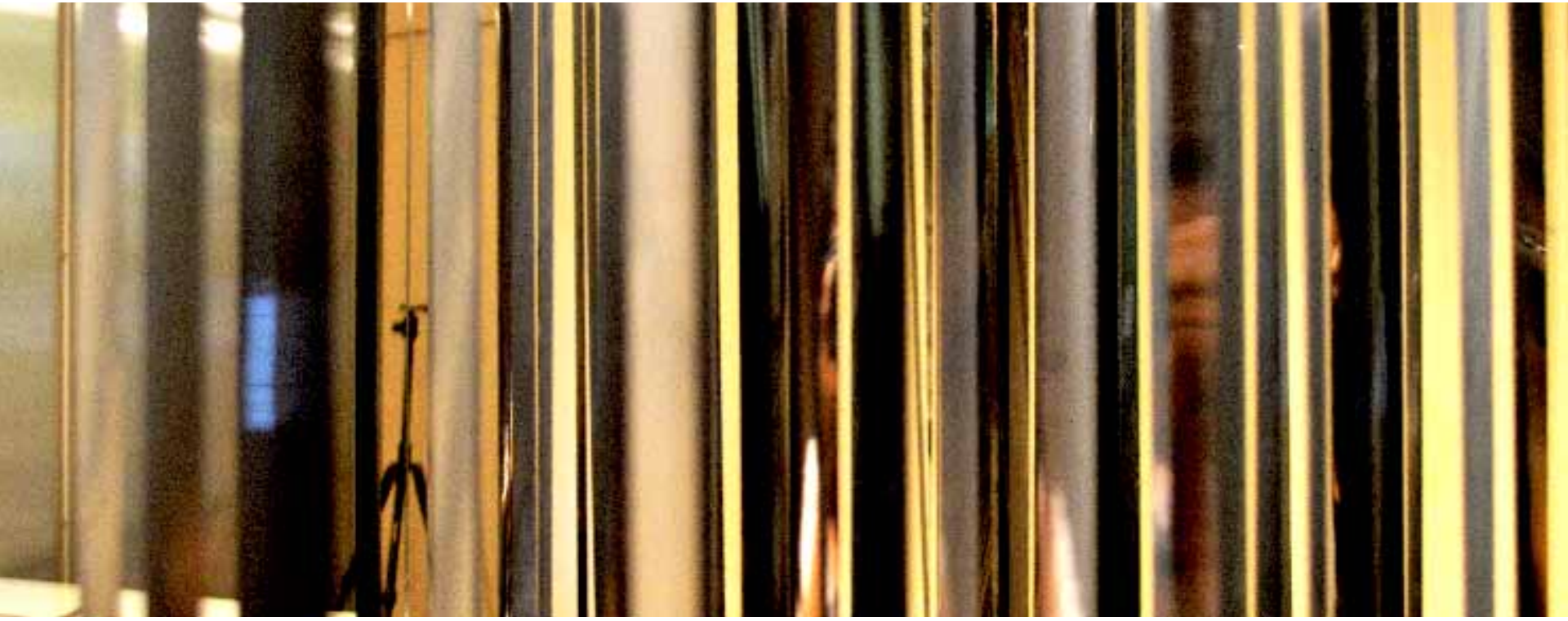

PERCEPTUAL INTERACTION

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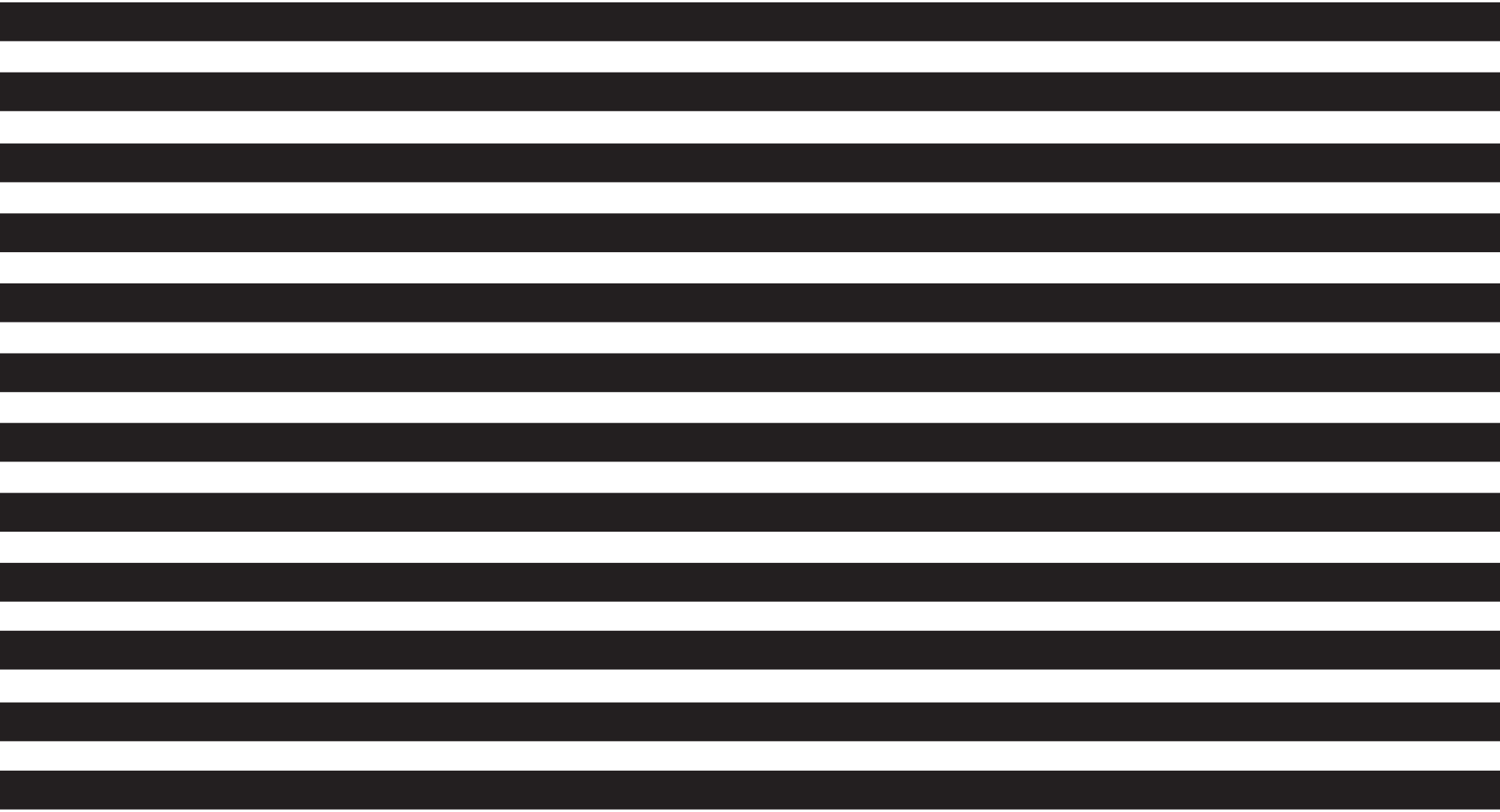
“Space remains in oblivion without light. Light’s shadow and shade, its different sources, its opacity, transparency, translucency, and conditions of reflection and refraction intertwine to define or redefine space. Light subjects space to uncertainty, forming a kind of tentative bridge through fields of experience.”

Steven Hall



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Abstract

Architecture is designed to be experienced in a predesigned way where the architect uses a combination of materials and lighting to achieve an experience. Much of a space's characteristics—regardless of what sense they might invoke—hinge on materiality, and that materiality relies heavily on lighting to express itself. The expression of said materiality relies more on its surface qualites than what material is being used because it will ultimately either reflect, refract, or absorb light. Chiaroscuro fuels the existence of light since without darkness light would not exist; together the presence or absence of light reveal a given material's surface qualities. The importance of having both is often taken for granted because society has developed an addiction to light; one that has allowed for an almost complete elimination of the darkness that cripples humanity's most essential sense: sight. Artificial lighting was introduced to feed that addiction and though it gives way to a plethora of possibilities in the field of architecture, people take comfort in a uniformity of light which often times leaves spaces with the look and feel of an overcast day; void of any drama or point of interest. There are few like artist Olafur Eliasson who use lighting to change the way one would normally experience spaces by experimenting with the bending of perception. This thesis explores the perception of space through the interaction of light, material, and viewer.

Photograph by author

Light and Perception

"To create space in architecture is nothing more than to concentrate and refine light."

Tadao Ando

Space is nothing more than a combination of forms with different dimensions and surfaces all of which owe their existence to light. Without light there would be nothing to contrast darkness, thereby rendering everything unreadable to the eye. It is the visual contrast of light and darkness that allows everything from texture to form to be revealed. Shadows in particular play an important role, since they allow for the perception of the direction, intensity, and the movement of light. Shadows have the ability to change how a space is perceived through constant movement. A chapel, for intance, lit only by glowing candles is cast in dancing shadows that transform the chapel every time they shift. The chapel itself ovbiously remains the same, yet it is one's perception of it that has changed with the movement of the shadows. Though light and shadow greatly impact the experience of a space, they rely heavily on how it is perceived, placing great importance on perception itself.[3]

Human beings are fragile creatures that can easily find themselves in perilous situations and as such rely heavily on environmental cues to avoid said risk. Elements within the environment that provide visual information that is needed to accomplish a task or satisfy a biological need, are also given visual priority; if something does not provide any useful visual information, it is ignored. Depending on a

person's present activity, he can shut out his environment and focus solely on the element or small group of elements that best aide in accomplishing said task or biological need. Attention will shift once the need has been satisfied or task accomplished.

According to Gestalt Theory, one's environment is viewed as many individual parts that make up a whole. The reason for this can be understood by examining first how perception works.

The retina receives sensory information which is then relayed to the brain for processing. Next, the data is classified and given meaning, allowing it to be sorted and stored according to that meaning. Sorted information is hereafter seen as "past experience". Any new information is always filtered in case it can be classified within the library of past experiences.[2]

The brain is only able to process up to a certain level of visual complexity after which objects will be simplified in order to be processed faster. Objects can either be broken down into their less complex components, or in the case of groupings of objects, the group will be processed first and then broken down into individual objects. For example, a group of square shapes might be hard to read if scattered across a table at random, therefore taking the brain longer to process, yet if the squares were to be arranged to form a larger square, processing time is decreased. [Fig.1]

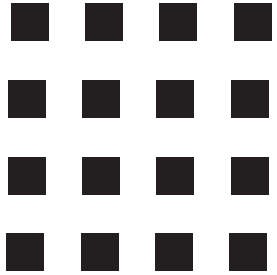


Fig. 1

There are three main parts to perception that happen alongside the general input, storage, and processing of sensory information. The attributive phase is responsible for linking the information to past

Fig. 1: Author graphic

experiences which activate any expectations regarding the object in question. Expectations that are triggered in this first phase become the second part of perception, they determine what attribute might follow based again on past experience. The next part of perception is the affective phase which determines how important the attribute is and whether there will be a specific emotional reaction based on past experience with the object itself or something relating to that object.[2]

Each piece of sensory information can have billions of associations if viewed in a vacuum, yet when linked into certain combinations, those associations are narrowed down, allowing for the identification of specific objects, spaces, and persons. Once an individual identifies a combination of stimuli as, say a tree he's faced with several factors that further affect that perception; the most influential being his current physical or emotional state, expectations based on past experience, and the current environment he finds himself in. For example, as a human being this individual has more than likely encountered trees before and will expect the current tree to assimilate to his idea of what a tree should be. This particular tree happens to be in the individual's favorite park, a familiar environment that has an effect on his emotional state—comfort, security—which in turn affects his perception of the tree. In this way expectations set in motion a cycle of relationships that ultimately affect perceptual experience, or experience based on the perceptions of objects, spaces, or persons.

This can be applied directly to the perception of light:
Having experienced the phenomena of light since birth, human beings become accustomed to its patterns of behavior and any deviance from this would become disorienting. The sun follows a constant rise and set cycle which has allowed the prediction of its position in the sky and intensity at certain times of the day, such as its highest point being at noon and its lowest at midnight. Naturally this means that it will seem brightest at noon, and darkest at midnight, depending on geographical location and time of the

1. Binet, Hélène, Roberto Casati, Werner Oechslin, and Tadao Andō. Das Geheimnis Des Schattens: Licht Und Schatten in Der Architektur = The Secret of the Shadow : Light and Shadow in Architecture. Tübingen: E. Wasmuth, 2002. Print.
2. Lam, William M. C. Perception and Lighting as Formgivers for Architecture. New York: McGraw-Hill, 1977. Print.

year. Due to this fact, iregardless of the illumination level indoors, one perceives brighter outdoors during the day and brighter indoors during the night.[3] [Fig. 2 & 3]

Top- Fig. 2
Bottom-Fig. 3

Being deprived of any expected sensory information is never preferred since it could block information that could be crucial to survival. For instance, a window implies a view, yet when the window exists without the view, such as one with pebbled glass, it can once again be disorienting. If the window were to continue not to have a view but were to have a specific purpose for doing so—such as stained glass—then it would be more acceptable.

The expectation that one will perceive something that then in turn is not perceived is similar to when the movement of shadows altered the perception of the chapel. There are two possible ways where this could occur. The first being a physical alteration done to a space which one frequents often and therefore has an expectation of what that space will look like based on having previously experienced it.

Fig. 2: Fort Worth Museum
http://www.arcspace.com/features/tadao-ando/the-modern-art-museum-of-fort-worth/

Fig. 3: House of !5 Patios, Legorreta, Mexico City, Mexico
http://legorretalegorreta.com/en/area-principal-legorreta/casa-de-los-15-patios/

The second involves a preconceived notion of what a space will look like before having actually experienced it, which will likely be different than what will be experienced when one actually visits that space, therefore altering the perception of the space.

This second notion relates directly to the perception of the pebbled and stained glass windows. Regardless of having been in that space before all human beings have a set of preconceived notions that were logged in the brain when a window was first encountered, which allow them to recognize their properties. So when one happens upon a window several things must happen before any differences are even noticed, all of which happen in a split second. First the brain must run through the list of characteristics that would identify this object as a window, such as it being made up of several or a single pane of glass, framed by mullions, providing a view, etc. Once all of these things have been identified, in the order that allows the brain to do so the quickest, the thing that has been altered—such as the pebbled glass—stops the process, which allows this irregular perception to then be processed. The next process is simply an evaluation of whether this alteration in perception has changed the perception for better or worse, determining whether there will be a positive or negative reaction from the viewer. When dealing with the perception of an entire space, like the chapel altered by shadows, the reaction might involve curiosity, if a space that was in shadow is suddenly illuminated, or fear, if the shadows take on somewhat sinister shapes.[3]

Fig. 4

Fig. 4: Notre Dame du Haut, Le Corbusier, Ronchamp, France
http://www.greatbuildings.com/buildings/Notre_Dame_du_Haut.html

3. Major, Mark, Jonathan Speirs, and Anthony Tischhauser. Made of Light: The Art of Light and Architecture. Basel: Birkhäuser, 2005. Print.

Looking again at the perception of a window, other things besides the type of glass that is utilized can change the perception of not only the window itself but of the view out of it. An obvious example would be the view out of a barred window versus the view out of a window with no bars or mullions. The act of framing a view or object itself, also alters perception. Cropping a picture to show one specific part, results in the creation of a completely new picture since it is perceived as such. When the original and the cropped images are shown next to one another, they might be perceived as the same or very similar, depending on what was cropped yet it doesn't change the fact that the original has been altered and is therefore perceived differently than the cropped image. When perception has been altered any previous expectations about that perception change to suit the new perception.[6]

Changes are picked up quickly since the eye is always scanning for new stimuli. It is the peripheral vision that is charged with this task while the central vision is focused something specific. This is again owing to a biological need to be aware of the environment; should there be stimuli that immediately demands the central vision's attention, the peripheral vision will make sure it is not overlooked. It is for this reason that things that hold some interest, satisfy a biological need, or are visually appealing tend to be viewed longer than those that lack visual interest, don't satisfy any needs, or are visually unappealing. Perception of a space can then change according to what is focused on. Focus can be affected by the three parts of the process of perception previously discussed: attributive, expectative, and affective.

In addition to focus, there are several other factors that affect visual perception, the most important being the characteristics of the objects in question. These characteristics include form, texture, color, and contrast which are all affected by the optical size of the object. The way light interacts with an object and its characteristics also directly affect how it is perceived. For example, color perception depends on the spectral qualities of light, and the perception of

form and texture depend on the direction and relative concentration of light.

Type of lighting is also important since type affect how the light will behave. There are four factors that affect the perception of different types of light sources. [1.] The source type itself determines the intensity, directional characteristics, and color of the light. Which is why, for example, point sources disperse light in more or less all directions, and line source light is dispersed in a cylindrical fashion. {2.} The shape and size of the source affects how the light will react with the receiver or receiving surface. [3.] The type of receiving surface [i.e., opaque, transparent, or transluscent.] will allow light to reflect, will redirect, or absorb the light that interacts with it. [4.] The last factor that affects perception is the observer himself: their height in relation to the views they are perceiving, whether or not they are moving, their emotional state at the time of observation, and the viewer's age and health of their eyes amongst other things.

Contrast sensitivity is also important in visual perception since it is contrast of light and dark that allow us to see. The more contrast there is, the less the contrast sensitivity required for the perception of a given visual task. There are times when form is only visible with the right amount of contrast, while others require next to no contrast, revealing themselves in silhouette. A certain amount of contrast can even allow light to dematerialize the form of an object or space. As Millet stated in *Light Revealing Architecture*, "we see by contrast, we live by contrast, and we are aware of qualities only through their opposites" (Millet, 1)[4]

The material of an object is almost as important in visual perception as the light source itself. Since light is immaterail and needs to interact with material to be seen. The type of material and its properties are almost more crucial than the form of the object itself. Materials with glossy finishes will cause light to reflect in the opposite direction that the light hits it, while materials with matte surfaces will diffuse in all directions. Glossy surfaces reflect, while

4. Millet, Marietta S., and Catherine Jean. Barrett. Light Revealing Architecture. New York: Van Nostrand Reinhold, 1996. Print.

5. Michel, Lou. Light: The Shape of Space. New York: Van Nostrand Reinhold, 1996. Print.

matte and rough surfaces may reflect only a portion of the light that hit them. There are also transparent and translucent materials, which allow some light through and reflect the rest. The more light that is allowed through a surface, the more transparent the material, and vice versa, the more light reflected off the surface, the more translucent it becomes.[5] [Fig. 5]

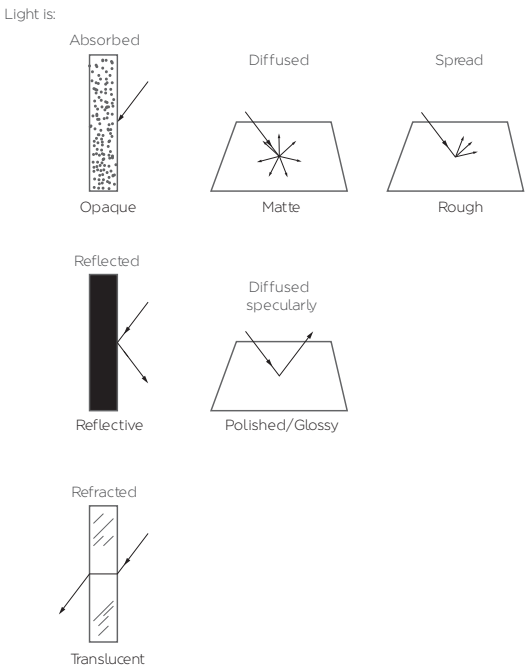


Fig. 5

It is this interaction with light and how it is perceived that I have particular interest with. Keeping in mind the importance of this interaction, I began compiling several case studies in which the experience and perception of a space is dependent on its materiality and lighting. Throughout this process the typology changed from architectural projects to installations of various size since it became apparent that through installations it would become a lot easier to study and manipulate the perception of spaces. Of the thirty or so installations that were compiled, a few resonated due to their interactive nature and ability to demonstrate the manipulation of perception through use of reflection, refraction, and absorption of light.

I first looked at the Reichstag Dome by Norman Foster, which is situated atop the German Parliament Building in Berlin. As visitors ascend the dome's spiraling ramp, they must choose to focus on one of two differing perspectives of the city: the one reflecting off its central sculpture or the view out the dome's glass façade.

Fig. 3: Author graphic

6. Neumann, Dietrich, and Kermit Swiler. Champa. Architecture of the Night: The Illuminated Building. Munich: Prestel, 2002. Print.

Left- Fig. 6
Right- Fig. 7

The sculpture ultimately dissolves the surrounding space into an incomprehensible collage of reflections, creating a multitude of perceptions. [Fig. 6 & 7]

Next I came across Incandescent Cloud, one in a series of mobile installations made entirely out of incandescent light bulbs. Individuals can choose to turn a bulb either on or off, yet they can't control which bulbs others will choose to manipulate. Those engaging with the Cloud watch the bulbs turn on and off from up close, which limits their visual window to a smaller area, whereas

Fig. 6 & 7: Reichstag Dome, Norman Foster, Berlin, Germany
http://www.fosterandpartners.com/projects/reichstag-new-german-parliament/

inactive observers are able to view the entire Cloud, maximizing its effect as parts of it sporadically turn on and off. [Fig. 8 & 9]

Agua or water is an installation designed to act as a liquid mirror. It is composed of 45 mirrored plaques that react to people's weight and position thereby distorting their projected shadows on the wall and ceiling. The installation is meant to simulate the play between light and water while it is in motion. [Fig. 10 & 11]

James Turrell's Aten Reign occupies the Rotunda of the Guggenheim museum in New York. The installation consists of a series of elliptical rings that symbolize the Earth with each ring supporting a band of white light which casts a glow around it. The intent of the installation was to direct people's attention toward the rings and away from the enclosure of the museum which due to its design tends to command attention. By dissolving the idea of enclosure, visitors can focus on internal contemplations as they are soothed into meditation by the installation's slowly shifting colors. [Fig. 12]

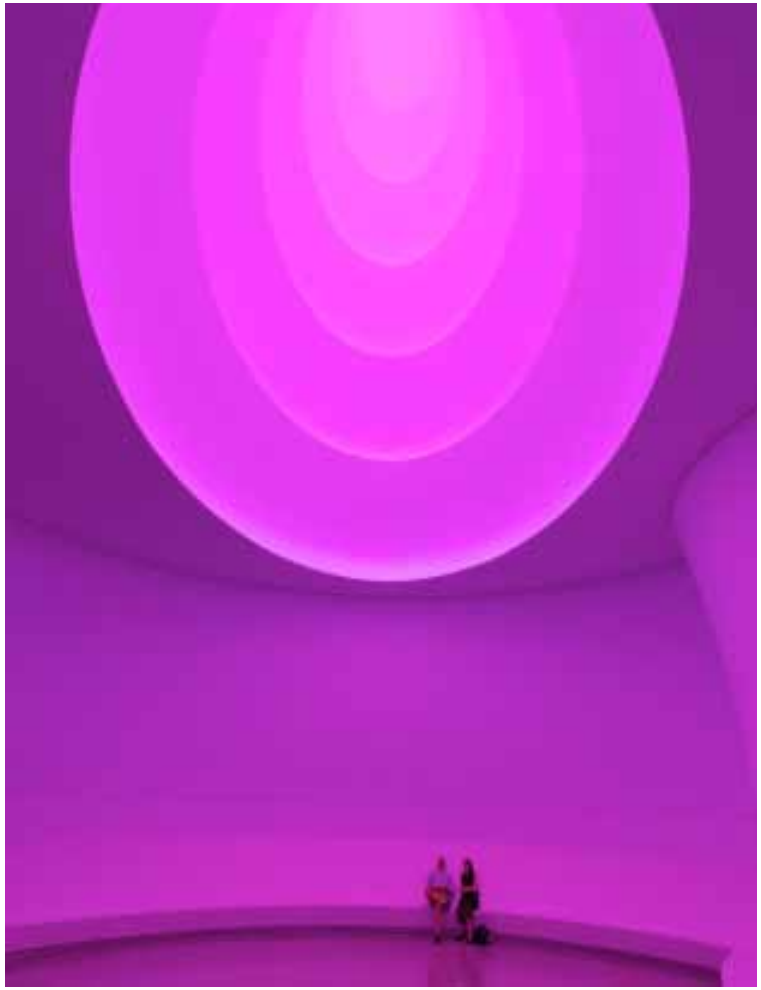
Top- Fig. 8
Bottom- Fig. 9

Fig. 8 & 9: Incandescent Cloud, Caitlind r.c. Brown & Wayne Garrett, Canada
http://www.thisiscolossal.com/2012/09/an-interactive-cloud-made-of-6000-lightbulbs/

Fig. 10 & 11: Agua, Cantoni & Crescenti
http://www.cantoni-crescenti.com.br/water-images/single-gallery/10313599

Top Left- Fig. 10
Bottom Left- Fig. 11
Right- Fig. 12

Fig. 12: Agua, Cantoni & Crescenti
http://www.cantoni-crescenti.com.br/water-images/single-gallery/10313599



The next installation consists of a long tunnel filled with thick fog which reduces vision to only a couple of feet, deeming it worthy of its name, Your Blind Movement. The installation forces its visitors to make use of their other senses to safely meander through the space, being able to hear other people approaching before they appear out of the fog becomes suddenly more important than being able to see clearly; touch is essential in avoiding collisions with the walls and making sure the floor is at a consistent level. [Fig. 13 & 14]

Fig. 13

Your Rainbow Panorama, like Your Blind Movement, is another installation by Olafur Eliasson; it is essentially a circular walkway clad in colored glass that mimics the colors in a rainbow. Eliasson's intent was to change a person's perspective of Aarhus, Denmark by casting it in quite literally a new light. As people cross the threshold between colors, there is an initial afterimage in the complimentary. [Fig. 15 & 16]

Fig. 13 & 14: Your Blind Movement, Olafur Eliasson
http://www.olafureliasson.net/publications/your_blind_movement.html

Fig. 15 & 16: Your Rainbow Panorama, Olafur Eliasson
http://www.olafureliasson.net/publications/your_rainbow_panorama.html

Fig. 14 My last case study is Unwoven Light, an installation by artist Soo Sunny Park. It is made up of a chain link skeleton with plexiglass squares woven into its openings. One side of the plexiglass pieces is covered in a dichroic film which allows certain colors to filter through it and reflects others. As light hits it at varying angles throughout the day, the sculpture casts multicolored shadows onto the ceiling, walls, and floor which interact with one another, the space, and its inhabitants. [Fig. 17, 18, 19]

Fig. 15

Fig. 16

Top Left- Fig. 17
Top Right- Fig. 18
Bottom- Fig. 19

Fig. 17, 18, 19: Unwoven Light, Soo Sunny Park, Houston, Texas
http://www.thisiscolossal.com/2013/05/soo-sunny-parks-unwoven-light-documented-by-walley-films/

Photograph by author

Installation Studies 1

`From a combination of my case studies and research, I derived a set of conclusions. That reflections, refractions, and absorptions paired with the surface qualities of materials are crucial to the contextual interaction of light. The physical or emotional state of an individual, his current environment, and his expectations based on previous experience will influence his perception of a given space. Materiality and light can in fact be manipulated to create more individualized experiences, and finally, that translucent and reflective materials might be more suitable to manipulating the perception of light.

While keeping in mind the underlying issues of spatial perception and interaction of light, I chose to move forward with a series of installations aimed at exploring these notions as well as the implications of these initial conclusions.

I chose first to study the interaction of light with translucent material and hoped that through interaction with the material people would in turn begin to interact with light as well. The installation consisted of several empty water bottles divided into pairs and strung together by the caps; these were placed on a string stretching the length between two columns framing a sunken lounge space (the Pit). If one bottle was pulled down, its partner would follow suit and rise upward. I then projected slides towards the installation to allow a more focused interaction of light. While the projections did result in an interesting interaction between bottle and light, the study was unsuccessful in prompting interaction since people are familiar with bottles to the point of ignoring them in addition to being unsure of whether they should be touching the installation. Also, the installation was on the periphery of a hallway and though it might

Top- Fig. 20
Bottom- Fig. 21
Right- Fig. 22

Fig. 20 & 21: Bottle Installaltion
Work and photographs by author

Fig. 22: Mylar Squares
Work and photographs by author

catch people's attention, it required them to go out of their way to interact with it. [Fig. 20 & 21]

My second set of studies focused on reflective material in the form of sheet mylar. My hope was that by using an unconventional material in a simpler state I would eliminate any expectation in terms of its properties or usage, thus spurring more curiosity from the observer and in turn more interaction. [Fig. 22]

The first of these reflective studies consisted of several 2 by 2 squares strung together in strands. These strands were hung in the same location as the first installation to test how much impact the space really had on viewer perception and interaction. Additional light was introduced and was cast upward towards the strands, acting as a spotlight and turning them into a focal point when the hallway lights were extinguished. The strands were constantly in motion, casting reflections about the space. This study was also later tested in a more enclosed environment utilizing only natural lighting. {Fig. 23 & 24]

The iteration with natural light created a more dynamic experience, partly owing to a more defined enclosure on which its effects could be viewed yet it still failed to physically engage individuals. In both cases—natural and artificial lighting—the placement of the installation within the space still failed to spur too much interest. Though the installation yielded little physical interaction with the viewer, reflections gave way to a passive interaction where the viewer's perceptual experience was swayed not by physical interaction but rather by the viewing of a fragmented distortion of the surrounding space. This spatial distortion informed the second half of these studies, bringing the interaction of viewer and light to center stage. {Fig. 25, 26, 27]

The goal was to study the effects of the fragmentation and distortion of space on perceptual experience at a larger scale. I created a large reflective rectangle composed again of mylar squares. Overall it was

made up of some 25 horizontal rows and 13 vertical ones. Due to lack of time only the vertical rows were fully completed and only two horizontal rows on each end and two in the center of the rectangle were completed. This unintentionally allowed more flexibility in movement which was ideal for this study. After hanging one corner, the sheet naturally curled in on itself, creating a pirouetting form that I decided might yield better results than a rectangular sheet of mylar squares. [Fig. 28, 29, 30]

Keeping in mind the recurring need to facilitate viewer/installation interaction, it was installed in the middle of the hallway with light shining down on it from above as well as from one side. The effect was similar to that of a disco ball which shoots dancing reflections in all directions with a bright glow outlining its contours.

As with the Reflector Strands, this study was repeated with natural light, this time above the landing of a staircase. In both iterations, this installation forced a physical interaction with the viewer, since each was placed in the middle of circulation paths. The one in the hallway was more subtle as it was at a height where collisions were more easily avoided, as well as being visible from both ends of the hallway. The second one however, hung much lower and due to its location was harder to spot at a distance, making it easier for people to absent-mindedly collide with it. [Fig. 31 & 32]

The most obvious observation to take from this iteration was: that the bigger the scale of the reflector, the greater its interaction with light. The novelty of an object in a space, though important in capturing the attention of viewers must be acknowledged before being experienced in order to avoid forced interactions. When a viewer has formed expectations of a given environment based on routine experience of that space, a forced interaction is easily achieved with a drastic enough interjection. Forced interactions hold no real value in terms of perceptual experience as they tend to happen when the viewer is in the middle of completing a task and therefore only experienced as a passing annoyance; the interaction

Fig. 23 & 24: Reflector Strand Installation-Artificial Light Study
Work and photographs by author

Fig. 25

Fig. 26

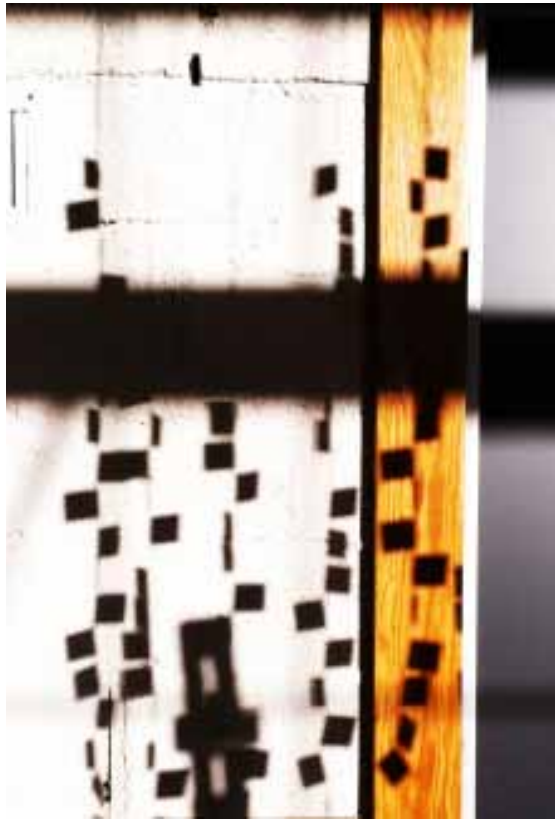


Fig. 27

Fig. 25 & 26: Reflector Strand Installation-Natural Light Study
Work and photographs by author

Fig. 27: Shadow cast by Strand Installation
Work and photographs by author

Fig. 28

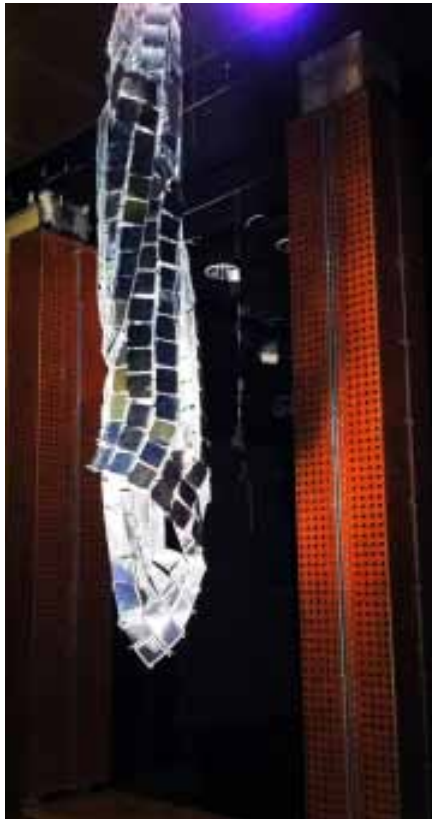


Fig. 29

Fig. 30

Fig. 28: Process shot of Reflector Sheet Installation
Work and photographs by author

Fig. 29 & 30: Reflector Sheet Installation and its interaction with surrounding materials
Work and photographs by author

Left- Fig. 31
Right- Fig. 32

Fig. 31: Reflector Sheet Installation-Natural Light Study
Work and photographs by author

Fig. 32: Inside view of installation
Work and photographs by author

here falls victim to the negative effect of the three perceptual influences previously discussed.

The next study continued with the study of perceptual distortion by making use of the grate at the core of the staircase which essentially acted as a distorted perception composed of smaller fragmented ones; perceptual experiences were therefore constantly shifting and changing as one walked by.

The squares were made of mylar, vinyl plastic, and a thin film-like material—each with different surface qualities—were used to cover some of the openings of the grate. Ideally, this would make the distortion of space more dramatic and allow for physical interaction. [Fig. 33, 34, 35]

The sudden appearance of the squares at the beginning of the installing process spurred some curiosity yet when people were finally asked to interact with it, very few did, which I attribute to a loss of novelty brought on by the long installing time as well as the requirement that people stop along the staircase and physically move the squares. It became apparent that scale also plays a large part in spatial perception and interaction of light; the size and number of the squares may have made interaction a bit tedious while the size of the grate made it hard to experience the entire installation from any given point. Lighting also became an issue as the east-facing window provided limited lighting to really create a consistent dramatic effect and due to its size, artificial lighting would have also been difficult.

My last physical study was designed to address the issues brought forth by previous iterations as well as the encompassing themes of spatial perception and interaction of light. Making use of a grid, VHS film was hung in strips to create an abstraction of space within a defined and enclosed space. The track-lighting of the host-space was used to illuminate the film-space, which resulted in a shimmering affect as the light was simultaneously reflected and absorbed by

the gently swaying strips. The host-space provided both opaque and semi-reflective walls on which the reflections and shadows of the film-space were easily visible, which along with the fragmentation of the space caused by the strips, added a layer of passive interaction to the overall perceptual experience. The ease with which the film responded to light as well as movement, made interaction easier for individuals who were asked to interact with the space.

Though the installation was in place for two weeks, dimming of the track lighting, introduction of additional lighting, and of fans transformed the space, giving it a continual novelty. In successfully addressing all previous issues, this installation brought forth some key ideas with regards to the architectural implications of my studies. The most obvious being the distortion or manipulation of perceptual experience of a space through the fragmentation and recombination of perception. This particular installation allowed the viewer to create several perceptual experiences of the space by moving through it or standing still as it either gently moved on its own or was more violently set in motion by the fans.

In terms of interacting with light, the semi-reflective quality of the film allowed it to interact with both viewer and space through both reflections and absorptions of light, making it the most successful in addressing the interaction of light and dark. [Fig. 36, 37, 38]

Fig. 33

Fig. 34

Fig. 35

Fig. 33, 34, 35: Grate Installation
Work and photographs by author

Fig. 36

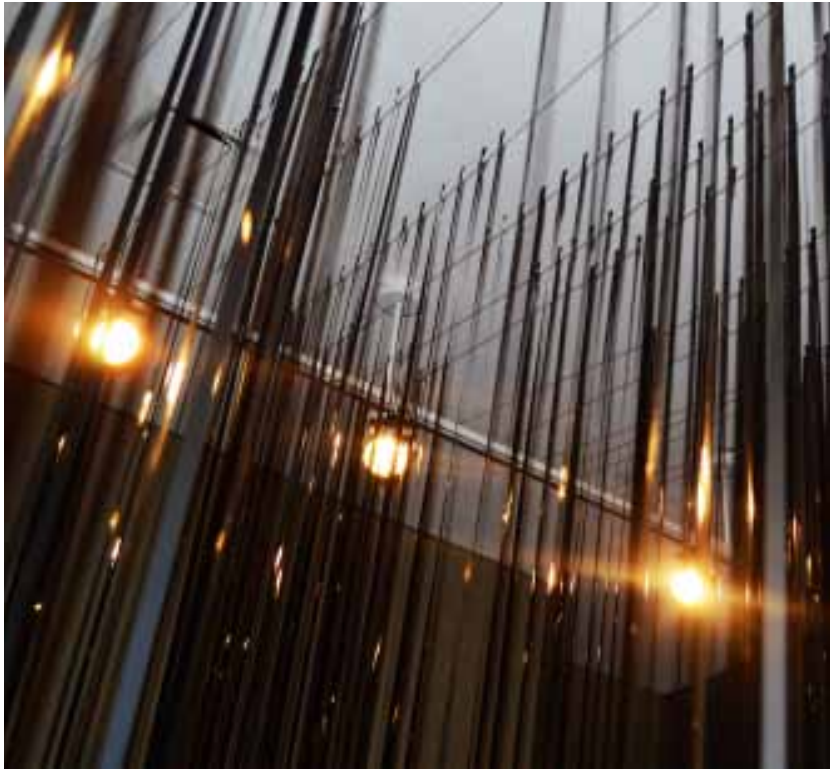


Fig. 37

Fig. 36: Close-up of Film Strands
Work and photographs by author

Fig. 37: View of light reflecting off top of strands
Work and photographs by author

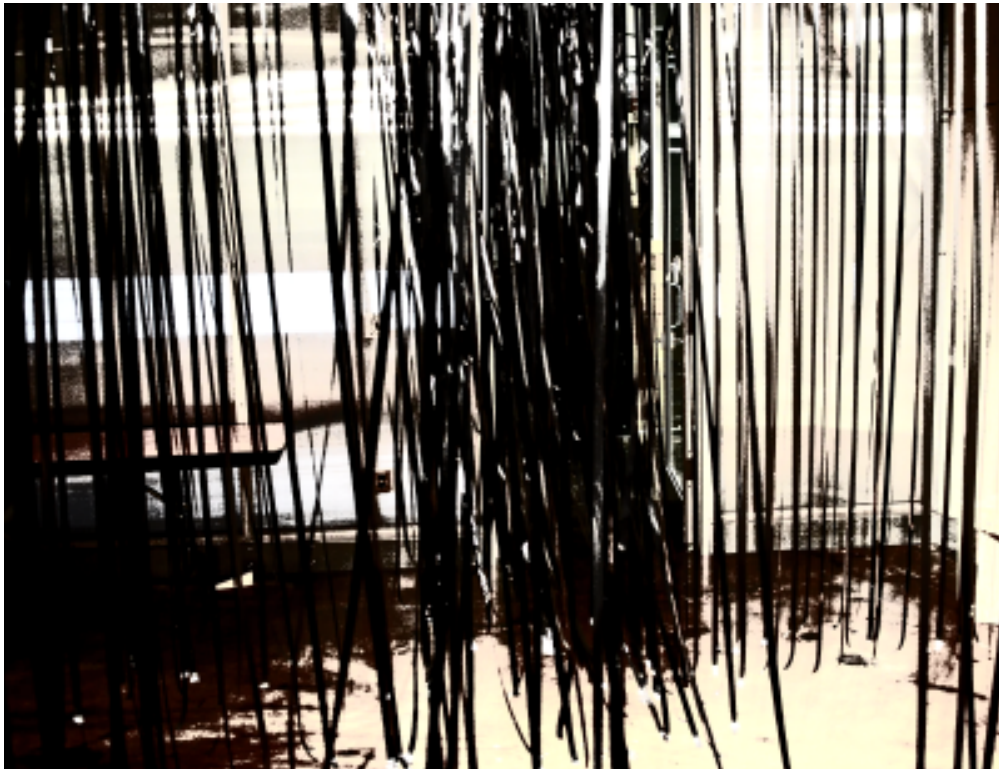


Fig. 38

Fig. 38: Film strands mid-motion. Photograph was manipulated to show figure/ground contrast
Work and photographs by author

Lastly, I did a short digital study on the fragmentation of space by applying the film-space's method of fragmentation to three different spaces as a way of leading into my next phase of study which I see as a more aggressive manipulation or distortion of space. This last study in particular helped me realize the immaterial nature of both light and material. I mentioned at the beginning of this paper that without light, material cannot make itself seen and the same is true for light: without a material to interact with, it doesn't exist. With that being said, I see reflections as distortions of their context, distortions of the perception of the space. [Fig. 39 & 40]

Fig. 39

Fig. 40

Fig. 39: Distortion Excersize 1
Work and photographs by author

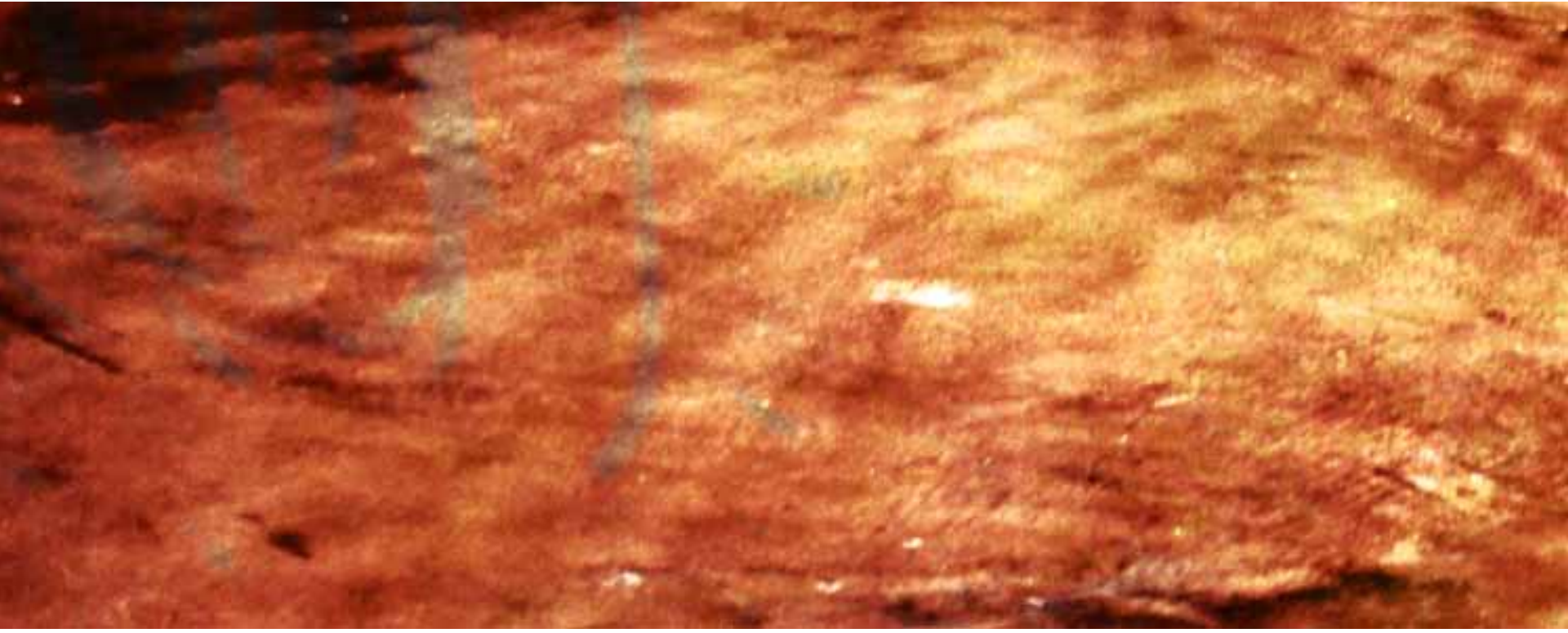
Fig. 40: Distortion Excersize 2
Work and photographs by author

My process during the first half of this thesis has ultimately led to a series of overall conclusions that speak to the main themes of light interaction and manipulation of spatial perception based on the implications brought forth by my iterations. Manipulation of spatial perception, which indirectly leads to creation or transformation of perceptual experiences, can be achieved through the fragmentation of perception. Further manipulation or distortion of perceptual experience can be achieved through the introduction of movement either of the installation, the space, or the observer. Another important factor to consider is the distinction between active and passive interaction which merely refers to the distinction between actively participating in the manipulation of spatial perception or passive observance as the manipulation takes place without need for physical interaction.

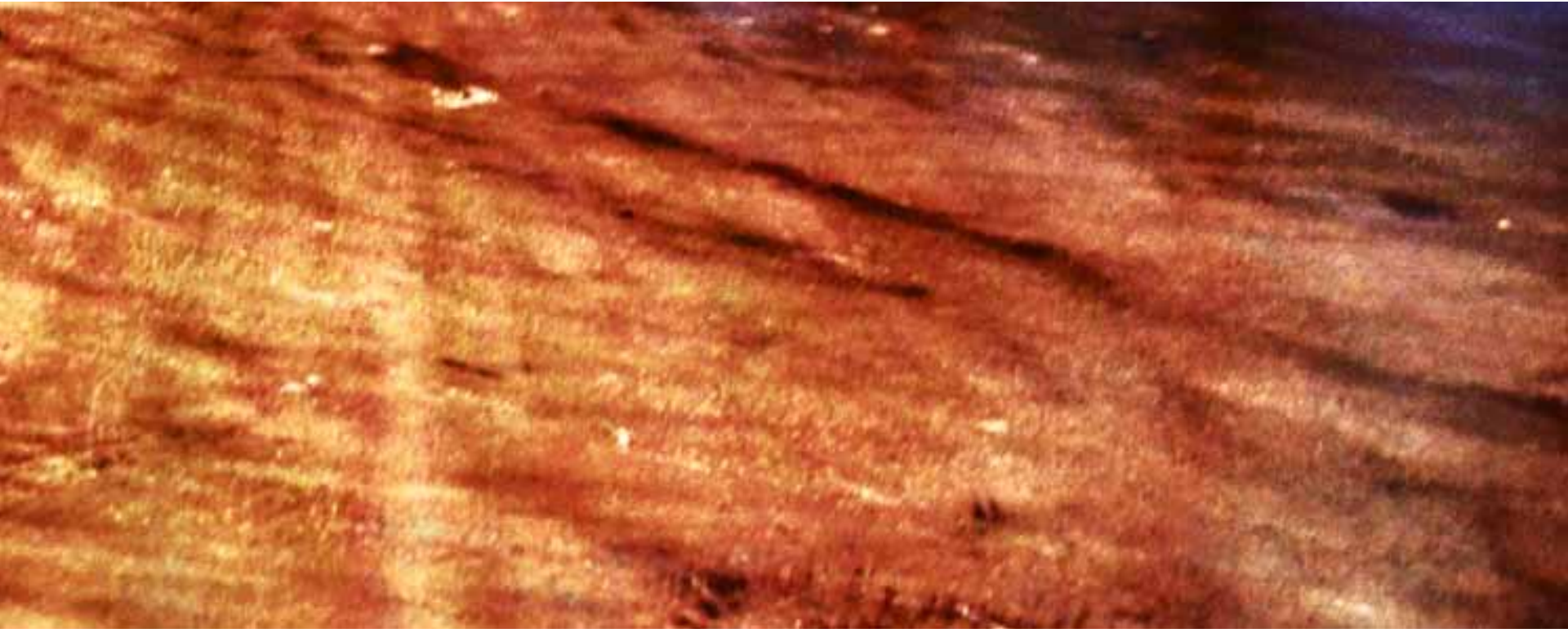
With regards to the interaction of light, the surface quality of material is the driving factor, which after studying various materials it became apparent that semi-reflective materials are more conducive to the multifaceted interaction with light. In other words, semi-reflective materials allow the interaction of light with not only one but all of the following: material, darkness, contextual space, and viewer. Other conclusions included the importance of novelty and curiosity, human scale, a well defined host-space, avoidance of forced interactions, and the understanding of the limitations of natural lighting in terms of manipulation.

As mentioned before, the intention was to continue exploring the possibilities of the perceptual distortion of space through larger scale installations. These Spatial Interjections would address a lack of interactivity within a given host-space through the use of the implications and ideas previously discussed; some of which can act as criteria for the design of the Interjection and a method for choosing the host-space. The final design would be that of the interjection, with the host-space acting as a site of sorts. With this being said the plan was to further define the criteria for the host-space which at this point was still vague as well as reevaluating my

intent in terms of its ability to address an architectural issue.



Photograph by author



Site Analysis

In continuing my study of light and perception it was necessary to step back and organize my thoughts in a manner which would allow me to better understand my own intentions. The installation studies from the previous chapter as well as the ones that will follow are not intended to solve a particular problem or address a certain issue per se but rather to act as a tool for my further exploration of the interactions that make the world visible. What I wish to arrive at upon finalizing this thesis is simply a better understanding of perceptual interaction of light with the built environment and the people inhabiting them.

My thought process is as follows:
[1.] The interaction of chiaroscuro[7] with the surface qualities of objects can allow for distortion or manipulation of perception.
[2.] This manipulation changes the way a space or object is perceived, creating a novelty which then in turn spurs curiosity in the observer, who was expecting to perceive the same space/object that had always been in that particular spot.
[3.] Curiosity being an innate sense in people will ideally propel them to want to explore this novelty which would be an installation.
[4.] Using an interactive installation to activate a "dead site"—a site no longer being utilized for its intended purpose or at all—seemed like a good way to explore my topic in a context that would not be as controlled as had been dealt with before. [Fig. 41, 42, 43]

Naturally my next step was to select a site that would fit the criteria of a "dead site": being void of activity most of the time, potential for future program, easily visible to passersby being the most important.

7. Contrast of extreme dark and light

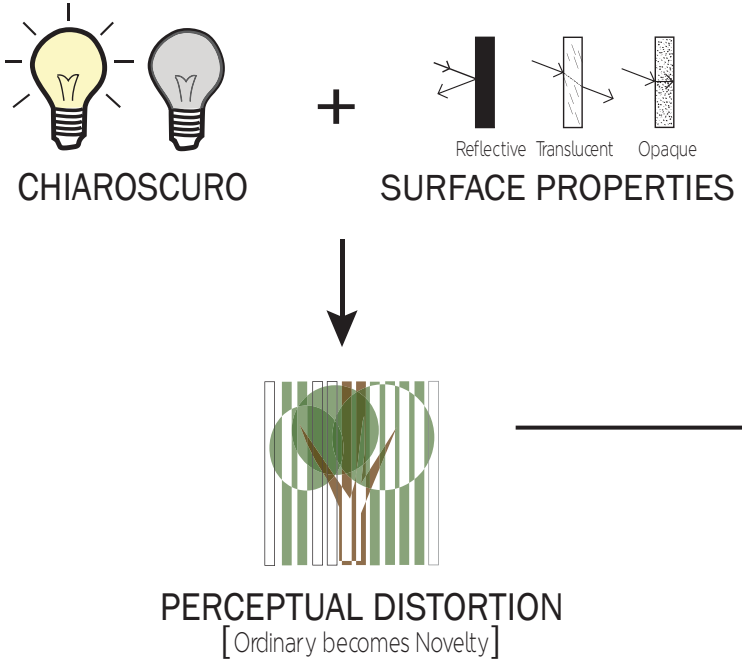

CHIAROSCURO
+
Reflective
Translucent
Opaque
SURFACE PROPERTIES
PERCEPTUAL DISTORTION
[Ordinary becomes Novelty]

Fig. 41

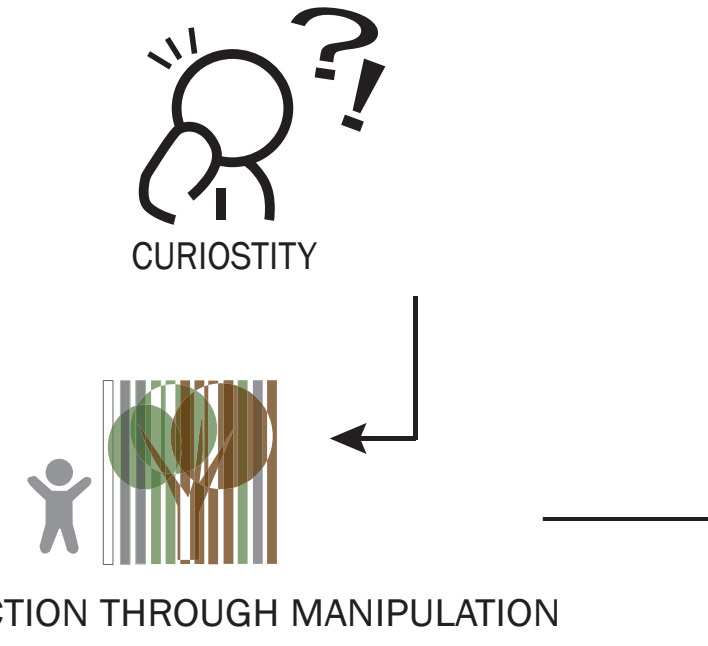

CURIOSTITY
INTERACTION THROUGH MANIPULATION

Fig. 42

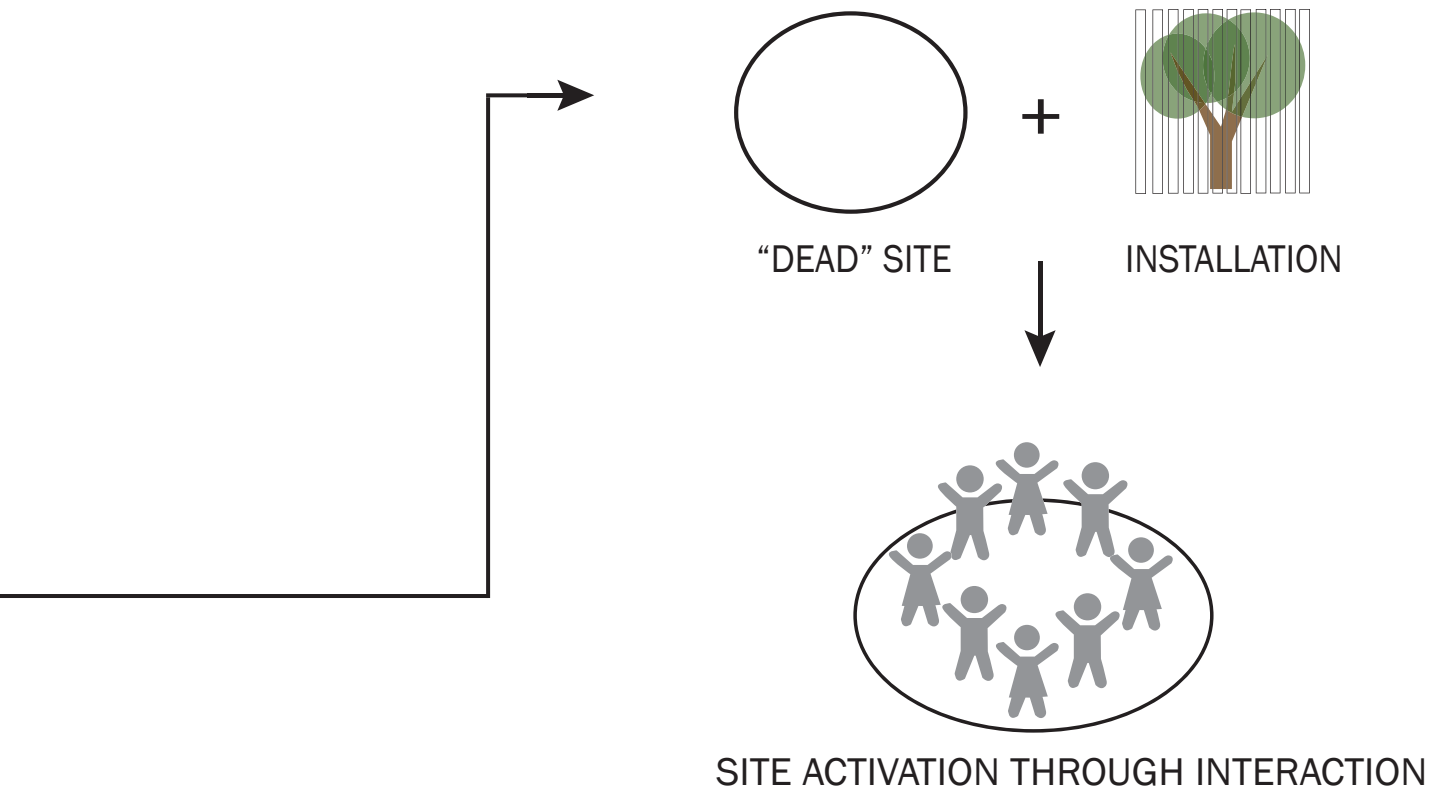


Fig. 43

Fig. 41, 42, 43: Info-graphic used to communicate thought process.
Work by author

Detroit is full of possible “dead” sites due to its growing vacancies. The activation of the site would ideally result in the creation of a gathering space in the form of a plaza. I hoped not to alter the site itself at all but rather insert the installation as an intervention for it. This intervention would ultimately spur the curiosity of passersby and bring them into the site, creating an interactive atmosphere.

My first thought was to try and activate a certain part of Haart Plaza which is underutilized save for a few times a year when events are hosted there. I decided against it since there are already several installations in place throughout the plaza. Also, for an installation to grab the attention of people at this location would have to be close to Jefferson Avenue, limiting my options further.

Just North of Haart Plaza, up Woodward Avenue, I found a plaza of sorts that once served as the entry to the lobby of the bank that once operated out of the first floor of the Guardian Building. What caught my attention about this location in particular was the way the glass facade of the lobby reflected its surroundings back to viewers. I saw this as an oppurtunity to manipulate the perception of those that passed by it daily and as such expected to see the same view from the day before. [Fig. 52]

One of the reasons the site might have gone dead is the unique condition it creates, with the side directly adjacent to the lobby facade being elevated about three feet on the North end and sloping back to ground level at the south end. This creates an elevated platform lined with planters to sit by. The East side of the plaza that is not elevated acts like a normal sidewalk would and is what is utilized most by people walking by. The platform is seldom utilized except for the few times that staff from nearby offices sit under the shade of the trees in the planters during their lunch breaks. [Fig. 44]

Looking at the site at a macro level, I became more and more conviced about utilizing it for my explorations. I noticed that about a block north of this site, three major Detroit streets [Michigan,

Grand River, and Gratiot Avenues] converge into Woodward Avenue as though pushing through it and towards Haart Plaza and the riverfront. [Fig. 48]

Having of course considered Haart Plaza as an option for my site, it seemed fiting that I might still be able to address it indectly. I saw the position of the Guardian Building plaza as an opportunity to possibly propel more people toward Haart Plaza at times other than during major events. [Fig. 50] My thought was that this site could act as a third activity hub on Woodward. The first being Grand Circus Park, and the second: Campus Martius. These hubs could activate a movement of activity toward the riverfront. Though not my main concern in designing for this site, this idea was nevertheless interesting and a possible starting point for exploration beyond this thesis. [Fig. 49]

The surrounding buildings consisted mainly of mixed used commercial and office buildings. Which meant that the people frequenting the area on a daily basis would be those working in the area either in offices or surrounding restaurants and stores. [Fig. 51]

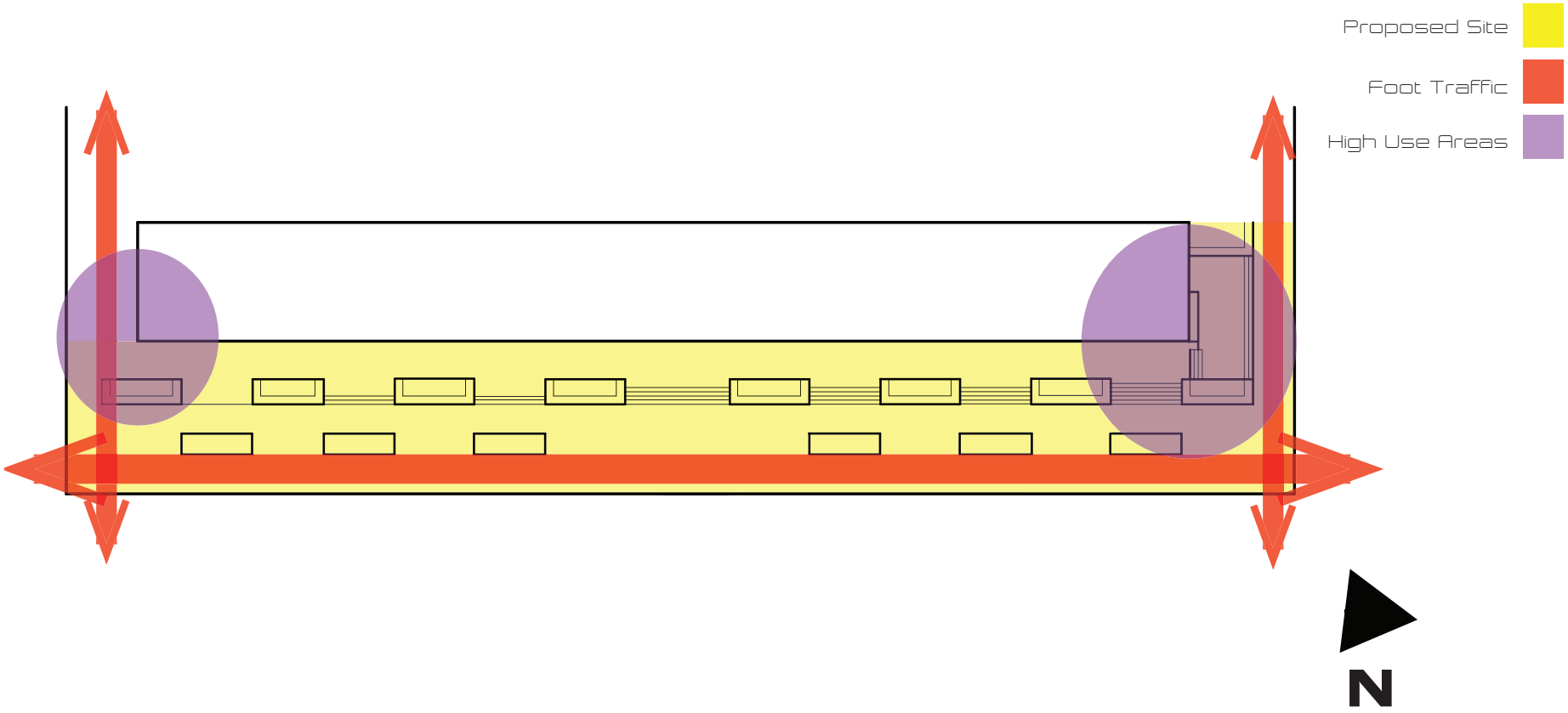


Fig. 44
Analysis of Plaza
Work by author

Fig. 45, 46, 47
Site Photos
Photographs by author

Fig. 48
Street Convergence Map
Work by author

Fig. 49
Woodward Activiy Hubs
Work by author

Fig. 50
Connection Activation
Work by author

Fig. 51
Building Usage Map
Work by author

Fig. 52

Fig. 52: Reflective facade on West border of plaza
Photograph by author

Fig. 53: Close-up of the center portion of the plaza
Phortograph by author

Fig. 53

Fig. 54: Panoramic view from North-East corner of site
Photograph by author

Fig. 55: Panoramic view from South-East corner of site
Photograph by author

Installation Studies 2

Derived directly from the explorations from my first set of installation studies, the following were my first attempt at designing something to insert into the site.

The underlying problem with this set of studies was that there was too much focus on the derivation from the past studies and not enough focus on the engagement of the site itself. Though the functional aspects of the site and its surroundings were well analyzed in the previous portion, there still lacked an understanding of the characteristics of the site, such as materiality and form which are crucial to the interaction of light and perception.

Each of the studies derived from one of the three installations done previously, taking on or abstracting their form, materiality, and ability to interact with light.

The first, utilized strips like the Film Installations as a means of visual distortion. The movement of the strips would ideally cause the observer's percption of the space to change; this would be a passive viewer/installation interaction. By interacting with the installation, by taking the movement of the strips into his own hands, the viewer participates in the distortion of their percption in a more active interaction. [Fig. 56-61]

The second studie involved the Distortion Studies that were done at the end of the first half of the thesis. Using again the idea of strips to distort perception through the framing of views and manipulation of those views, an abstraction was derived to conceive a panel system.

7. Contrast of extreme dark and light

The panels would contain three different materials that when slid in front of the openings in the large panel frame, would distort the view. [Fig. 62-68]

The last of these studies would consist of a grid which would create small framed perspectives similar to the effect created by the previously mentioned Grate Installation. When viewed as a whole and at certain angles, the frames would become frames to other frames which in turn would frame the perspectives. [Fig. 69 & 70]

Since these studies failed to engage the site more actively, the goal moving forward was to focus more on and more aggressively utilize the design characteristics and opportunities within the site.

Fig. 56
Film Installation
Work and Photoraph by author

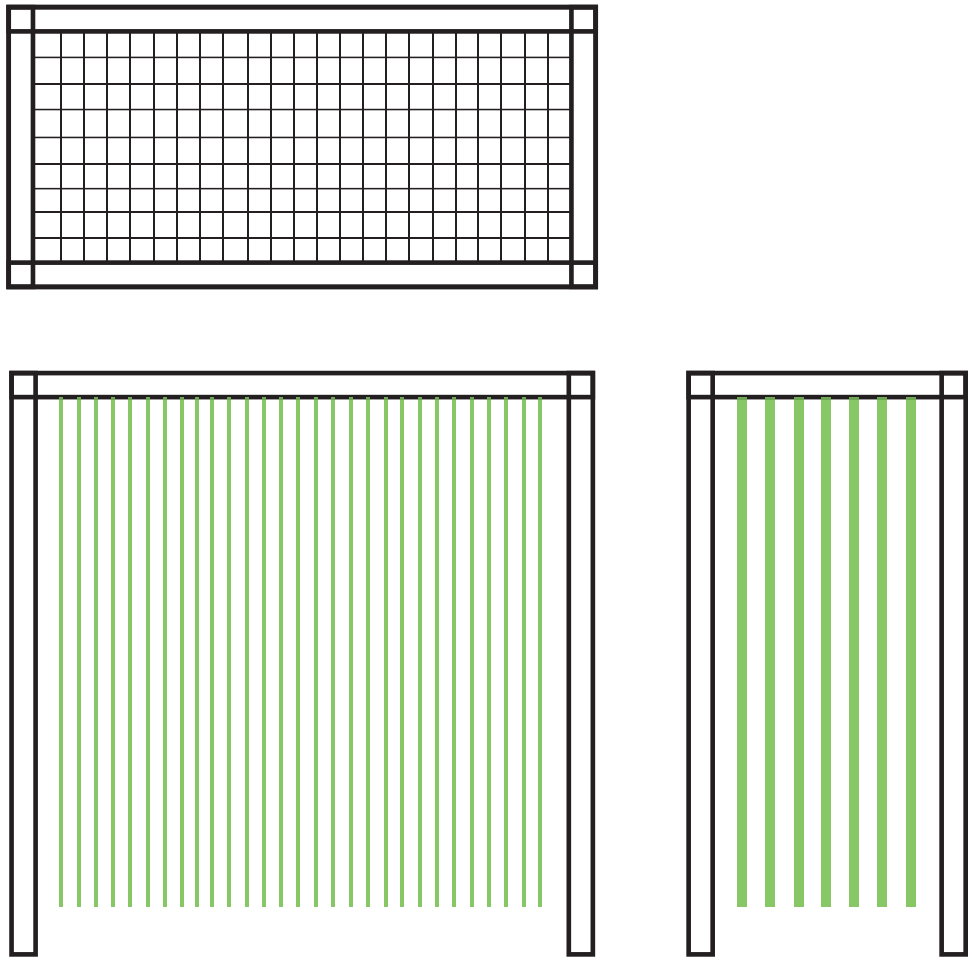
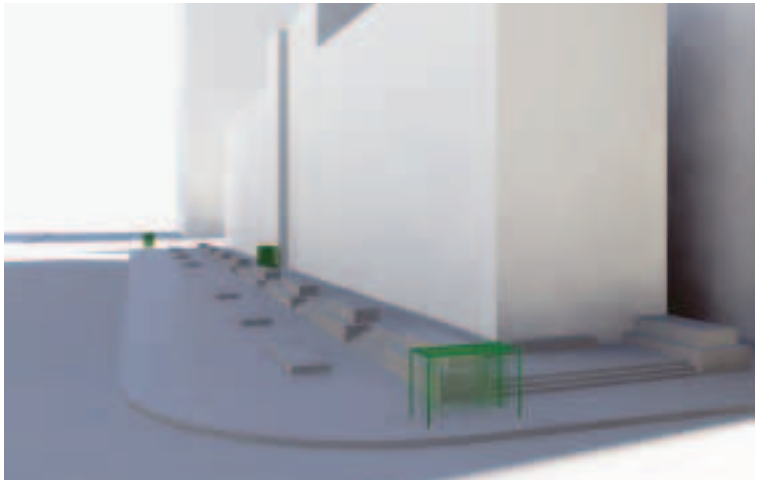
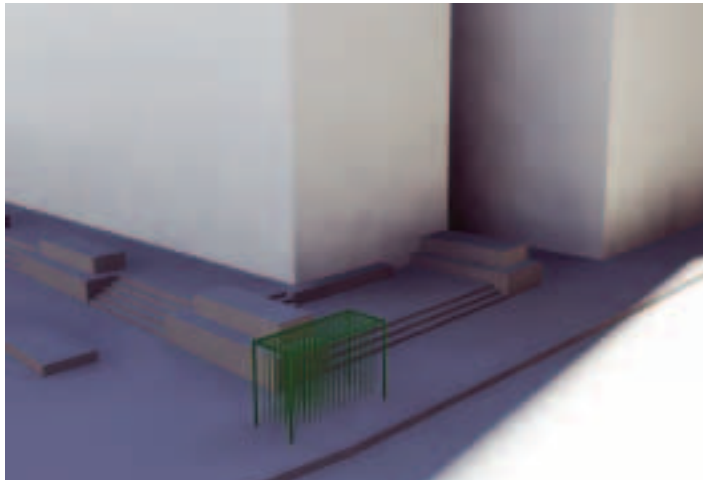
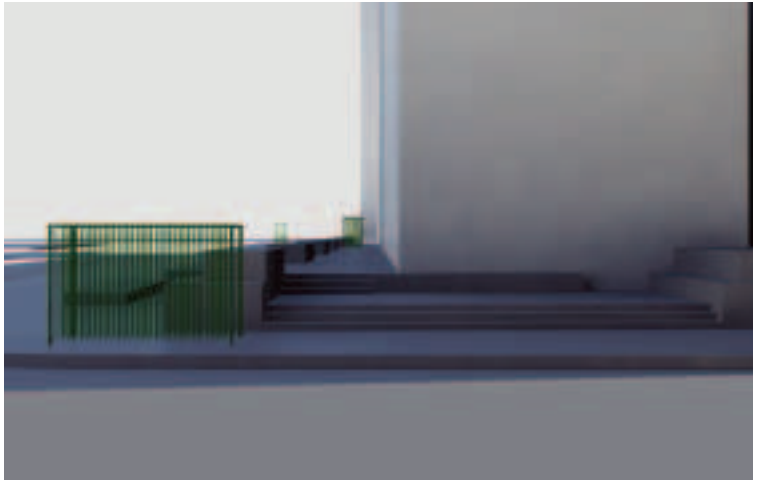


Fig. 57
Proposed Installation 1
Work by author







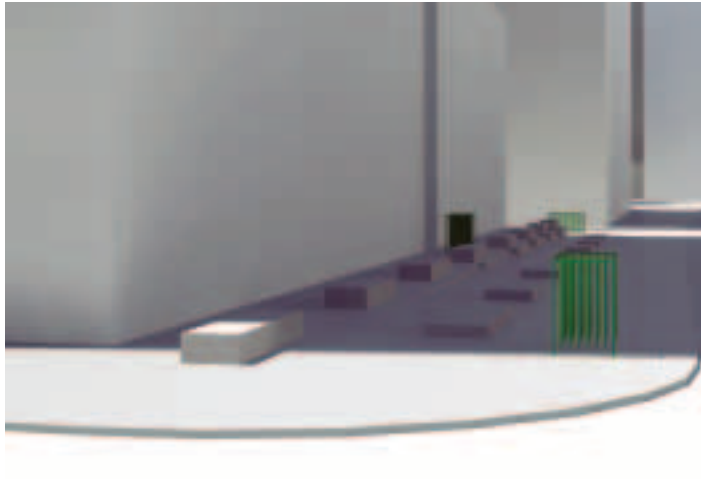


Fig. 58-61
Installation 1
Renderings
Work by author

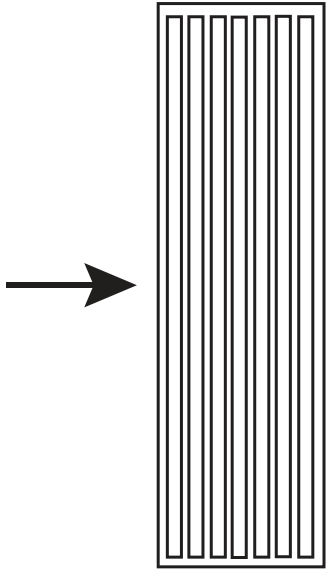


Fig. 62 & 63
Proposed Installation 2
Work by author

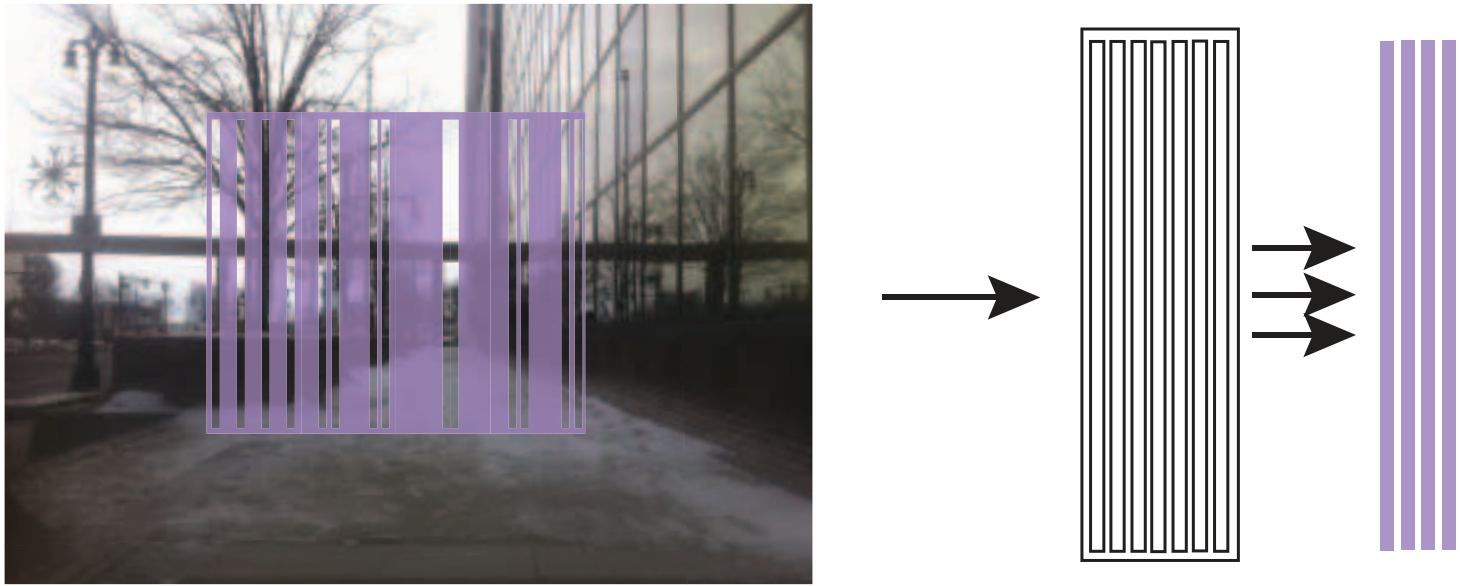
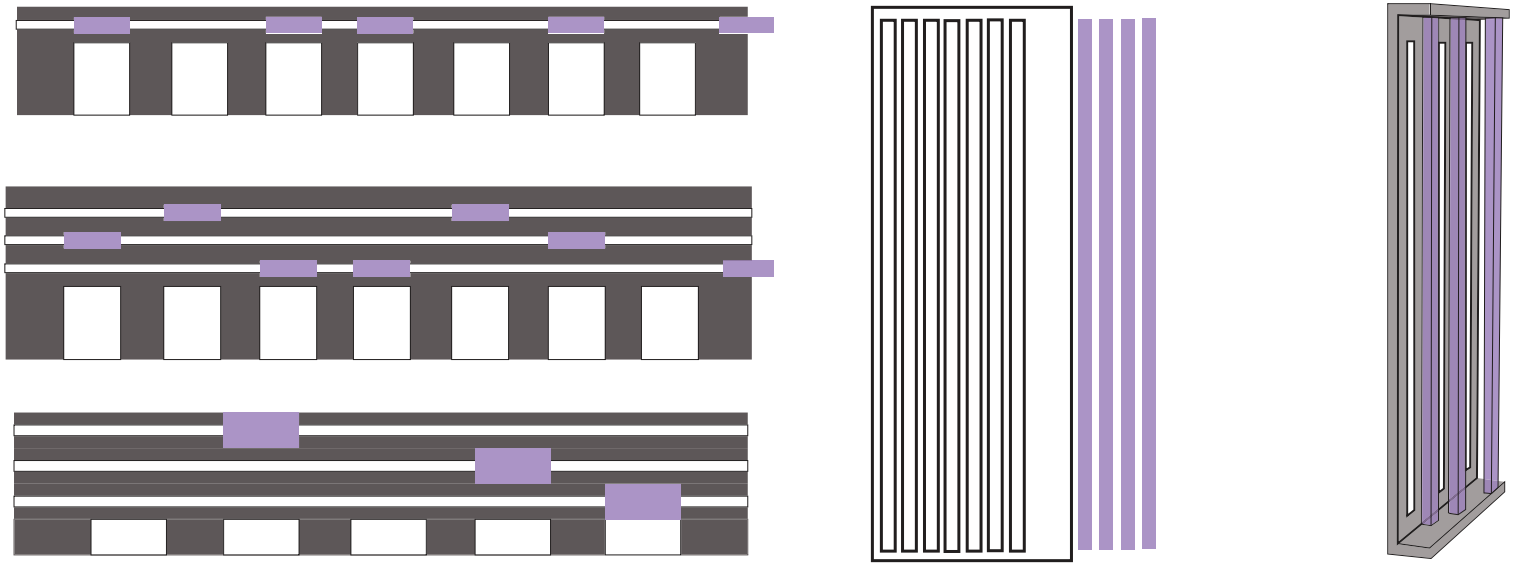
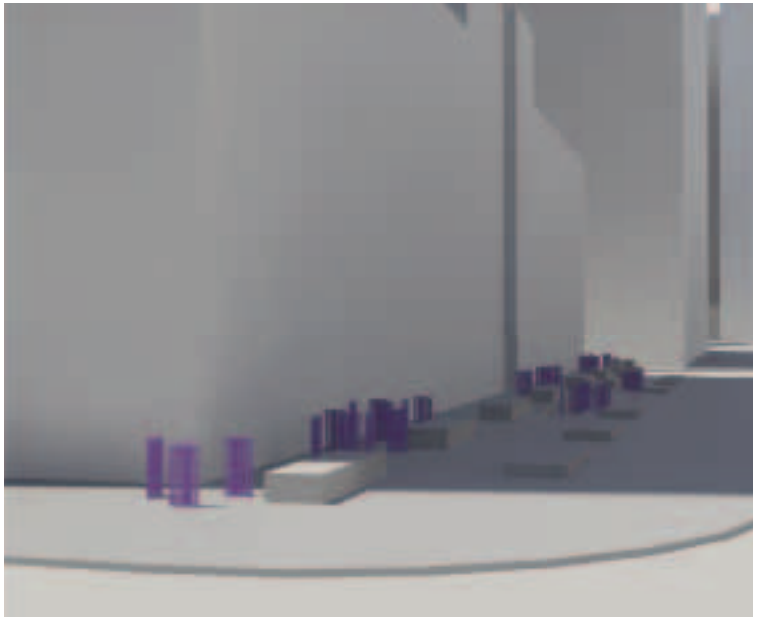


Fig. 64
Panel Abstraction
Work by author

Fig. 65 & 66
Installation 2
Work by author





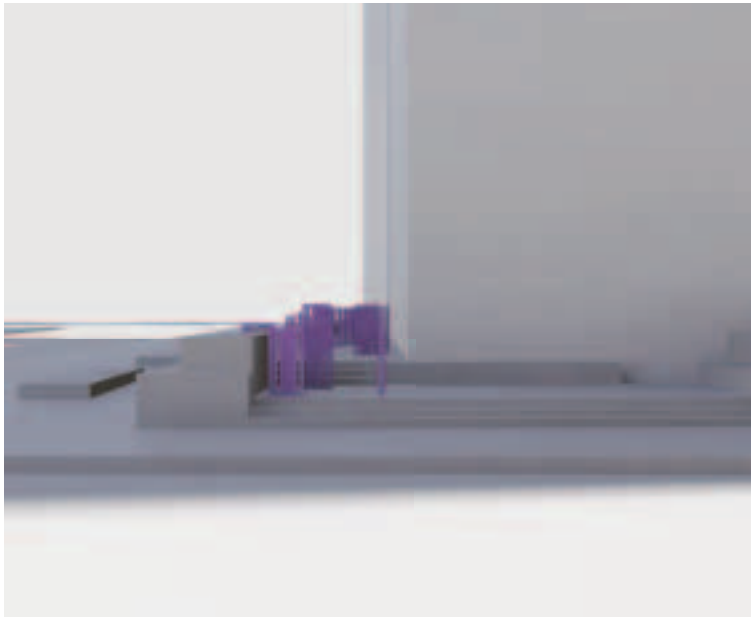
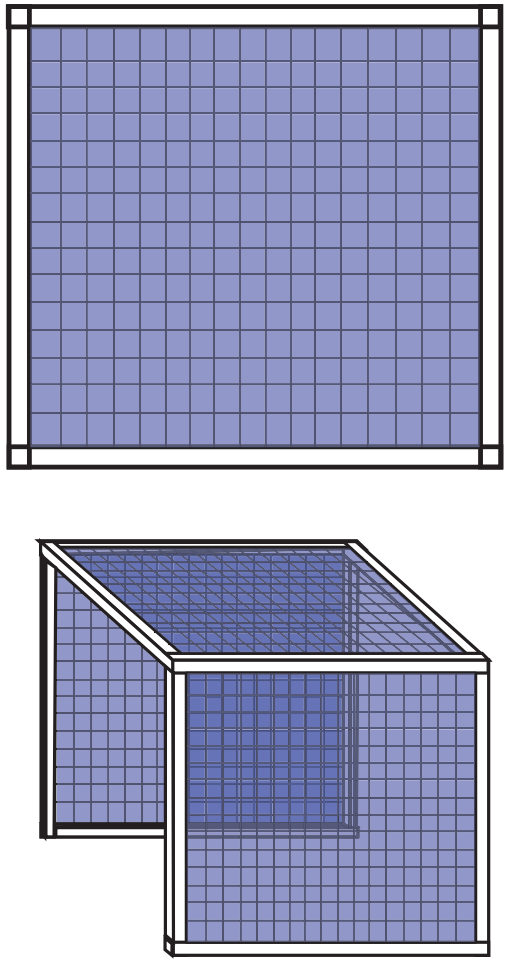
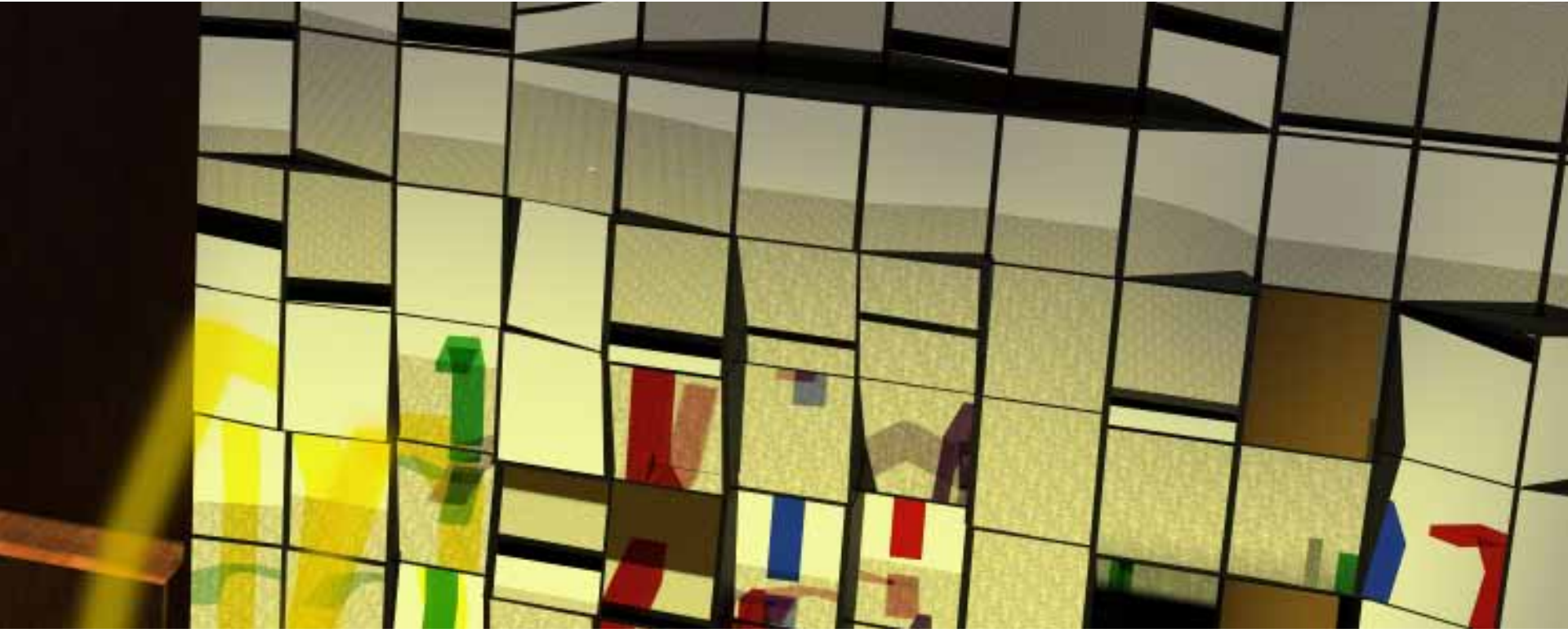


Fig. 67 & 68
Installation 2
Renderings
Work by author

Fig. 69 & 70
Proposed Installation 3
Work by author



Work by author



Final Design

Following the second set of installation studies, I initiated the final steps towards a final design by doing a series of sketch problems. They were done in sets of three with similar characteristics and goals. After completing each set, I stepped back and evaluated their pros and cons to help me later decide which one I would move forward with.

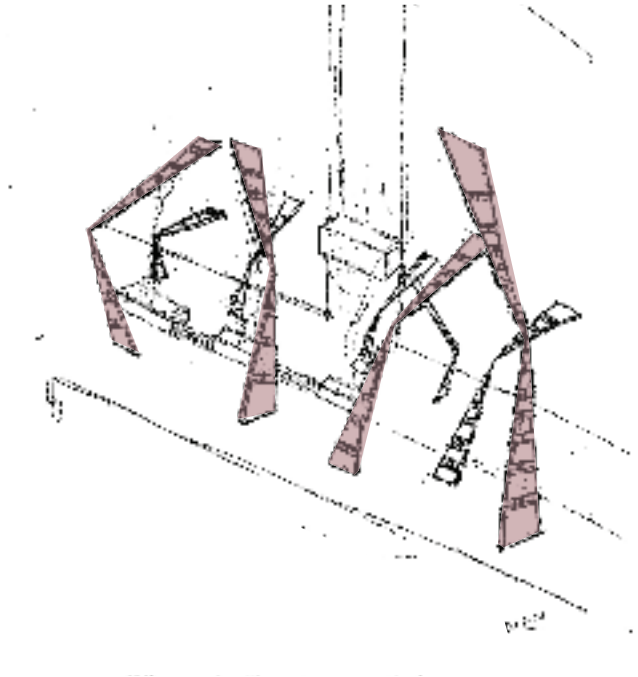
Throughout this process I found myself torn between two typologies that arose in my design. The first being an installation that would lend itself to a more physical interaction with the viewer yet, like the installations in the previous study, lacked in actively engaging the site. The second did the reverse: actively engaging the site, more specifically the glass facade, yet failed at an active engagement with the viewer. [Fig. 71-79]

After reviewing what each design had to offer and was lacking in, I decided that a combination of two of the two typologies might yield better results since both engagement of site and viewer would be covered. [Fig. 80 & 81]

The final design ended up consisting of what I refer to as a permanent intervention and a temporary catalyst. The intervention became a tesellation of the facade which was an attempt at distorting the reflection that regular passersby would be accustomed to, and by doing so spurring some interest as to what this new element might be. [Fig. 83] The temporary installation consisted of several tinted, transparent columns meant to actively engage the viewer. These would each contain motion sensors with varying sensitivity so that when a certain motion would be detected, the column

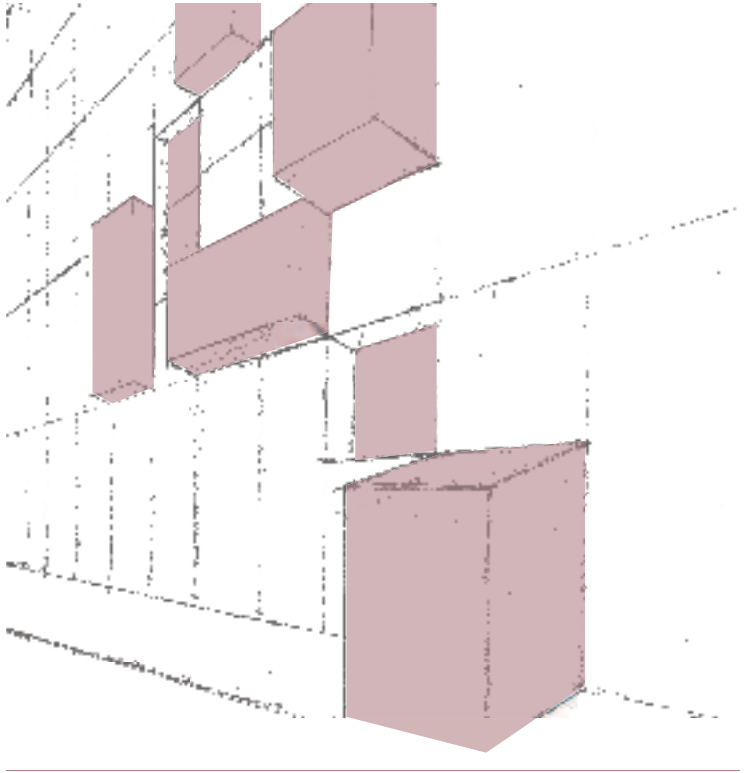
7. Contrast of extreme dark and light

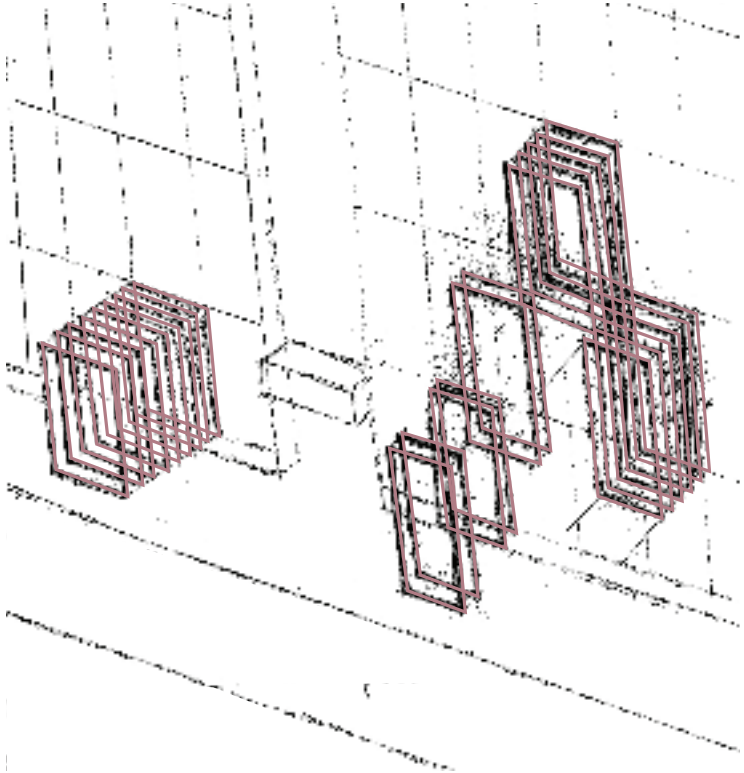
would react by lighting up in sections, entirely, or by changing color through color addition. [Fig. 86] This feature would ideally capture people's attention and make them want to gather in the space and enjoy the light show. The gathering space has no real program other than possible performances done at the mid-section of the elevated platform, which would act like a stage. Other than this programming, one could imagine the space simply being used for people to converse, have lunch, or enjoy their breaks from work in the sunshine.



Left- Fig. 71
Right- Fig. 72
Sketch Set 1
Work by author

Fig. 73
Sketch Set 1
Work by author





Left- Fig. 74
Right- Fig. 75
Sketch Set 2
Work by author

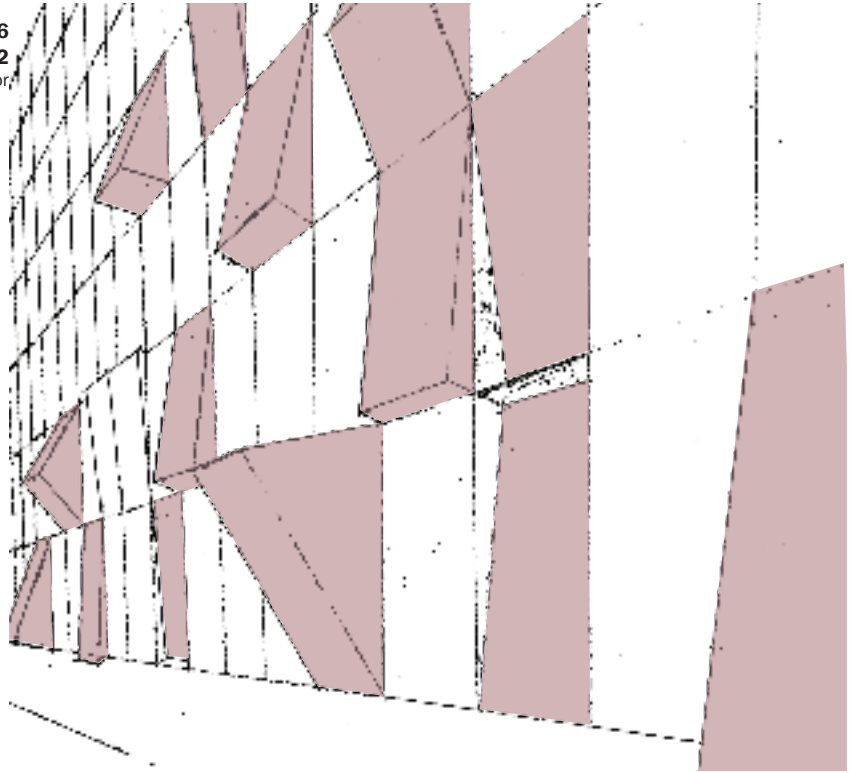
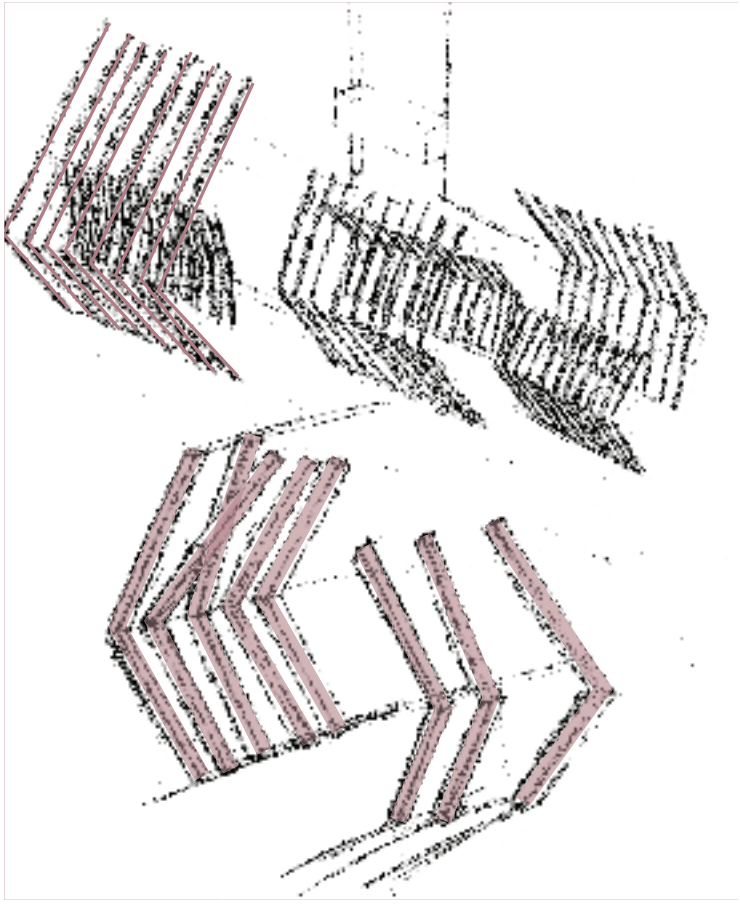
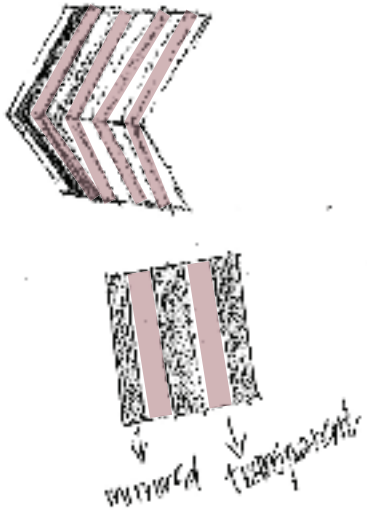


Fig. 76
Sketch Set 2
Work by author





Left- Fig. 77
Right- Fig. 78
Sketch Set 3
Work by author

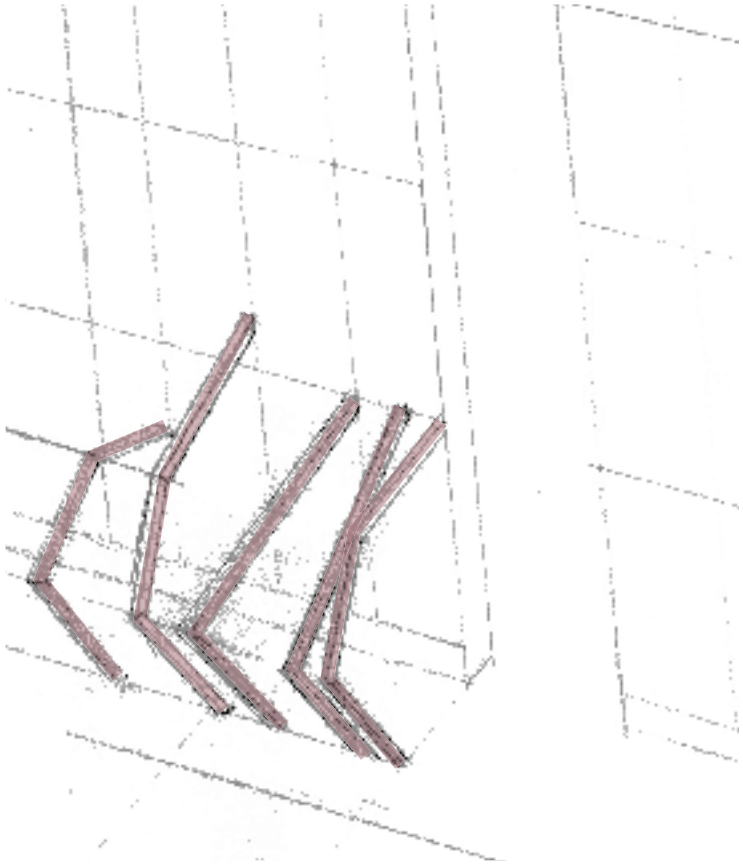
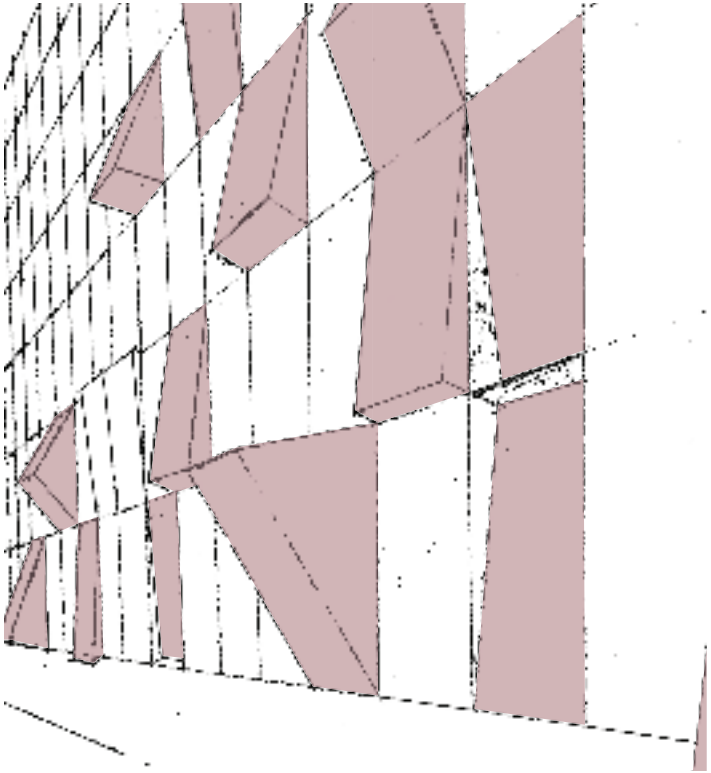


Fig. 79
Sketch Set 3
Work by author



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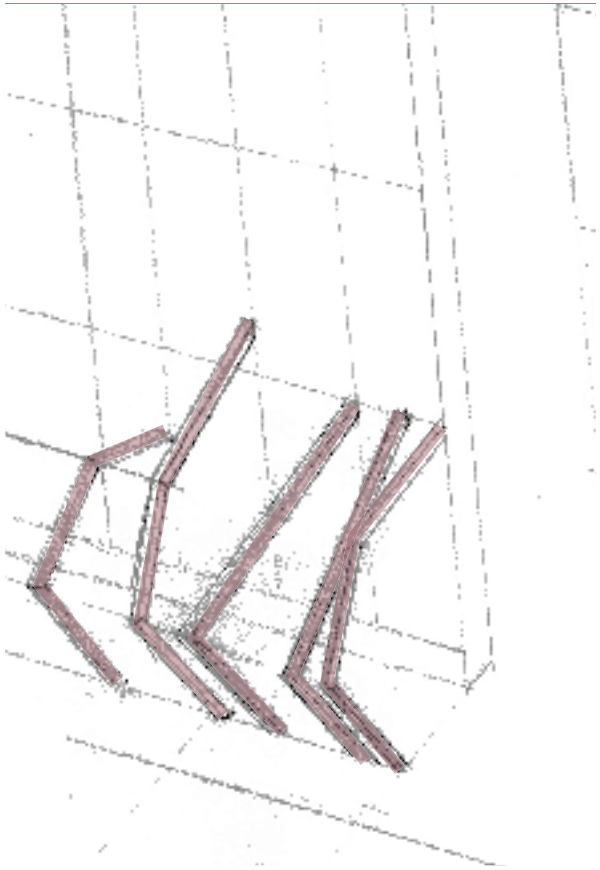

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Left- Fig. 80
Permanent Intervention
+ Temporary Installation

Facing- Fig. 81
Rendering 1
Work by author

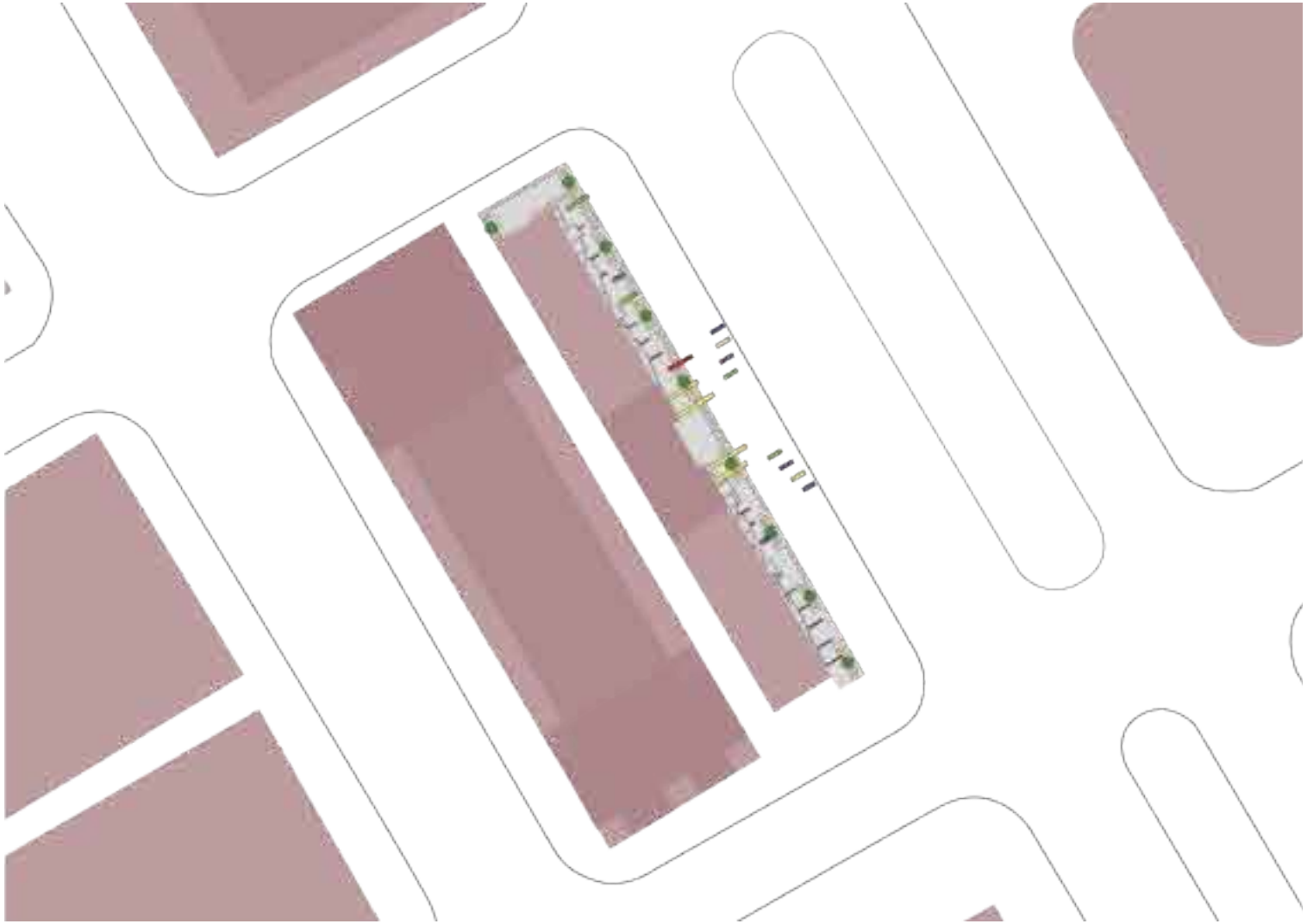


Fig. 82
Site Plan
Work by author

Top- Fig. 83
East Elevation

Bottom- Fig. 84
South Elevation
Work by author

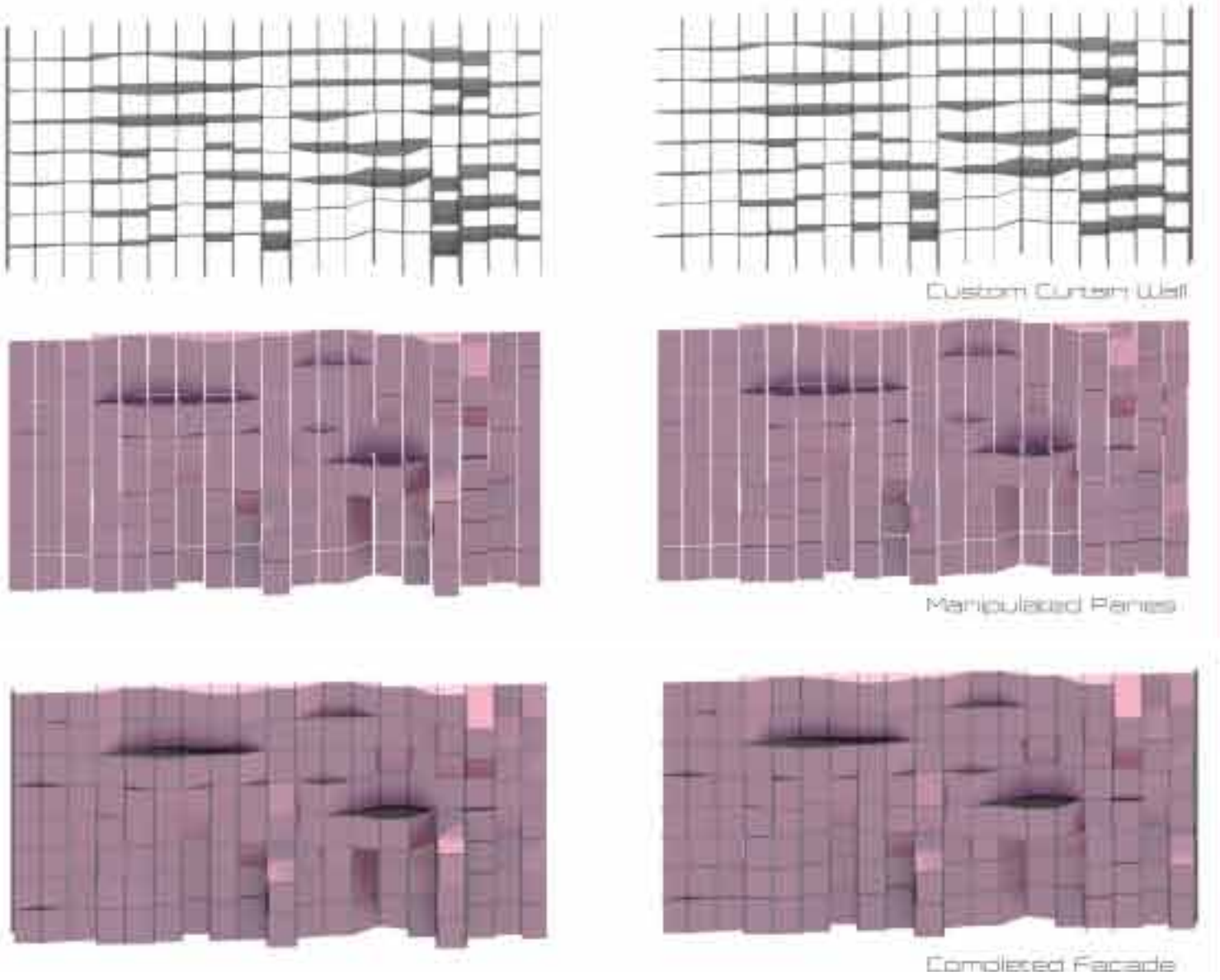
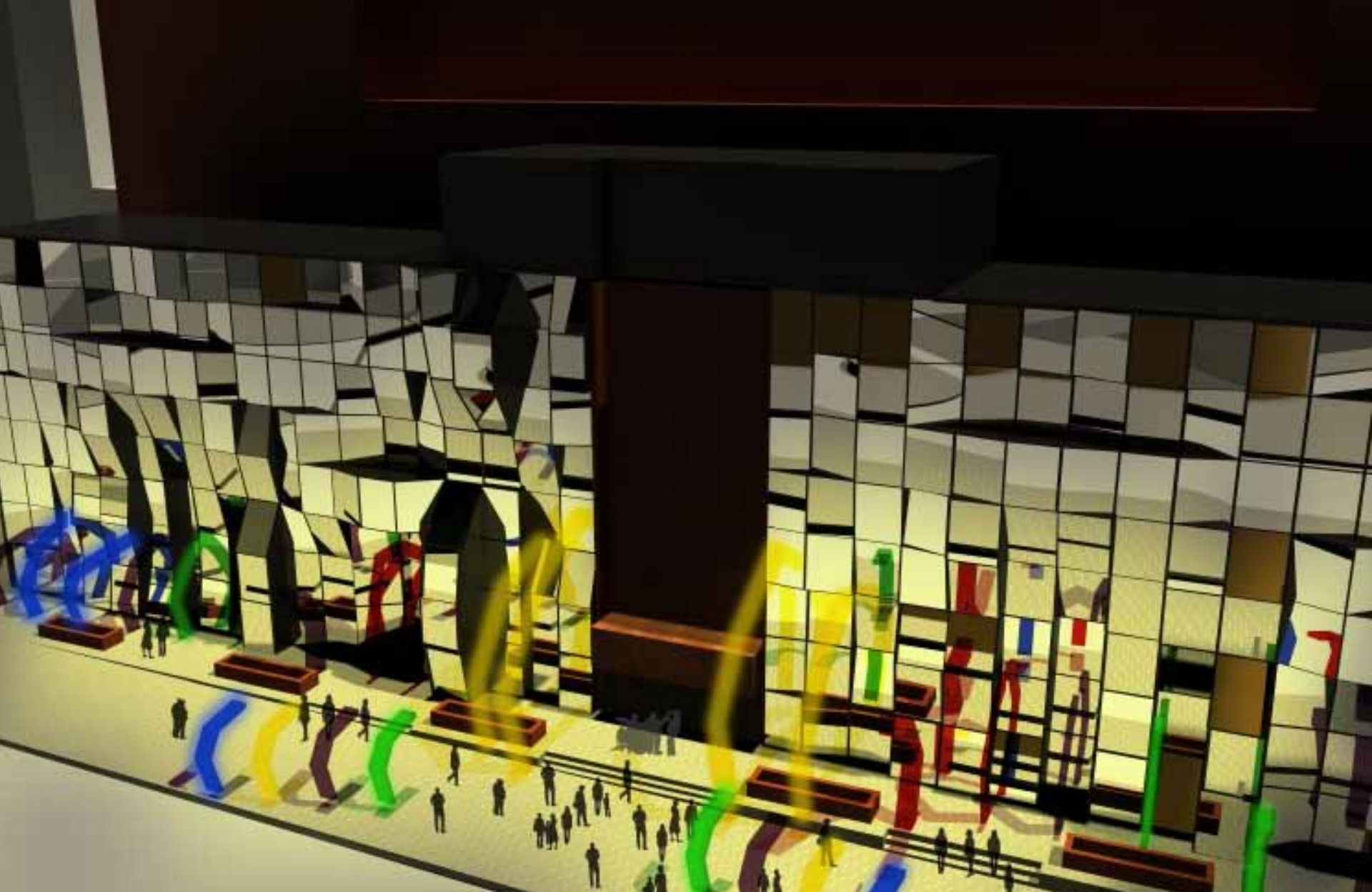


Fig. 85
Facade Detail
Work by author

Fig. 86
Rendering 2
Work by author



Left- Fig. 87
Night Rendering

Right-Fig. 88
Rendering 4
Work by author