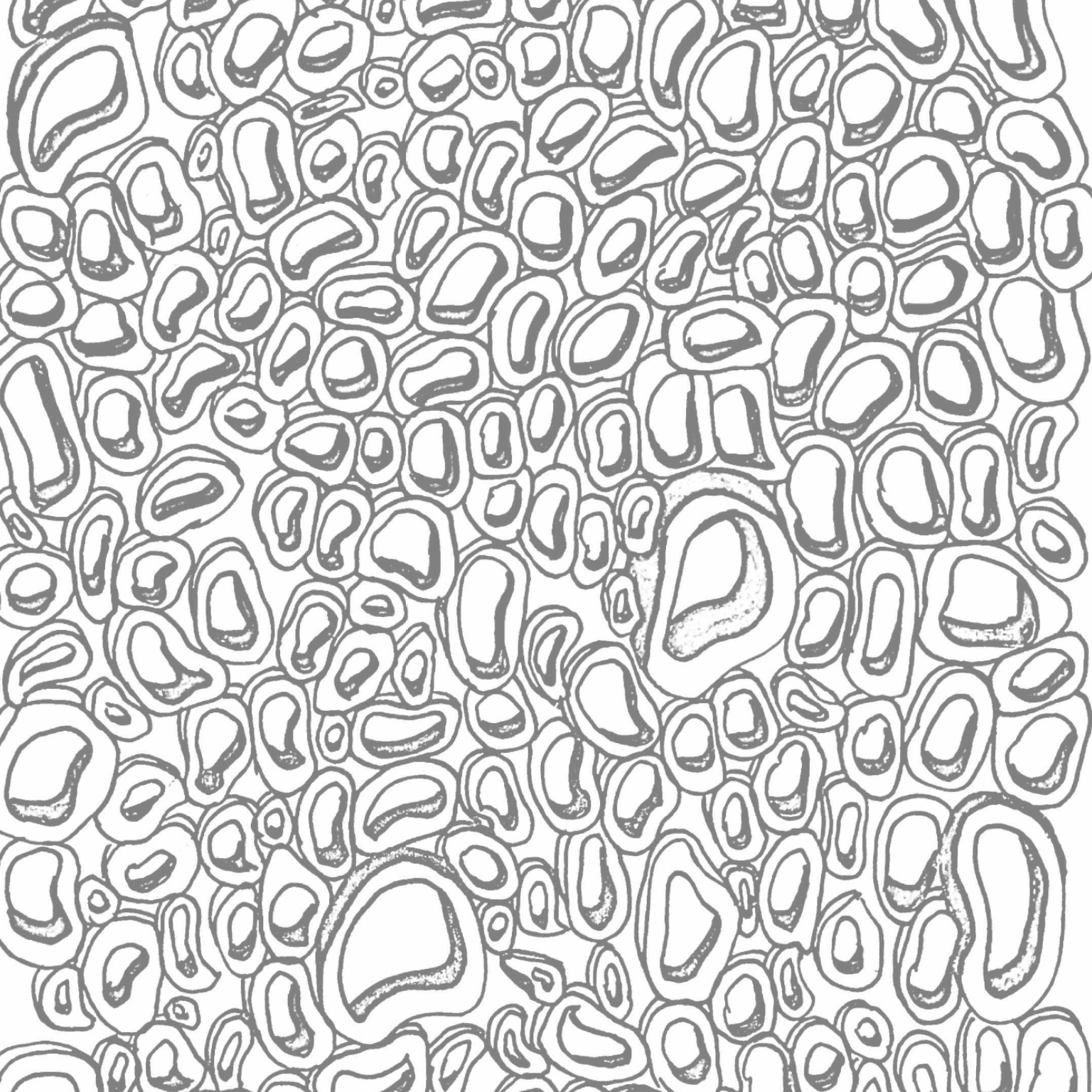
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# Abstract

In a predominantly human-made, constructed world, I am exploring how I can manifest the natural world with a hand made screen divider system, based on form and structure, that replicates that of a work of nature, more specifically simulating dappled light. Questioning sustainability through the limitations of terracotta clay, while introducing a passive, bioclimatic design, I explore how a fragile, rounded, hollow fired system impacts its structural integrity and its ability to embed nature like qualities in modular form. Clay is brittle when thin, dry, or water absorbing material is added; it absorbs water slowly, needs to be a certain plasticity to create rounded shapes, and has to dry slowly. Knowing these limitations, I need to work with the material in order for it to respond the way I wish it to.

These structures are meant to be self-supporting in exterior and interior contexts, using either artificial or natural light, designing complex patterns and gradients. Available to all climate types, the personal experience may compel diverse, or even contrasting fixations on one's body; whether that be the whistling of wind, temperature fluctuations, or the scattering of light and shadows, they are all a part of the sensory experience of the system. By using the least amount of material possible, and allowing the forms to connect to each other's tangencies, the modules allow for ambiguity, and an easy to assemble one piece module that encourages creativity and individuality, for each wall can be made completely different from the next.

Through testing and prototyping, I could rule out what could and couldn't be done from the limitations of clay. Whether it was coiling, slabs, molds, adding material, or the extruder, I was able to decipher how to avoid these limitations, and learned for my module I needed to maintain a 1/2" thickness at all times, and never go beyond 3 1/2" diameter. With the Extruder having a limitation due to my Module size, I am only able to extrude a range of the diameters that make up my module, 2"-3 1/2". Extruding the smaller diameters and reconstructing them, I was able to create the other diameters, 1 3/4" and 1 1/2", and add a personal touch to the rounded modules to design an impactful spatial experience. The modules will have the ability to bring nature in any context: urban, rural, interiors, backyards, etc. Versatility and ease are what makes this dappled, rounded module the new go to individualized, statement piece in any space.

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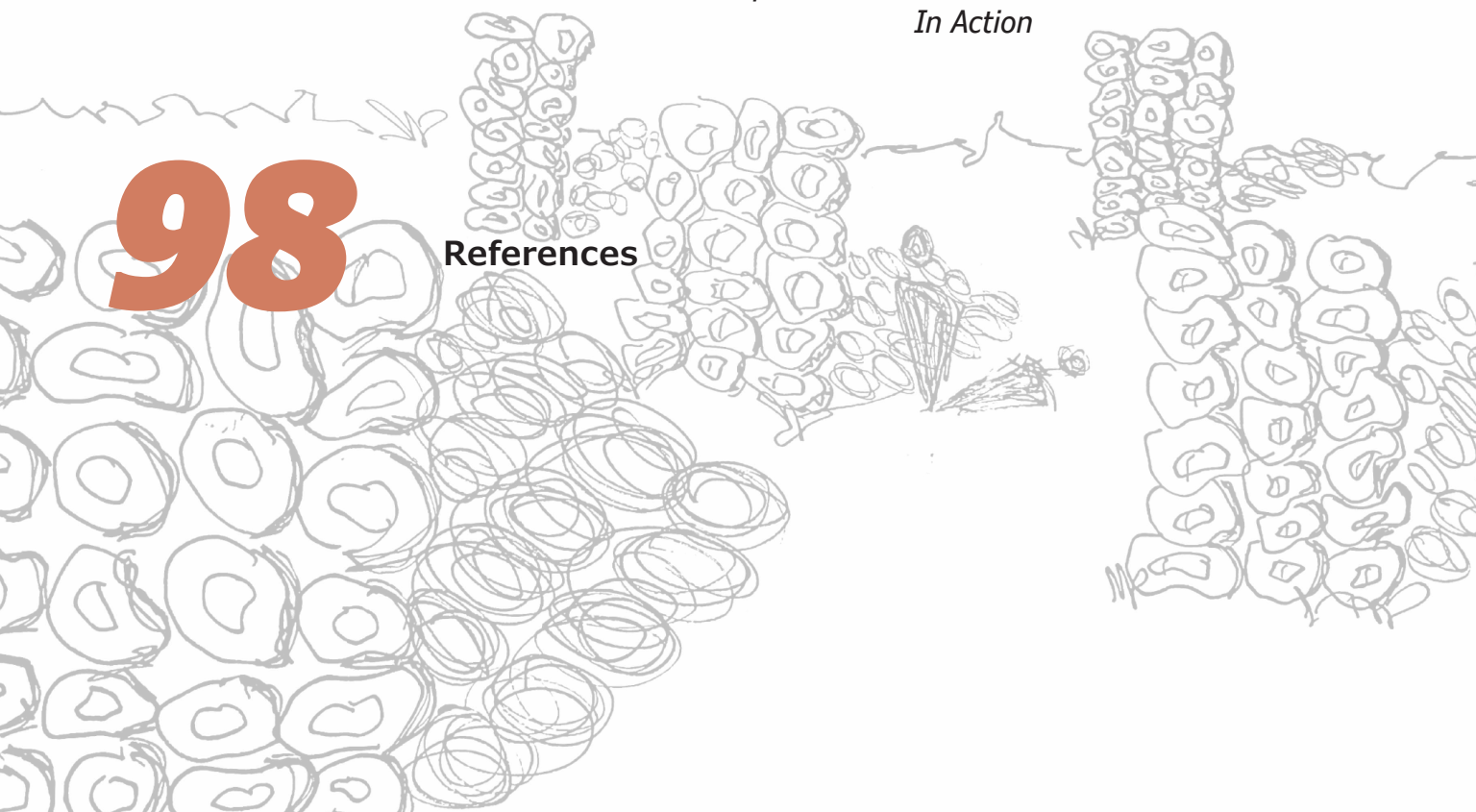
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# Introduction

I want to Manifest Nature in this mass produced human-made world, and I want to Manifest the *here and now*. Society has molded and guided us in ways that are not our own ideas, thoughts, and feelings. They have created a pathway to our future as if it is something we designed for ourselves. We are surrounded by all these similarly constructed houses, buildings, and structures coming directly from the computer, letting the digital world take the reins. This has stopped designers from exploring their own curiosities and learning from the mistakes and failures that come with hands-on experiences.

I want to be that outlier and follow my own way, form my own path, but I get stuck. Stuck between. Between the two ideas of accepting the intricacies of the digital realm, or learning directly from hands-on experiences. It is as if I am rebelling in my own mind against society by dissociating with the digital world and only wanting to work hands on, but still wanting to maintain the knowledge that comes from computers since my future depends on it. Caught up in the Liminal space that separates these two ideas. Can I do both? Can the between be my lifestyle? How can I design that for people? For people that are stuck “between” two ideas and caught in the stage of what’s next? Away from society, and be able to listen to our own thoughts, form our own identities, and relinquish the norms that have been forced upon us, and define them for ourselves. A space between that navigates openness and vulnerability for people who are ready to connect with their innermost selves, nature, and cross that barrier society built in front of us.

In *Dramas, Fields, and Metaphors: Symbolic Action in Human Society*, Turner speaks of the community that is created when people are going through similar experiences and stages in life due to the “comradeship” and “equality” among each other. The *communitas* that is created from the people going through similar liminal awareness and transitions creates a sense of safety that allows for an open mind and the availability to be vulnerable (Turner, 232). By creating a space that is able to detach “the individual or the group from either an earlier fixed point in the social structure or from an established set of cultural conditions (a ‘state’),” one is neither in the past nor future, but almost a limbo (Turner, 232). By separating oneself from those, either already existing, or not yet, we are able to be in the present moment and allow ourselves to pause. Being in the moment creates a release from the outside world and allows an escape from the pressures of society, cultural conditions, and other influences.

The place I want to design, the “Space Between: Navigating Openness,” can be set in any location, since it will have the ability to bring nature into any space possible. I want people to be physically and mentally present and aware of the space and time they are in. The clay that builds the space will be sliced into delicate circles by hand, then attached at each others tangencies using Nature as a Co-Designer. One clay piece directly on top of the other is what replicates the Biomorphic forms seen in nature, specifically dappled light. The modules interlock at the others tangencies, as if each clay piece has embraced each other. Light, wind and shadow are the other key factors of this space, enforcing you to use the rest of your senses while going through, or experiencing your between space.

You fully immerse yourself into what the structure is, what it means, and how these clay modules can symbolize the between, a threshold, and the manifestation of nature in any space. The light and patterned shadows created from the modules bring the trees and sun inside, or wherever installed. They allow you to focus on the present moment, and embrace the beauty of nature. The clay modules introduce a new way of building, by using nature as inspiration and working directly with the material at hand; manifesting nature and sustainability are the building blocks of these clay modules. This book will introduce an accessible way to understand the innerworkings of this dappled module, and also give you the chance to recreate it, as this should be a shared experience. I want everyone to be able to reconnect with their mind, hands and body with this module.



Victor Turner  
Dramas, Fields, and Metaphors: Symbolic Action in Human Society  
Cornell University Press, 1975

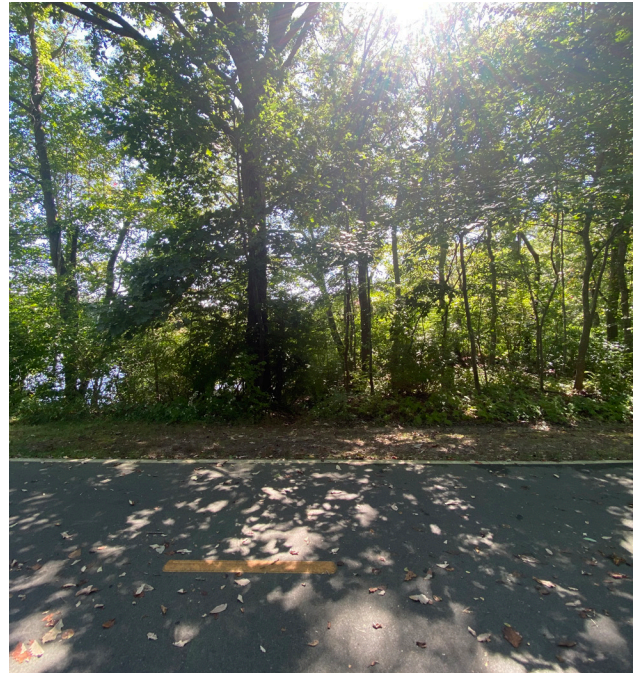


# Dappled Light

## *RISD Beach*

I'm at RISD Beach. Here with my classmates to record and draw what catches our attention as we each walk a different path. I've already been walking for 40 minutes, I'm sweating and currently out of breath; the hills in Rhode Island are no joke. Just reaching the top of the hill, I still can't see the ocean, the trees are blocking my view. The breeze is whistling through my hair and helping the beads of sweat roll off my body. I look down at my feet, strolling through a desired path I found, one created by students making shortcuts I assume. The ground is uneven, forcing me to be weary of each step. I can hear the leaves announcing their presence as they brush against each other. My surroundings are making me acknowledge my own body and how I am able to be in the present moment to choose where and what I want to do.

Through the path I notice the scattering of dappled<sup>1</sup> light on my shoes. The light is irregular and as far as my eyes can see. The sun is peeking through the leaves; a kaleidoscope of round patterns on the ground, like mini spotlights highlighting the insects, twigs, and leaves surrounding each trunk. The layered light stacking on top of each other forming different patterns, but still maintaining the same shape. The sun's directly impacting everything it touches, and with the elaborate intricacies of a tree canopy, together they induce a sublime experience for everyone entering its realm of dappled light. Is nature the only one capable of creating that? The wonders of how Nature has these gorgeous abilities to transform landscapes, spaces, and more using light and its surroundings as Co-Designers inspires me to dive deeper into recreating this feeling.



1. "Dappled light is produced when sunlight is filtered through the leaves of trees. The dapples result not because tree leaves have elliptical holes in them but rather because the leaves combine to make many tiny pinhole cameras, which then produce multiple images of the sun's surface on nearby projection surfaces. Thus each dapple is an image of the surface of the sun."

Edward Tufte  
*Escaping Flatland Sculptures*















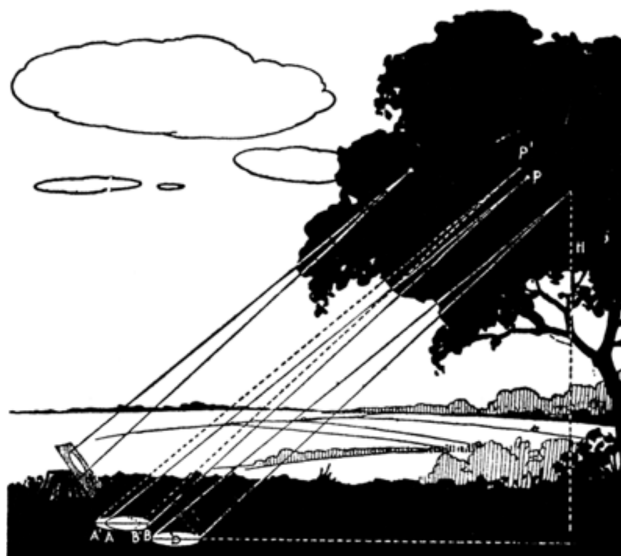
# Dappled Light

## Science

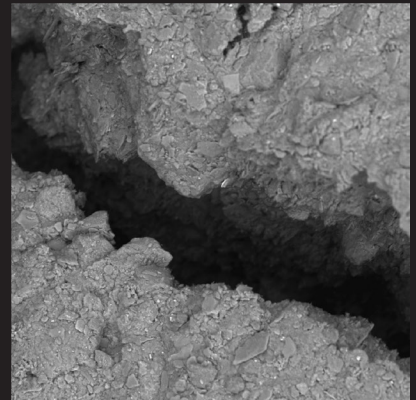
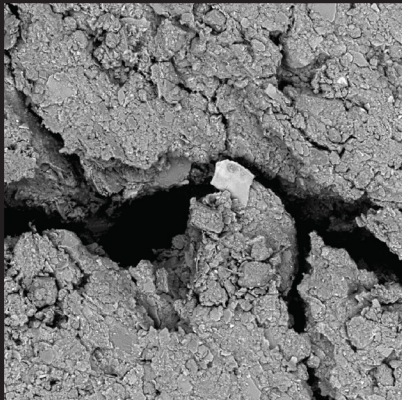
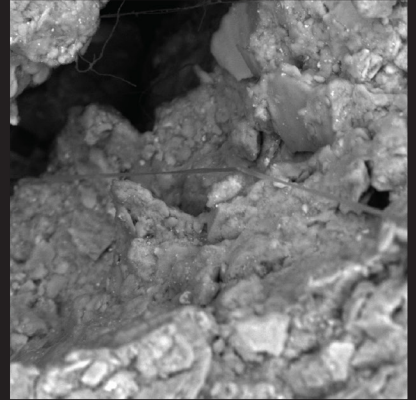
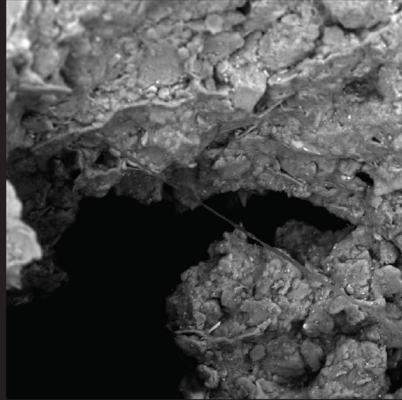
When we look at the ground, walking through the shadows of the trees, we see all different sized spots, but all similar in elliptical shape. We can hold our finger out to see where this light is coming from, and to no surprise it's from the sun, but this shows us the precise direction those rays of light are coming in from. We see the shadow of our finger on the ground, blocking a small area of all those spotlights we see shining on the ground. The strange part is knowing that all the openings we see on a tree are not nearly the same, and may not look rounded at all, so how do all the shadows and light we see on the ground appear elliptical? We can start testing the shapes by holding a piece of paper vertically against the light peeking through, to see that light is in a perfect circle, no longer elliptical. The reasoning for that is because the light that shines onto earth is always related to the shape of the sun. Since the paper is being held vertically, the light hitting it is at a right angle, creating a directly replicated shape of the sun, a circle. Since the ground is horizontal, it slices the rays of light "slantwise," much like a cone, therefore creating that elliptical shape (Tufte). The angle in which the light hits determines the shape of the light, and the proximity influences the size.

In other circumstances, when the sun is being slightly covered, whether it be from the clouds, or especially from a solar eclipse, what should we expect? That the shape still replicates the shape of the sun, but more specifically to the part of the sun that is still lit, or able to shine through. During a solar eclipse, the shadows will appear in different levels of crescents, depending on how and when the sun gets covered by the moon.

This amazing phenomenon is what has inspired me to work with nature, and is how I started to move forward in my creative, design process. I am trying to replicate the beauty of Dappled light in an organic, structural screen system so it can be experienced at any location, whether there are trees in season, or even any trees at all.



Edward Tufte  
*Sun's rays penetrating dense foliage*



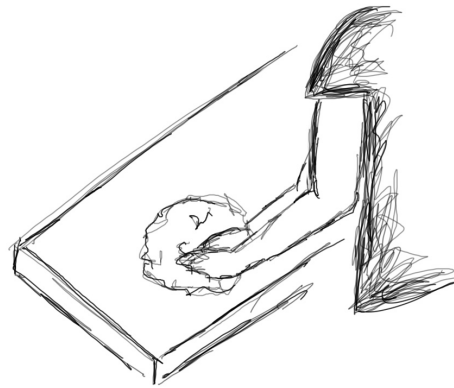


# Clay's Limits

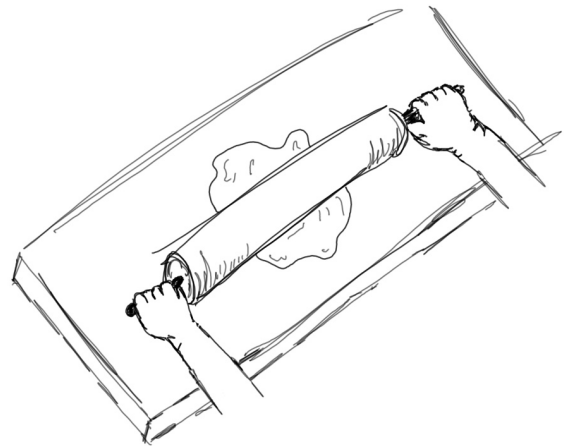
## Testing

When starting to work with clay as a material, I wanted to get a true hands on experience and connect with it. In order for me to understand the limits terracotta clay had, I needed to test the materials the only way anyone knows how to, experiment with it and find what breaks or doesn't work. I simply started by going through all the ways I learned how clay typically works; by kneading it like bread, flattening it into slabs, rolling into coils, and eventually molding it into different shapes. By gradually trying to find clay's breaking point, I was able to see just how fragile and light this material truly can be.

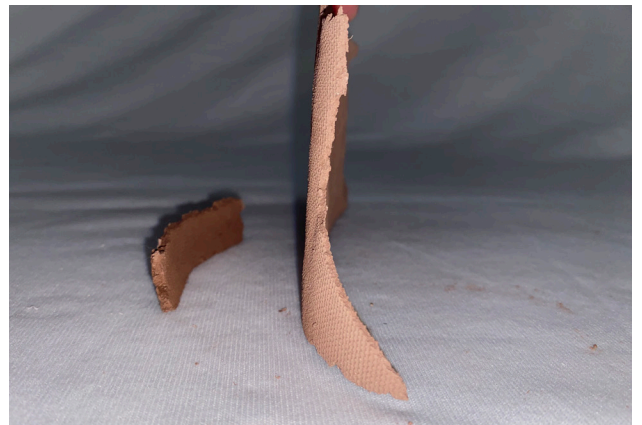
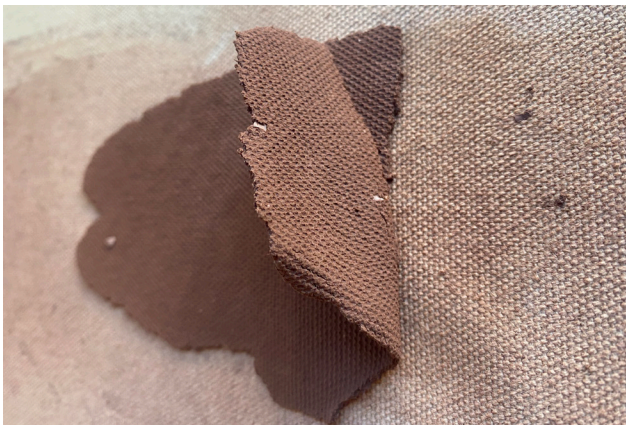
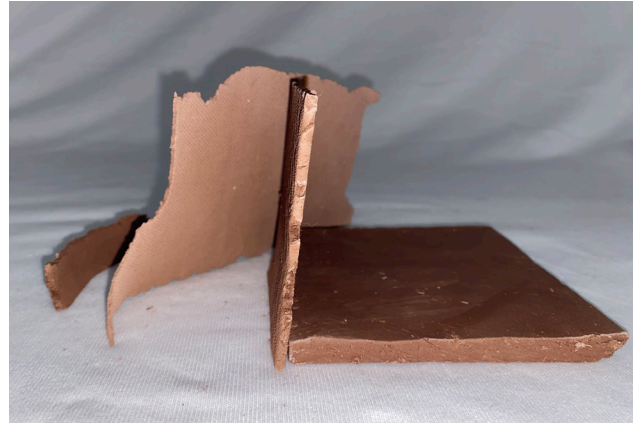
Kneading the clay is something that needs to be done in order to get all the air bubbles out of the clay, so in case you need to fire your future clay piece, it won't explode in the kiln, and I definitely don't want that to happen. I wanted to see how long it would take the terracotta to be completely popped of air bubbles to be able to work on the other techniques. Depending on how much clay you are working with you will get different results, but typically I used about a handful, mind you my hands are pretty small, and it took only a couple of minutes to move those bubbles out. I usually work in smaller batches in order to verify all the air is out.



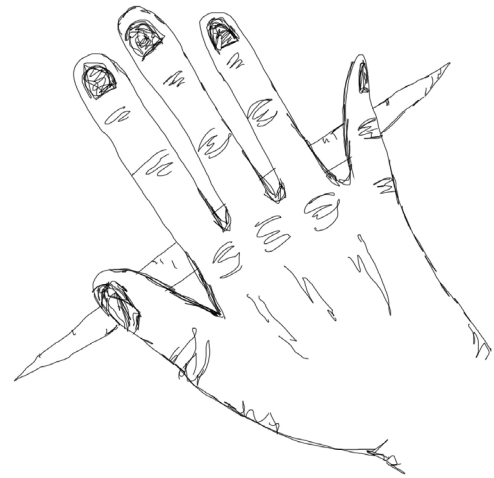
Flattening the clay into slabs can be done in multiple different ways. In the beginning we started by using rolling pins to get more of a hands on approach of working with the clay, and test how we personally can determine the thickness of the outcome. Later we got a tool called the Slab Roller, the name is pretty self explanatory and doesn't leave much room for interpretation, which became much more convenient, and less time consuming. This tool allows you to decide the thickness you want to see, put a blob of clay in front of the rolling pin look alike tool, spin the wheel, and push the clay through to get a perfectly flat piece of clay with your predetermined thickness. The convenience is extremely nice, and allows you to work a lot faster, so of course I moved forward with testing terracotta's limits with this tool. By going thinner and thinner with the clay, and letting the pieces dry out, I could find that initial breaking point. Going from 1" thick to  $\frac{1}{8}$ ", I could see cracking and increasing brittleness starting at  $\frac{1}{4}$ " thick. My ability to hold or work with different shapes and forms with anything lower than around  $\frac{1}{8}$ " while still in clay's typical plastic<sup>1</sup> form was tough, and not the thickness I was trying to work with for my future project. Rolling the slabs by hand and by Slab Roller was fun, and helped me learn more about clay's limitations.



1. Plasticity of Clay is when it is easy to mold and shape without the clay itself deteriorating. More scientifically, "The plasticity of clays is related to the morphology of the plate-like clay mineral particles that slide over the others when water is added, which acts as a lubricant." So when more water is added, the clay becomes more plastic.



Coiling with clay is another fun way to work with the material, and test the limits of what it is really capable of. A lot of us have most likely tried rolling any material we could find as a child into a worm-like shape, and that is exactly what this technique is, and what makes it so fun. Much like working with slabs, I started by using pieces of clay around an 1" thick and went down to  $\frac{1}{8}$ "; all pieces ranged in different lengths, since rolling them into worm like shapes I wasn't able to fully determine their lengths. Getting my hands directly in contact with the material and having that connection helped me understand clay more, and learned the ways in which it wanted to be moved and worked with. I used to think that we are the ones that determine the outcome of the clay piece, but really it is the clay; that is something I learned directly while working on coiling. No matter how much I tried to decide the end product of the coil, the clay did its own thing due to its limitations. To no surprise, the coils had similar outcomes as the slabs, where the majority of the cracking and brittleness started around  $\frac{1}{4}$ ". Especially when trying to curve or move the coils into any shape, the clay refused to morph to my decisions and chose its own path of breakage. Coiling is an intricate way to work with clay, but from this process and its ability to refuse to cooperate with me and my hand, I had to think deeply about this technique and the future of my module renditions.









# Clay's Limits

## *Sustainability*

I tested the limitations of clay in order to understand clay's breaking point, but more importantly to create a sustainable product by using the least amount of material possible. Creating a lightweight, but strong, sustainable, and self supporting structural system is at the forefront of my design process and strategy. By knowing the breaking point of clay, and having learned the best way it moves, I was able to set the amount of clay needed, and decide on a form for my design.

Before moving forward with the shape, size and among other things for my design, I wanted to test out how I could incorporate waste materials. This was something that popped into my head, as in past projects I have done this before with cement, so I thought why not try it with clay. My first instinct was to try sawdust, as in Architecture we see a lot of that going to waste in woodshops. Sawdust already comes out in tiny pieces, so it's something that was easy to incorporate into the clay as I kneaded. As I was doing research on sawdust properties and the possibilities of it being added to clay, I learned that it increased the compression strength, enhanced the thermo-physical properties, reduced water absorption, and created a more lightweight structure (Niyomukiza). So, why shouldn't I add sawdust in the clay, I thought?

With my experimentations I was completely off; due to the saw dust being made from wood, a water absorbing material, it made the clay dry extremely fast. With the clay drying fast, it became really hard to manipulate, cracked faster and more often, and was unable to curve into the shapes I wished for. Most of these issues were a result of me using as little clay as possible. The sawdust was taking away the moisture the clay needed to stay plastic enough to be manipulated the way I intended. As much as I wanted to be able to incorporate waste material in my product, it was best to leave the clay by itself for it to be manipulated the way I needed.

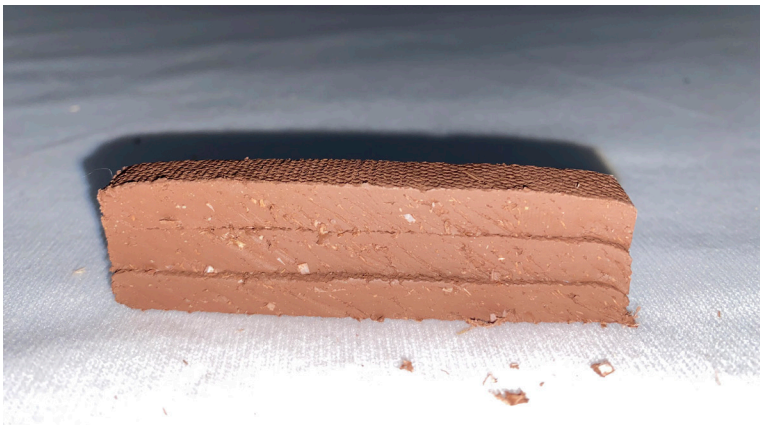
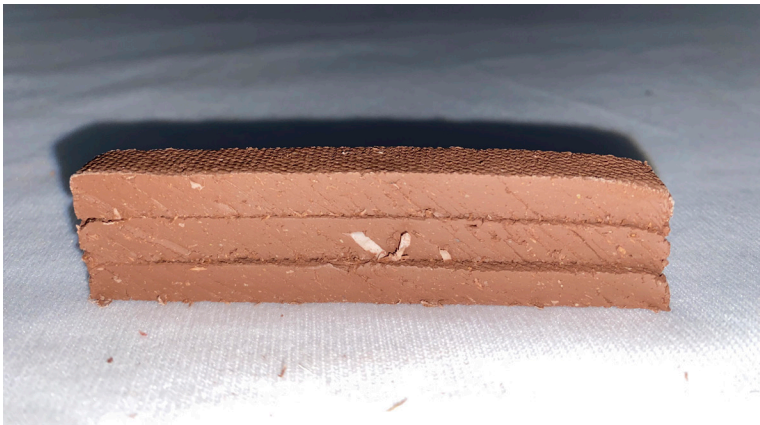








Sawdust & Clay Exploration



Ranging amounts of Sawdust in Clay



Striations in clay from Sawdust

By using the least amount of clay possible for my design, I am trying to reduce the amount of clay being extracted. Even though clay is a natural material, there is only a finite amount of it, so leaving as much to the land is my goal. On top of using the least amount as possible, I am also recycling all the clay byproducts that come from me constructing my modules. The extra pieces are either still plastic enough to go directly into my next batch of modules, go into a bucket of clay scraps and water to let settle in order to be reclaimed for future use, or I let them become bone dry to use for the slip making process. The specific clay I am using is a Cone 04 Terracotta; this means when I want my pieces to be fired, they can do it at a much lower heat than other types of firing, and only needs to be done once, instead of twice like other clays. This reduces the amount of energy that is being used, but still allows the clay to become more durable and water resistant.

Due to the reduction in material and low firing, the forms of my modules are very lightweight, creating quick and easy labor. They create a beautiful decorative piece that can be put in any space, whether it is interior or exterior. Not only decorative, but when put in exterior spaces it can be used as a thermal barrier, or bioclimatic design that directs the wind and the light to make for a better suited space to relax in, and help the insulation, or thermal envelope of your home. The stacked modules can reduce the amount of direct sunlight that may be turned into absorbed heat in your home. Not only redirecting light, but they allow for a cool breeze to pass through, more commonly known as natural ventilation. Natural ventilation can let you reduce or even stop the use of artificial cooling, allowing you to use less energy and just use the wind as passive cooling. This would typically be seen in a temperate, dry, or tropical climate, which is also where Breeze Blocks or Jolly walls are predominantly used, and mostly seen outdoors. These types of locations are the ones I see my modules being in to create natural ventilation and passive cooling. During cooler times of the year, the modular screen system can help block some of those cool winds, so you can enjoy the outdoor spaces for longer than before. I see my screen walls being implemented in many different ways, but it is all up to the user and how they see their vision.



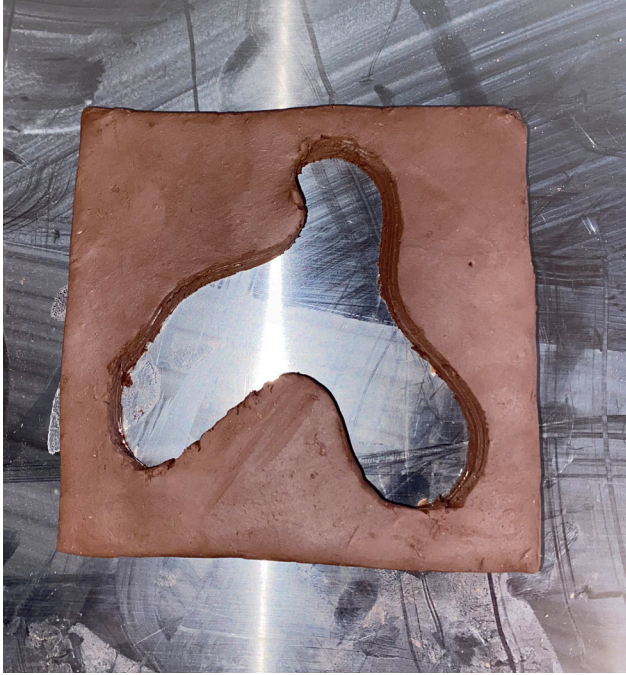




Coiling with Sawdust







Positive & Negative  
Mold & Slicing







# **Biomorphic Form**

## *Nature as Co-Designer*

When trying to come up with a design to manifest nature, I knew I needed to stray away from rigid, block-like structures and look towards Biomorphic shapes. Biomorphic Shapes are all inspired by the images and shapes we see in nature, as well as our own bodies. Artists like Matisse, who was an impressionist artist, used these shapes in his work to achieve “art of balance, of purity and serenity”(MoMA). This is something I was striving for; replicate nature to embody that we as humans are just as much nature, as it is in itself.

The module needed to stray away from any geometric form with corners and embody the irregularities and rounded features of nature. With this in mind I experimented with designing shapes on my own that I tried replicating from my body and patterns I see in nature, specifically shadows and water ripples. I started by drawing out shapes that could fit in a square to eventually turn into a modular form to create a screen system. These shapes decided one another as the first shape determined the amount of room that was left over for the rest, and chose the shapes they were able to take on. The shapes ended up being arbitrary and did not connect in a way to make the screen wall system successful or connect with nature like I intended.

From these mistakes, I learned that I wanted to specifically work on replicating dappled light, and design a rounded modular system to express the same type of feeling that light passing through tree canopies does. The shadows and light encourage pause, and allow one to embrace nature as it is and live in the moment. A moment in time to take a breath, forget about the outside stresses of the world, and give yourself the time to relax. The importance of relaxing and allowing yourself to breathe lets you put your life into perspective and understand what truly matters and is meaningful to you. Whether that be the nature surrounding you, the people in your life, or even just the silence or white noise the outdoors creates.

Nature is the Co-Designer, as it is where I got all of my inspiration from. There are many different possibilities we can see in nature, but the sun is definite. The source of life, something we get to experience everyday, rising and setting, ultimately designing the way we live. The sun is the reason we see the beautiful patterns, plants, insects, or any source of life, therefore we should be grateful for it coming and going, and never take the day for granted. The modules designing dappled light patterns are intended to enhance that feeling and be thankful for the current moment in time, as well as life itself.



Explorations with Biomorphic Shapes













# Prototyping

## *Process*

The prototyping process was one of my favorite parts of my exploration with clay and my module. The emphasis of making mistakes and failing during this process is extremely important. How is someone supposed to learn from something they did good right from the start? Once people have done something good enough to say it works, that's usually where they stop and give up, and that is when you are truthfully failing. Good may mean you have accomplished what needs to be done, but does it really mean it is your best work? The difference between ordinary and extraordinary I believe is time and effort. You have to allow yourself to be comfortable with being uncomfortable, and gain the knowledge of the unknown and learn from that. If we are not challenging ourselves and failing, then nothing new will be discovered or absorbed. Our minds need creativity in order to stray away from the things that are easy or automatically given to us. That is something I wanted to and was able to gain from the many failures of prototyping, but most importantly because I was working hands on with the material.

There were so many ways I could have gone about prototyping something I didn't even know the outcome of. Was it going to be something that hung up? Could it be a building block? Should I design puzzle pieces that interlock at the same or different points? The ideas were endless, but I knew where I needed to start, and that was with the biomorphic shapes I had locked in my brain.

By sketching and working hands on with the material, I was able to develop many ideas that eventually lead me to my final design. To me, sketching is a primary part of hashing out what goes on in my brain to further develop the ideas that are roaming around up there. So before getting my hands dirty I had to sketch in my book and learn about what the possibilities were. I did not want to hinder myself by only creating what came out on pen and paper, so when I moved to working with my hands I still allowed my mind to wander and think. The sketches were only the starting point, by working hands-on with the material I am able to learn more about what it likes to do; even after gaining information from testing the limitations of clay, it is still nice to consider yourself a learner. This way I am able to gain as much knowledge as possible.

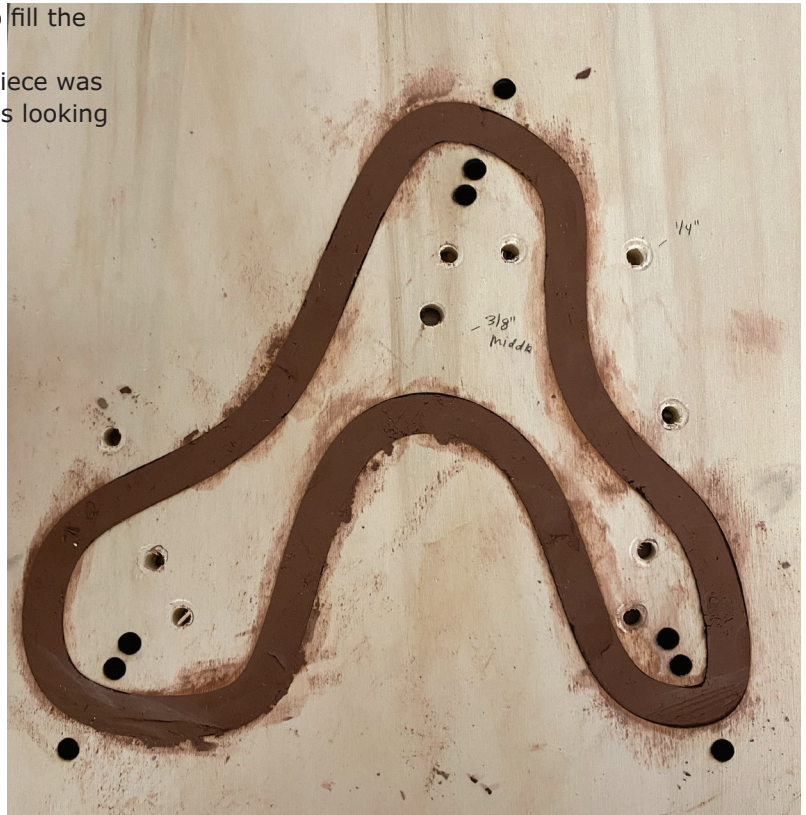


One of the ways I created the first prototyped shapes was plaster molds. Whenever I made a plaster mold, I used clay as the 3D element that was going to create the negative space in the plaster. In the picture you can sort of see the shape that is being developed from me mushing the clay into the molded shape. For reference, that shape I was trying to create was the image on the next page. While creating the mold, I did not think about how difficult it would be to take the strange shape out without deforming it, let alone how to get it out in one piece. Typically when using a mold it is a thicker, more solid shape, as well as a more basic shape. The mold was unsuccessful, and therefore I was able to check off that way of working with clay.



Shaping Clay with Plaster Mold

Next, with the same shape, I wanted to try using the Extruder. The size of the opening of the Extruder is 10" x 10", so when I laser cut my piece of plywood into sheets of at least 12" x 12" with the shape in the middle, I thought there would be no difficulties if the shape was at the center and not exceeding the 10" x 10" size. Well to my surprise I was wrong. The amount of pressure needed to get the clay to come out in the shape you want is a lot more condensed than I originally thought. So from that experience, I knew I needed to create smaller shapes in order to work with the extruder. In this image, I decided to try to fill the hole with clay by hand and see if that was successful. It ended up working, but the piece was very delicate and ultimately not what I was looking for in a finalized clay screen system piece.



Shaping Clay with Extruder



Knowing I was using dappled light and Biomorphic shapes as inspiration I started with the carving process. With slabs being rolled out into 1/2" thicknesses, what worked best from my limitation testing, I sliced in similar shapes as I did before to see what came of it. With wobbly shapes and curves forming the 2D clay piece, I started to see something coming together, but what exactly I didn't know. The only thing I really did know was that I wanted to create beautiful patterns like the tree canopies do with the sun. Using a knifelike tool, I let it guide my hands through the clay, and let the material decide more than my own hand. This was an attempt to not force anything onto the clay, and develop organic shapes that melded together.

I also knew I wanted a lightweight structure, so I tried to leave as little clay between each carved shape as possible. Don't worry though, the pieces that I carved out went towards the next prototype in order to never create any waste, and maintain the recycling aspect of my design. As I let the piece sit and dry, I moved it around to see the different shadows that were being cast. The way the light hit the piece was gorgeous, but I was not sure what really was going to come from a piece like this, and how it was going to be used to enhance space.

I let myself sit with this piece in mind and think about it. As beautiful as it was, it still felt arbitrary to the intentions I had for my final piece. I wasn't sure if I wanted to have something 2D as my piece, since there is not much of that seen in nature. The 2D aspect also made me think of it more as a decorative, design element, than a wall that could enhance the experience of a space sustainably. Things discussed before like thermal barrier, natural ventilation, reducing direct sunlight, and more would not be as successful with something so light and delicate as this piece.



Moving into working with 3D elements in clay, I started by creating circles, or more so cylinders with clay. I was thinking about how dappled is always projected onto the ground in elliptical shapes, and when vertical piece of paper, or other object interferences it creates a circle, or the direct shape of the sun. So knowing that, why should I not be working with circles to try and induce dappled patterns.



Using Extruder and Gravity to Slump Clay

Something I was also curious about was the way clay slumped using Gravity as a Co-Designer. I wanted the clay to organically form its own shape starting with a circle, a shape with no corners, and see how the material itself designs the module. The clay was plastic enough for the individual pieces to come together as one, but the part I wasn't able to accomplish was the way all the different modules would interlock to become a wall. I first imagined creating edges at the corners to stack like a normal building block, but that was going against all that I was trying to accomplish. These modules did not work as planned, but was fun and a great way to learn more about clay as a material.





Initial set up of Gravitational Clay Stack





Slicing curves

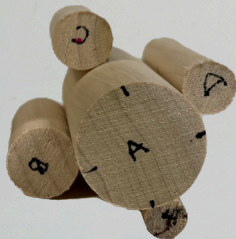
Still moving forward with circle and cylinders, I decided to step away from clay for a bit to let the more architectural, structural brain in me come forward. I knew that I wanted to design a module that was not rigid, interlocked, and gave the people the independence to design their space as they would like. My brain attached to the way circles attach to each other, at their tangencies, so why not make a module that way? I wanted to incorporate multiple sizes and lengths because there is no perfect dappled light with all the same sizes.



Dowel Exploration  
One Module Rotated to Interlock



By using one major circle at the center, and getting smaller and smaller as they attached at four of the middle circles tangencies, it gave the module the opportunity to connect at multiple different points, and rotate as the user wants. Here are two different examples of how I arranged them to show just how versatile this one module can be. Even if this is one module, it still allows for the wall to be different depending on who is working with the pieces. So I went forward and tested it out with clay, using the knowledge I gained from the limitations and I made some prototypes; lets see if it works.



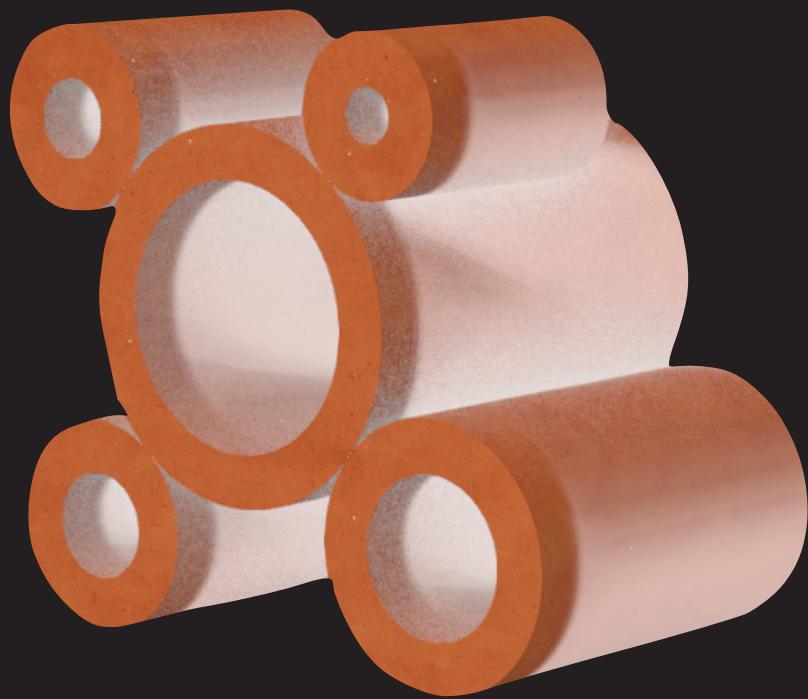
Module in question



Hands on first trial of module







## **Module in Place**

### *Specifications: How To*

The one piece modules are easy to follow to build a partition wall, but also just as easy to make for yourself, whether you have the tools or not. Your hands have the ability to do it all and I want to show you how! I am going to bring you through the process that I went through using all the tools accessible to me from the Sustainability Lab. Without the tools you can easily do it all by hand, but obviously will be more time consuming. Even so, it is a fun way to work with the material, get your hands dirty, and allows you to ease your mind of any stresses you have at the current time, hopefully it's not building this wall.

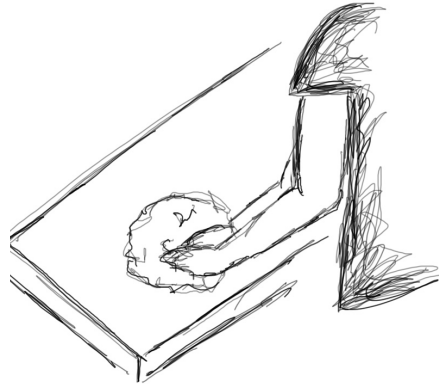
The way we are going to build the modules will be fun, but since it is a bit more strict on the measurements, your full focus will be needed. With that in mind, hopefully since you have to pay full attention to the building, it can block out anything else that may be on your mind. If anything, if you have chosen to build this yourself, you have made the decision yourself to be fully invested in this project. So, yayyyyyy, congratulations; you have at least joined me in this fun, extensive experience, and you can now call yourself a creative, semi-pro ceramicist, and builder! It may be extensive, but you will find a new joy in the material and respect for people that work in this field, and maybe it will lead you to do just the same.

From this year, me personally, I have gained a new found love, and a bit of hate lets not lie, for clay and its abilities. The people that work with clay and other alike materials deserve a thousand pats on the back. It takes patience, concentration, a fine hand, and more to succeed in using clay, but also to just be creative and design anything. I hope while you are working with clay, or any other creative project, that you respect the material and the process just as much as the end product.



## Step by Step

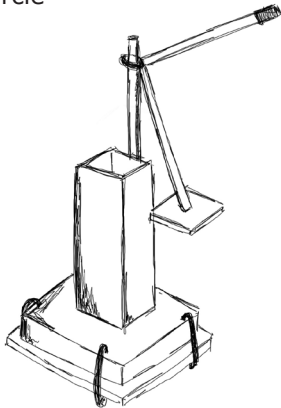
1. Grab Terracotta, Cone 04 clay, and knead out air bubbles at about a couple kgs at a time, so it is manageable.



2. Repeat the kneading process until you have enough to completely fill the extruder.

3. Prepare the Extruder by attaching one of the laser cut pieces, so the shape is at the center of the extruder.

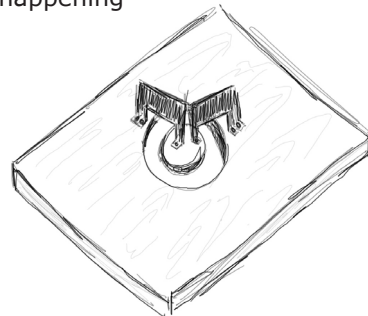
a. There will be multiple different sizes to extrude, but start with the largest shape first: 3 1/2" diameter circle



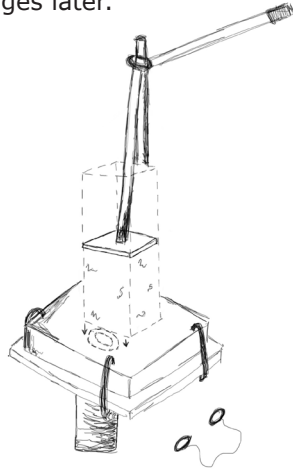
4. Place the plastic, kneaded clay into the extruder, until the extruder is full; the clay will eventually be squished down.

a. Put the extruder lever into the opening and squish the clay down until you start seeing clay extruding from the shape below

b. You may need to do a couple rounds of squishing and adding more clay until anything starts happening



5. Depending on the diameter you are working with, you will slice at a dedicated length, and touch up the edges later.



7. Repeat these steps till you have gotten all of the shapes extruded and set aside to assemble.

9. Once you have the enough modules, they need to be sent to the kiln to be fired at Cone 04 temperature: 1940 Degrees Fahrenheit

6. Set the pieces you have extruded aside. You don't want them to get dry so don't leave them exposed to the air for too long; you can cover them in a waterproof material and spray them with water and seal the pieces off to maintain the plasticity.



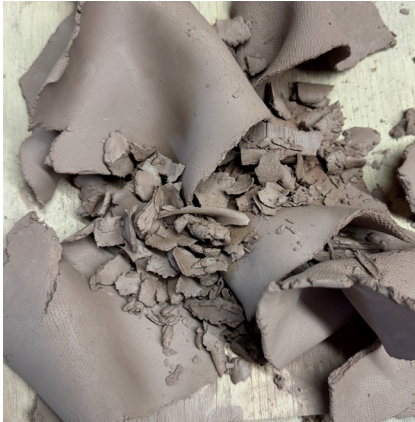
8. Now is time for assembly. Use the cheat sheet to correctly attach each of the pieces.

10. Once out of the kiln and you have enough modules fired, they are ready to stack and turn into a wall! With each of the circles being connected at each other's tangencies, that is exactly how they attach when stacking as well. It gives you the opportunity to choose how you would like to arrange them, so you can design your own wall.

## *How to Make Slip*

1. Roll out some thin sheets of clay and let them dry out until very crumbly (an hour - overnight)
2. Once Bone-Dry, add the pieces to a water tight container and go outside or a well airvented area, (can wear a mask if wanted) and smash the dry pieces into smaller bits, or even close to powdery.
3. Pour warer into the container; just enough that it covers the clay pieces, plus a tad bit more.
4. Let this mix of materials sit until all of the water is absorbed. This usually takes awhile, in which I leave it overnight.
5. After sitting, the textue should be pudding like. If at first there is access water on top, you can pour that out and should still have the right consistancy. If the pieces still seem either dry, hard, or it is too thick, repeat the water soaking process in order to gain that perfect pudding consistency.



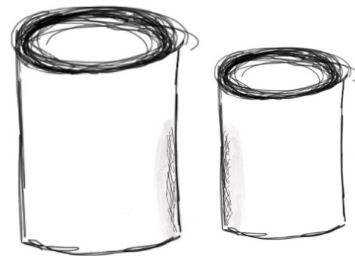
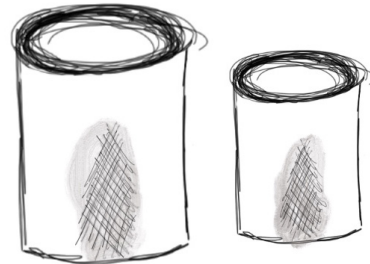


## Assembly & Cheat Sheet

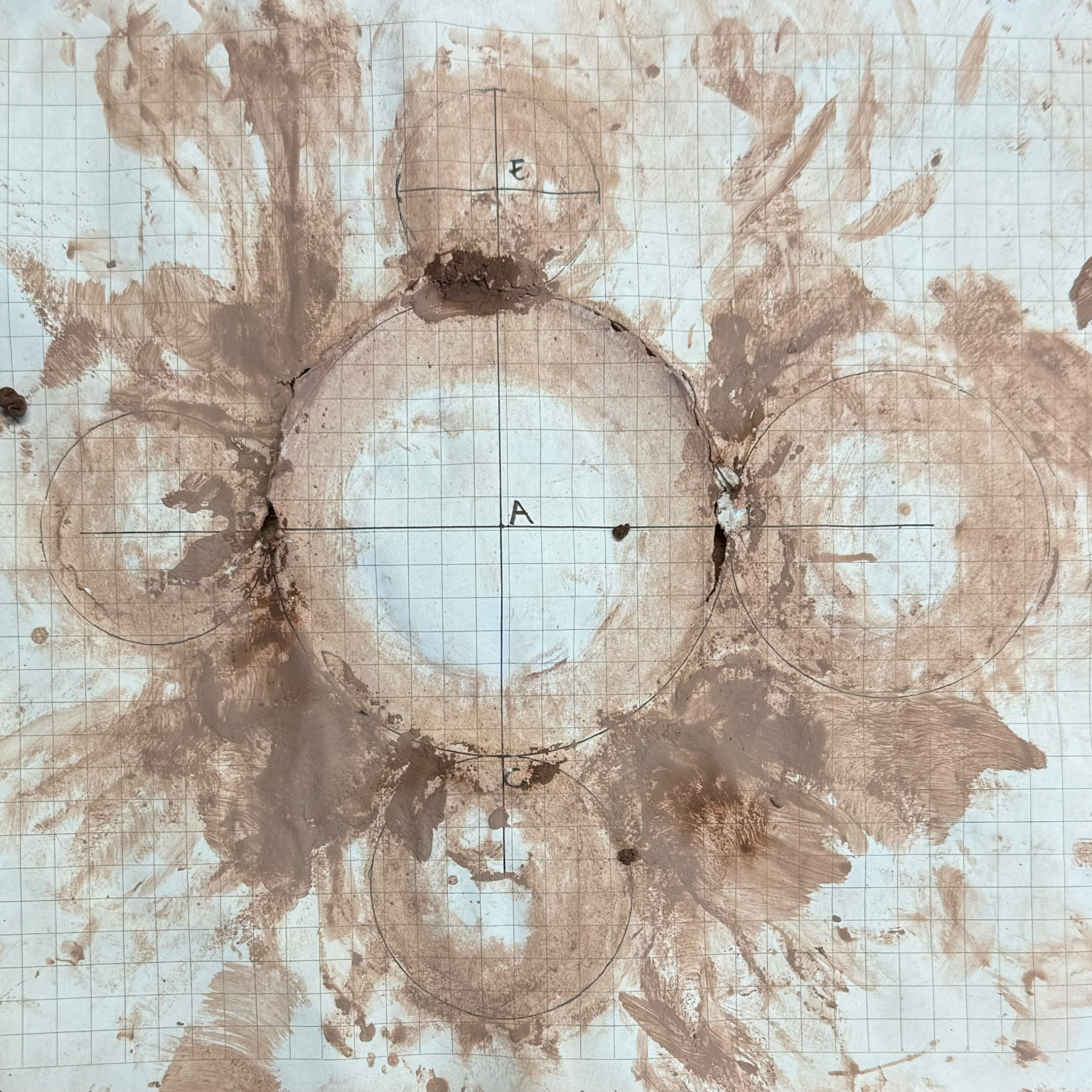
From A-E, Assemble using this cheat sheet. Starting with A, the largest piece, put it at the center. Then from there, in clockwise and alphabetical order, you will attach each piece; using a sharp tool to scratch at the exact location you want to attach the pieces together. Now, directly on top of the scratches add the slip you just made. A healthy amount so there are peaks, or spikes coming off the pieces, and then the two pieces can squish together. Once the pieces are fully attached you can go in with greater detail to enhance the attachment, the look, and the durability. By adding coiled clay in the cracks, that are created when the pieces are attached, you can fill the gaps and any unwanted breakage. Push the coil in as deep as possible, then using any tool that has smoothing abilities, smear the coil in to attach to the pieces and let the crack disappear. With a wet sponge, go over the smoothed out coil piece for the finishing touch. This should act like a glue, much like the slip, so your attached pieces can be solidified in place.



Possible tools to scrape with







E

A

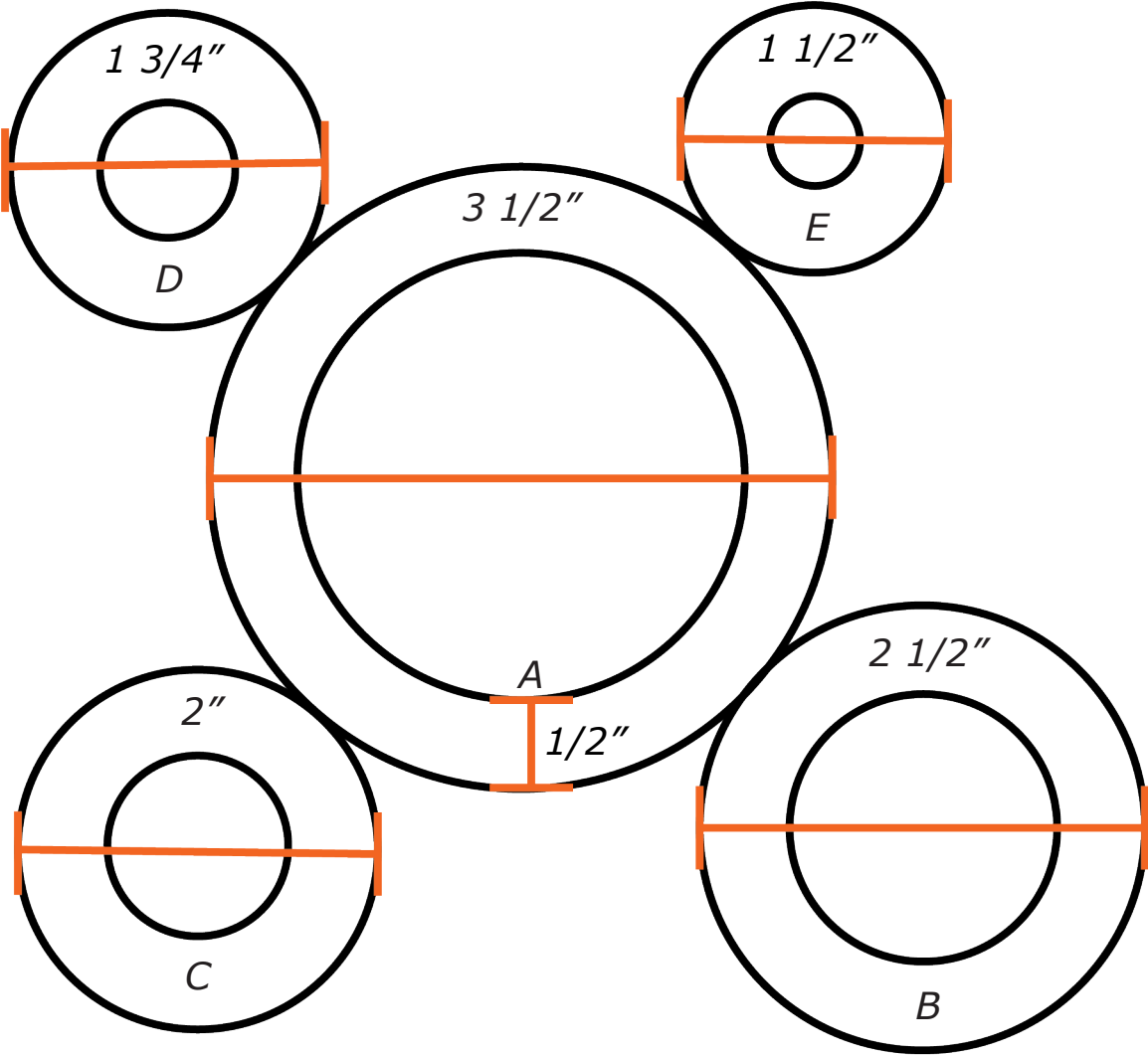




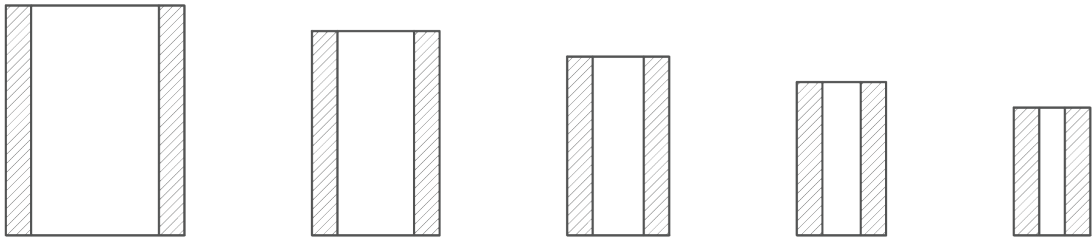
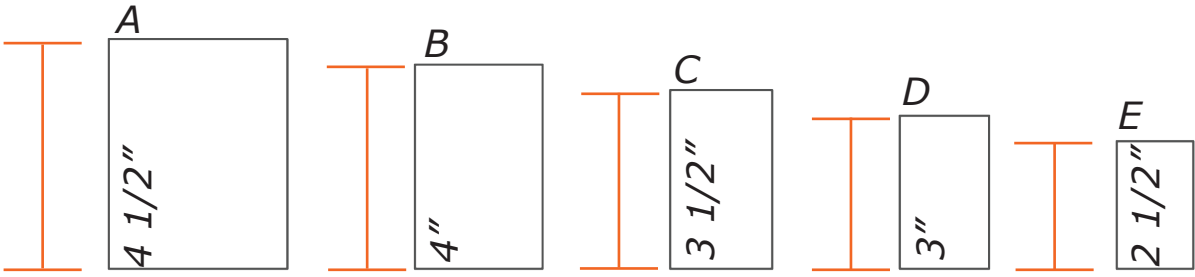
Detail work for the attachment of each piece



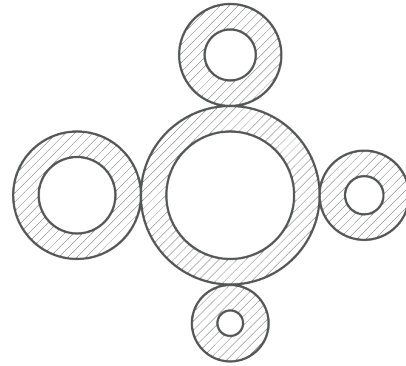
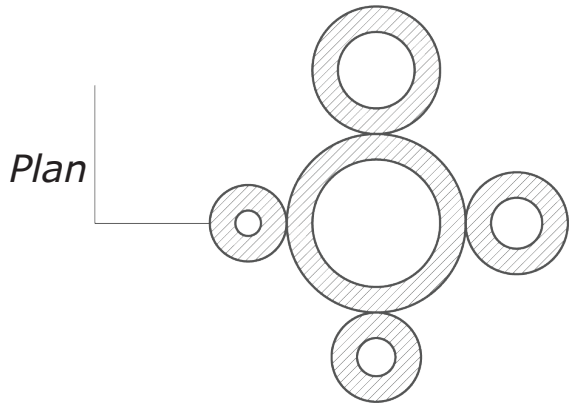
Module Measurements



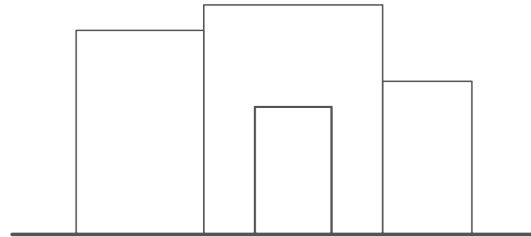
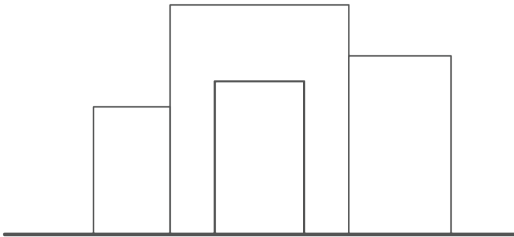
\*Not to scale\*



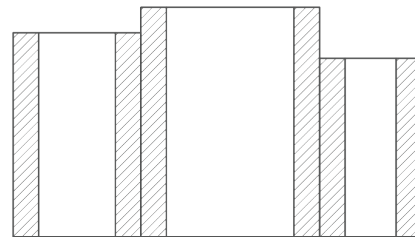
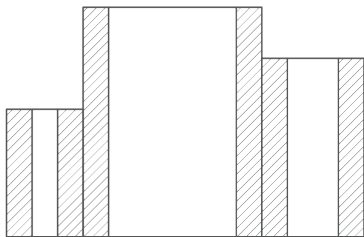




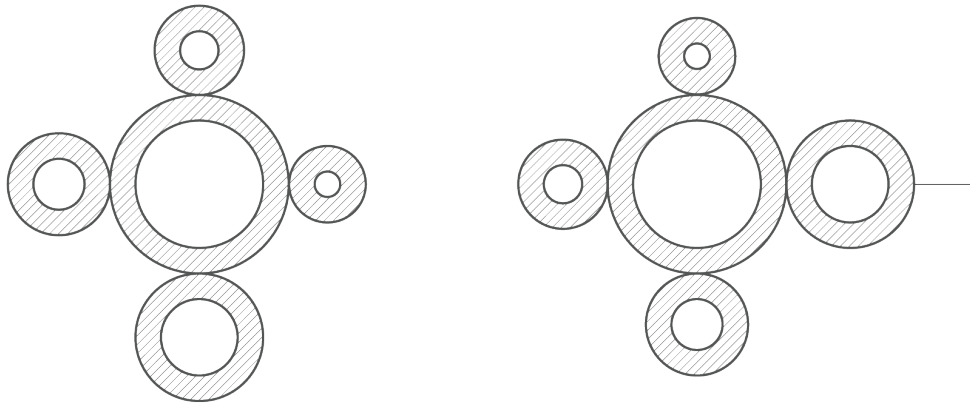
*Elevation*



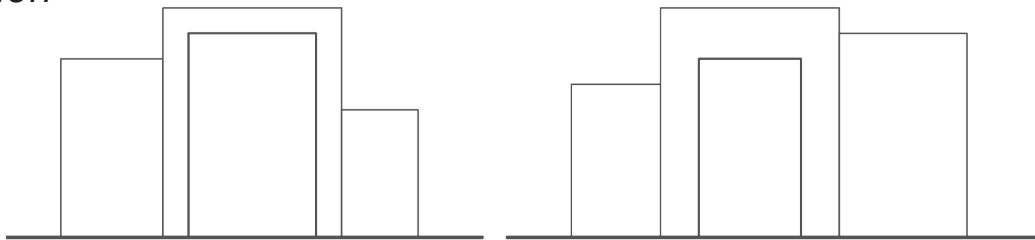
*Section*



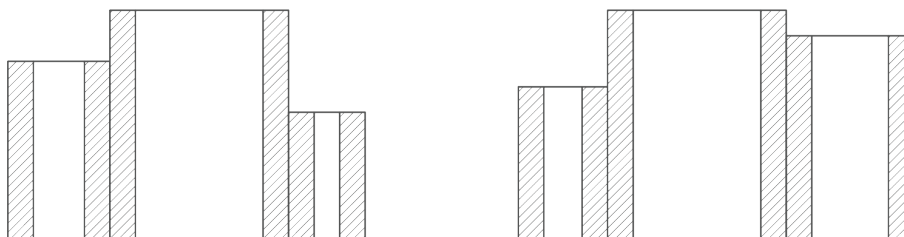
*Plan*



*Elevation*

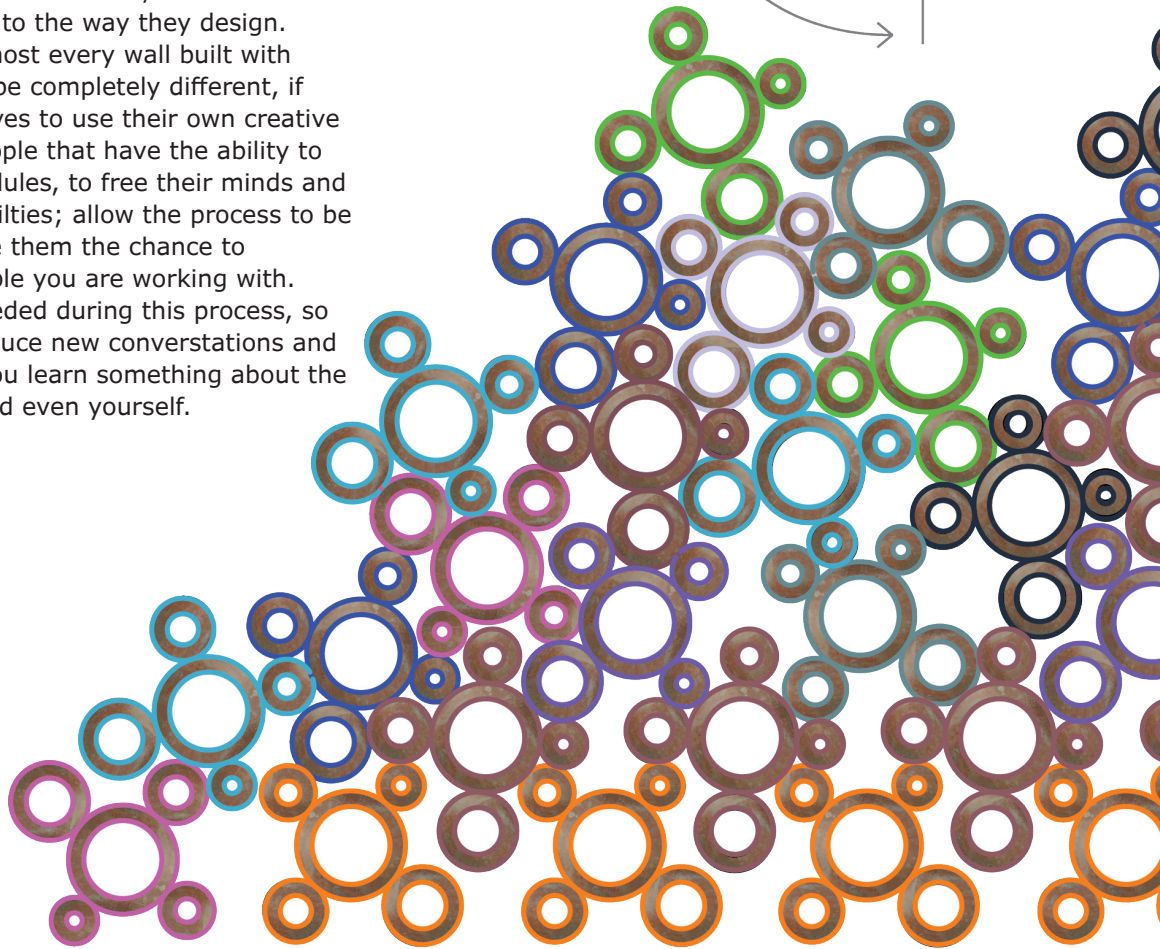
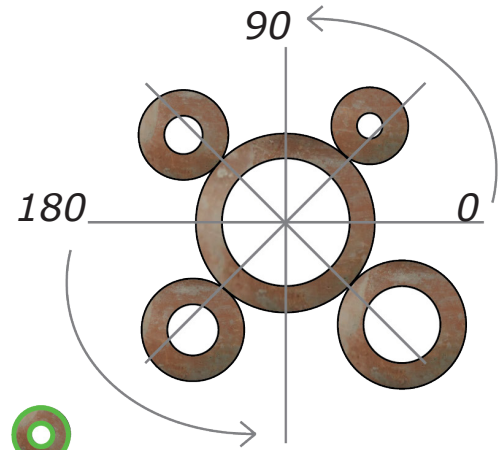


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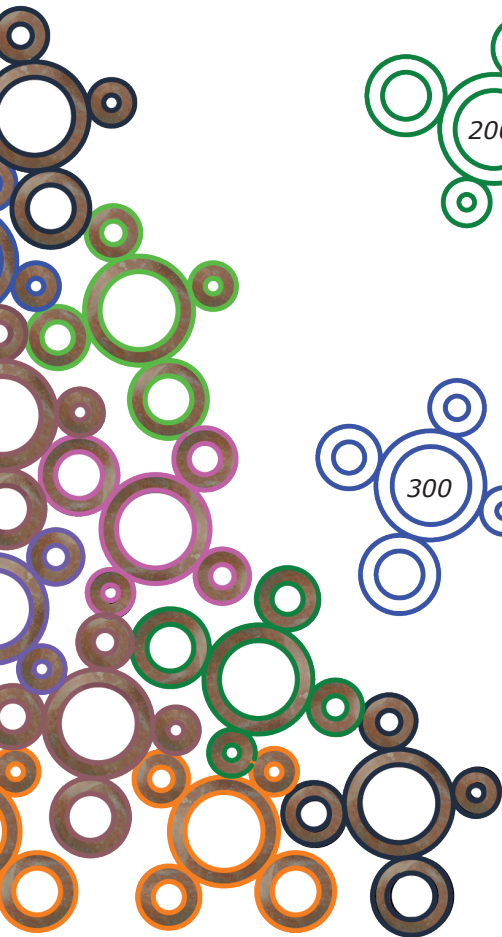
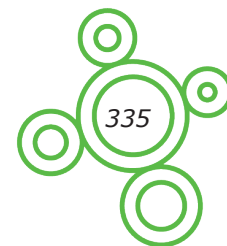
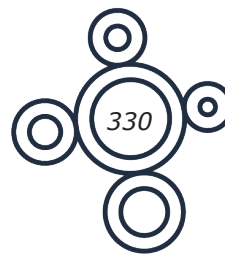
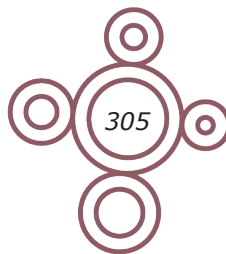
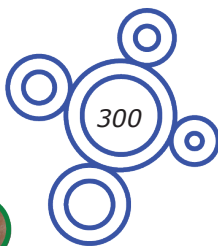
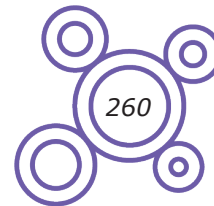
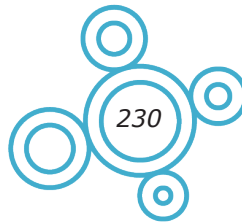
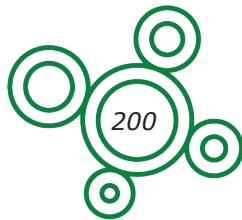
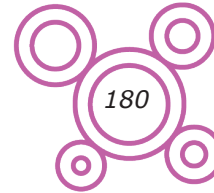
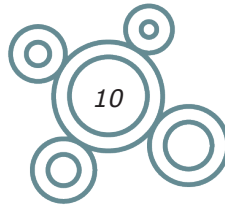
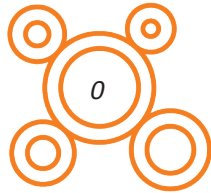


## Puzzle Rotation Possibilities

With the module being made from cylinders, and attaching at each others tangencies, there are so many possible ways they can be arranged. It is endless, from 0-360 degrees, the modules can connect; the piece you lay down first is the determining factor for what is going to happen with the next module. I wanted there to be a wide variety of options so the user and/or builder can add personal touches to the way they design. With this in mind, almost every wall built with these modules could be completely different, if people allow themselves to use their own creative minds. I want the people that have the ability to install the screen modules, to free their minds and be open to the possibilities; allow the process to be fun, mindful, and give them the chance to connect with the people you are working with. Communication is needed during this process, so hopefully it can introduce new conversations and connection, and let you learn something about the people around you and even yourself.



## Degrees Rotated Key



Only some examples of possible rotations





# Module in Place

## *In Action*

Now that we know how to build the module, everything it entails and the endless possibilities, lets look at it a bit closer in detail and in some of the possible contexts it could be in. These modules are meant to be installed in any context, whether it is outside, indoors, a thermal barrier, divider of spaces, or really anything else. Screens like this are typically seen in Temperate, dry, or tropical climates, as I have talked about before while covering sustainability, but in my case I hope that it would be able to go beyond those climates, especially if they have the ability to be used indoors.

When in Action, the shadows are the real show. With the different rotations of the module, and depending on the angle the wall is placed in, the shadows should induce dappled like patterns. With the sun angle changing with the time and seasons, the shadows will change and warp with the way the earth rotates, the type of weather, and the strength of the direct light that is available. At each location there will be different combinations of shadows, and that is the beauty of the modules and the personal touch people have on the walls they design.

Once in place, the screen wall system is meant to create a space for people to pause, be in the *here and now*, and live in the moment with either yourself or with the people you surround yourself with. Manifesting Nature with the simulated dappled light should help people connect with nature and find the beauty in the wall they designed, and be able to enjoy these types of experiences as many times as possible.

*Unfired Modules*





















*Fired Modules*























Scale Reference  
5'2" Woman Hand



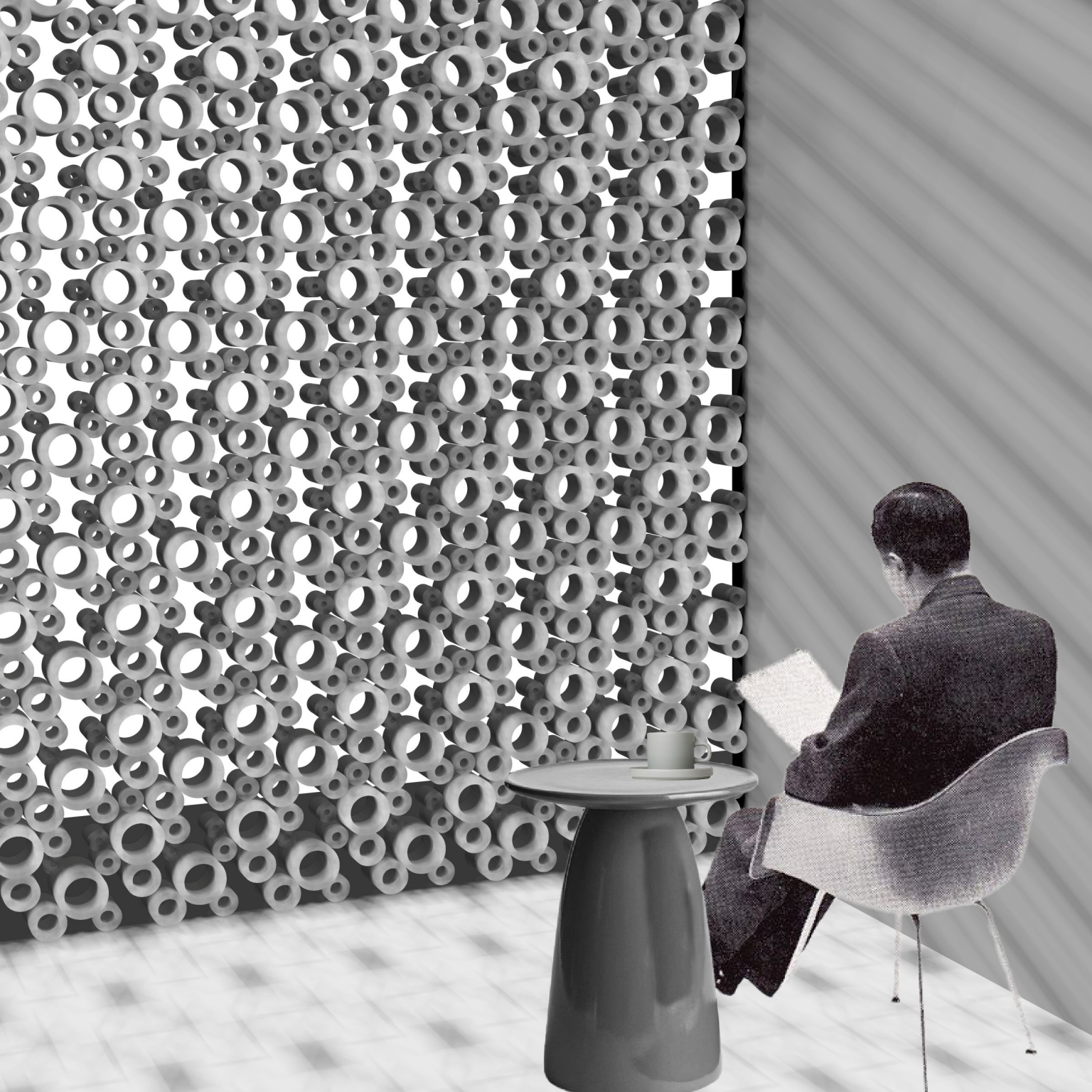


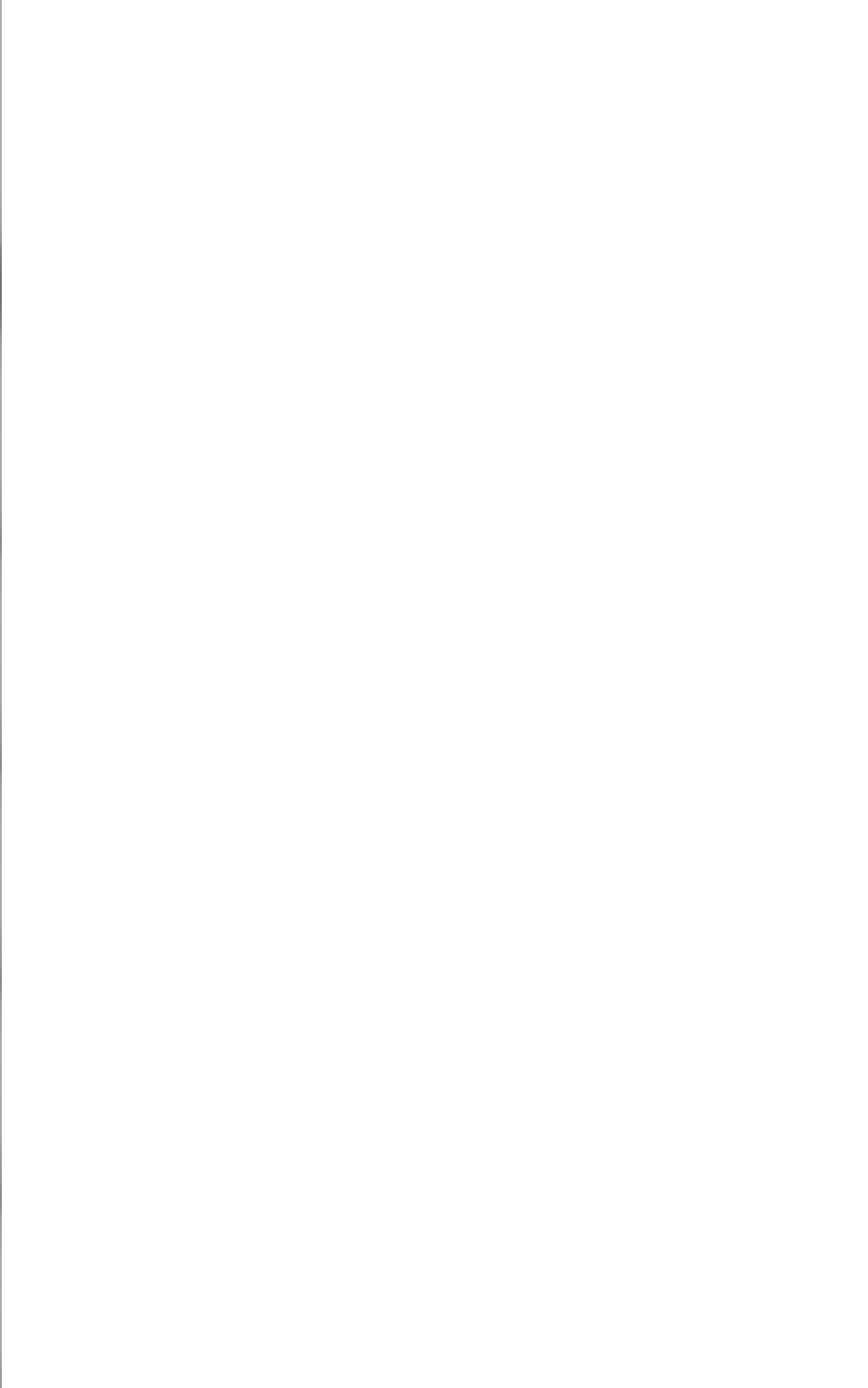
Artificial Light



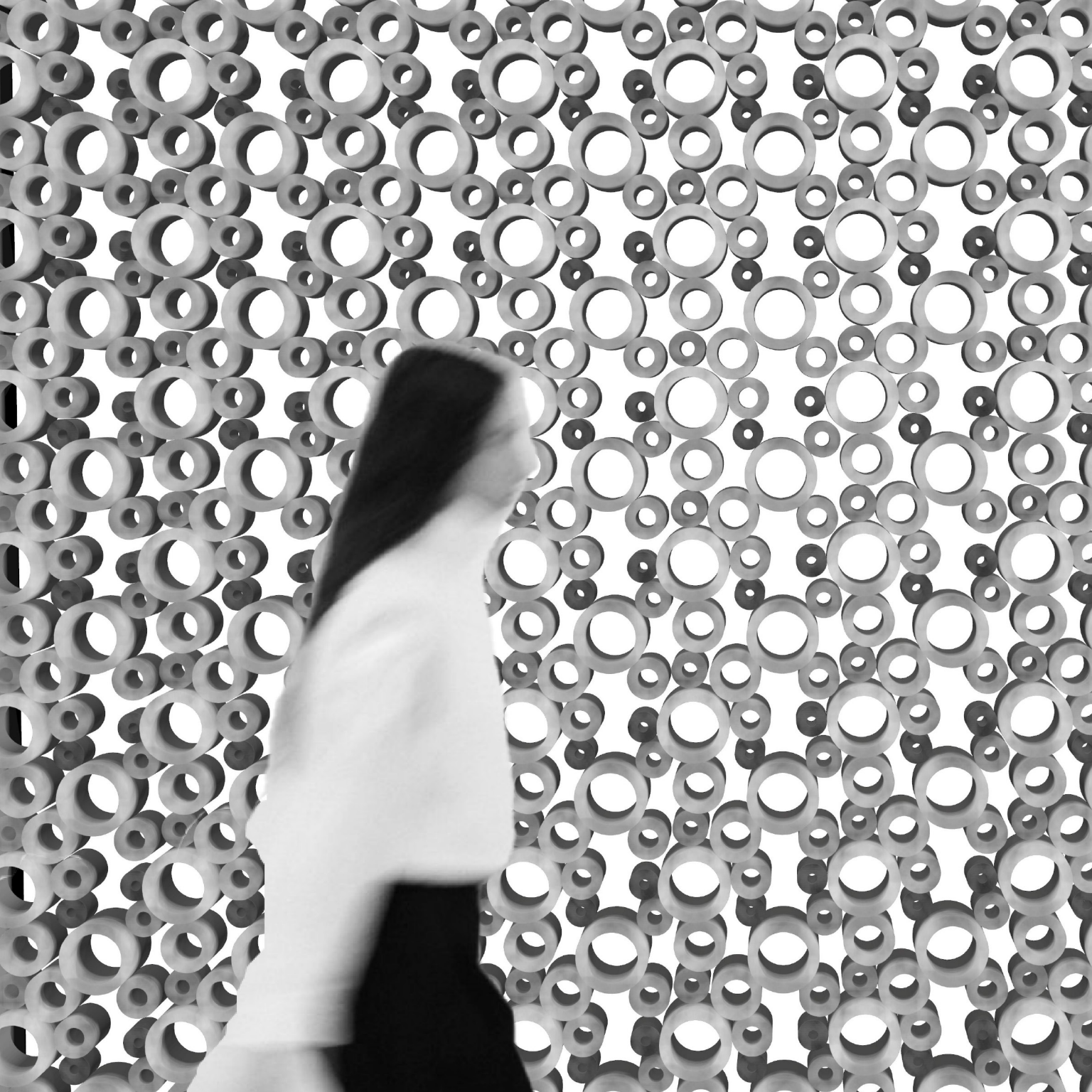
Natural Light

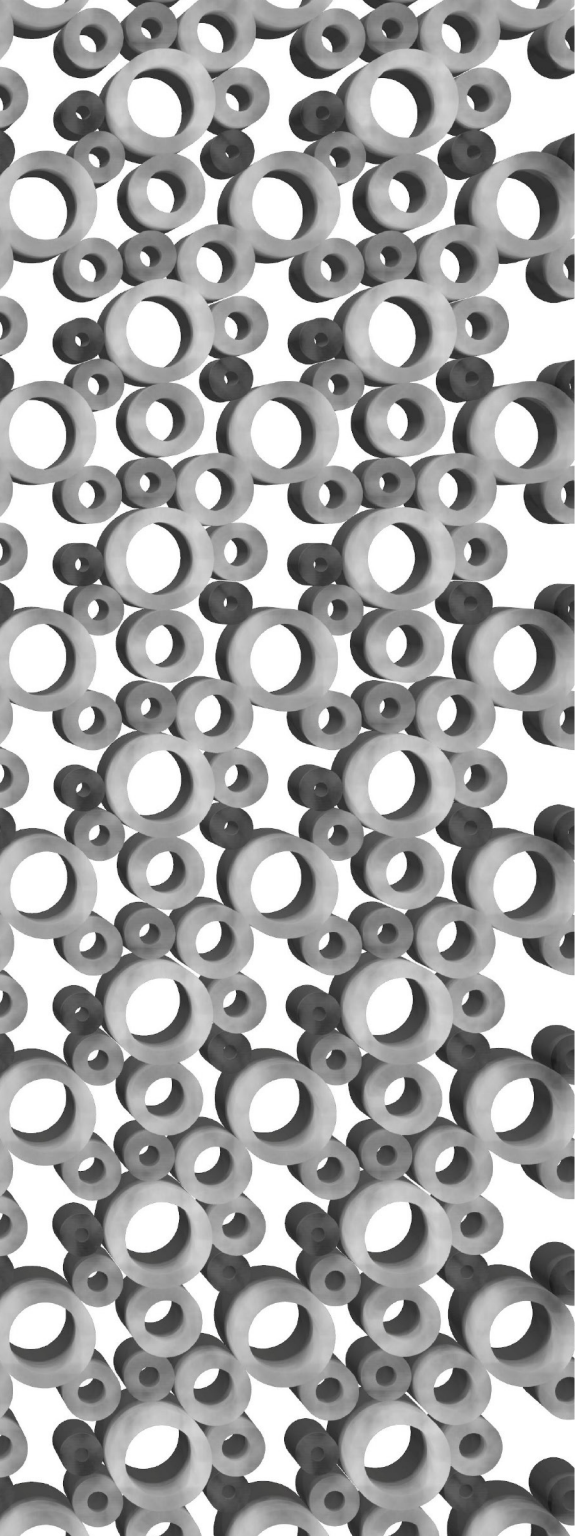












## References

Andrade, F.A., H.A. Al-Qureshi, and D. Hotza. "Measuring the Plasticity of Clays: A Review." *Applied Clay Science*, November 3, 2010. <https://www.sciencedirect.com/science/article/pii/S0169131710003601#:~:text=The%20plasticity%20of%20clays%20is,the%20nature%20of%20the%20clay.>

Anthology, The Art. "Tara Donovan: Clouds of Styrofoam." *Medium*, March 2, 2023. [https://medium.com/@The\\_art\\_anthology/tara-donovan-clouds-of-styrofoam-d1c186d22c3e](https://medium.com/@The_art_anthology/tara-donovan-clouds-of-styrofoam-d1c186d22c3e)

Bhoot, Mrinmayee. "Pao Hui Kao Balances Fragility and Sturdiness by Using Paper as a Medium." *STIRpad*, January 23, 2024. <https://www.stirpad.com/news/stir-news/pao-hui-kao-balances-fragility-and-sturdiness-by-using-paper-as-a-medium/>

Block, India. "Eight Key Projects by Christo and Jeanne Claude." *Dezeen*, February 21, 2022. <https://www.dezeen.com/2020/06/01/christo-jeanne-claude-seven-key-projects-installations-design/>

Hinton, Jack. "The Design Alchemy of Ronan and Erwan Bouroullec." *PMA Stories*, November 22, 2021. <https://blog.philamuseum.org/design-alchemy-ronan-erwan-bouroullec/>

Hughes, Dana Tomić. "Bricks Decoded: Easy, Breezy, Beautiful Breeze Block." *Yellowtrace*, November 23, 2020. <https://www.yellowtrace.com.au/breeze-block-architecture-trend/>

Lupton, Ellen, and Andrea Lipps. *The Senses: Design beyond Vision*. Princeton Architectural Press, 2018.

Miller, Francine Koslow. "Tara Donovan." *Artforum*, November 25, 2008. <https://www.artforum.com/events/tara-donovan-2-186509/>

MoMA. "Artists | Moma." MoMA. Accessed February 6, 2024. <https://www.moma.org/artists/>

Niyomukiza, John Bosco, Joseph Akampulira, Paul Tiboti, Moses Kiwanuka, and Karen Cathy Nabitaka. "Enhancing Properties of Unfired Clay Bricks Using Palm Fronds and Palm Seeds." *Results in Engineering*, September 9, 2022. <https://www.sciencedirect.com/science/article/pii/S2590123022003024#:~:text=Palm%20fronds%20and%20palms%20seeds,results%20of%20unfired%20clay%20bricks.>

Otto, Frei, Bodo Rasch, and Sabine Schanz. *Frei Otto, Bodo Rasch: Finding form: Towards an architecture of the minimal: The Werkbund shows Frei Otto, Frei Otto shows Bodo Rasch: Exhibition in the villa stuck, Munich, on the occasion of the award of the 1992 Deutscher Werkbund Bayern Prize to Frei Otto und Bodo Rasch*. Stuttgart: Axel Menges, 1995.

Otto, Frei, et al. *Frei Otto, Bodo Rasch: Finding Form: Towards an Architecture of the Minimal*. Axel Menges, 2006.

Otto, Frei. *Pneu Und Knochen = Pneu and Bone*. Vol. 35, *Inst. f. Leichte Flächentragwerke*, 1995.

Tomlow, Jos. II34: Das Modell: Antoni Gaudis Hängemodell Und Seine Rekonstruktion - Neue Erkenntnisse Zum Entwurf Für Die Kirche Der colonia Güell = the Model: Antoni Gaudi's Hanging Model and Its Reconstruction - New Light on the Design of the Church of Colonia Güell. Vol. 34, Institut Für Leichte Flächentragwerke, 1989.

Slater, Saskia. "Your Guide to Breeze Blocks." SABdrain, July 17, 2023. <https://sabdrain.com.au/your-guide-to-breeze-blocks/>

Tufte, Edward. "Edward Tufte Forum: Dappled Light." Edward Tufte Forum: Dappled light. Accessed February 5, 2024. [https://www.edwardtufte.com/bboard/q-and-a-fetch-msg?msg\\_id=0002pS](https://www.edwardtufte.com/bboard/q-and-a-fetch-msg?msg_id=0002pS)