

i-ARCH-i

FOCUS STUDIO - FALL 2019

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MUSEUM OF INTERACTIVE TECHNOLOGY
KENNESAW STATE UNIVERSITY | FALL 2019

Focus Studio-Interactive Architecture

ARCH 5015-02 | Fall 2019

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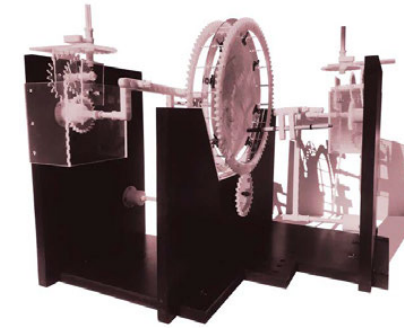
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Asbiel Samaniego

This book was published to fully exhibit the research, design, and speculation of fifth year, focus studio students at Kennesaw State University. We hope this experience will create a dialogue for making buildings more responsive, adaptable, dynamic and engaging.





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THE INTRODUCTION

INTENTION

**“The objects which surround my body reflect its possible action upon them.”
[Henri Bergson, Matter & Memory, 1892]**

Introduction:

Museums have a well-established reputation for creating interactive environments by using both traditional and modern technologies of interaction. Technology centers and science museums are two particular prevalent examples that have quickly integrated interactive technologies to enhance the quality of presentation and level of interaction between both exhibits and visitors. Until recently, the meaning of 'intelligence' in the field of architecture has been developed as the model of control, feedback and monitoring to enable efficient operation of the systems. These systems are called interactive environments, which contain spaces with embedded computation and communication technologies intended to enhance ordinary activities. With the emergence of a new wave of digital technologies, museum visitors are no longer satisfied by simply visiting worthy displays of exhibits in glass cases. They expect to get actively involved with exhibits to experiment and informally learn from their own personified experience.

The i-arch studio considers the various ways in which buildings can be designed and theorized as interactive environments. The studio project looks at ways of making buildings more responsive, adaptable, dynamic and engaging through the use of both traditional and contemporary cyber-physical technologies. The project began by considering a series of case-studies of the work of artists, roboticists, architects and designers in order to develop a conceptual framework for the design of a building exploring the future relationships between architecture, technology and the body.

The Fall 2019 i-arch studio focused on creating a 'museum of interactive technology' to engage visitors actively in new kinds of experiences in the city of Atlanta, Georgia. The final design proposals aim to define interactive architectural spaces for consuming, creating and exhibiting information comprised of a cyber-physical core, which blurs the boundary between the digital, physical and spiritual worlds.

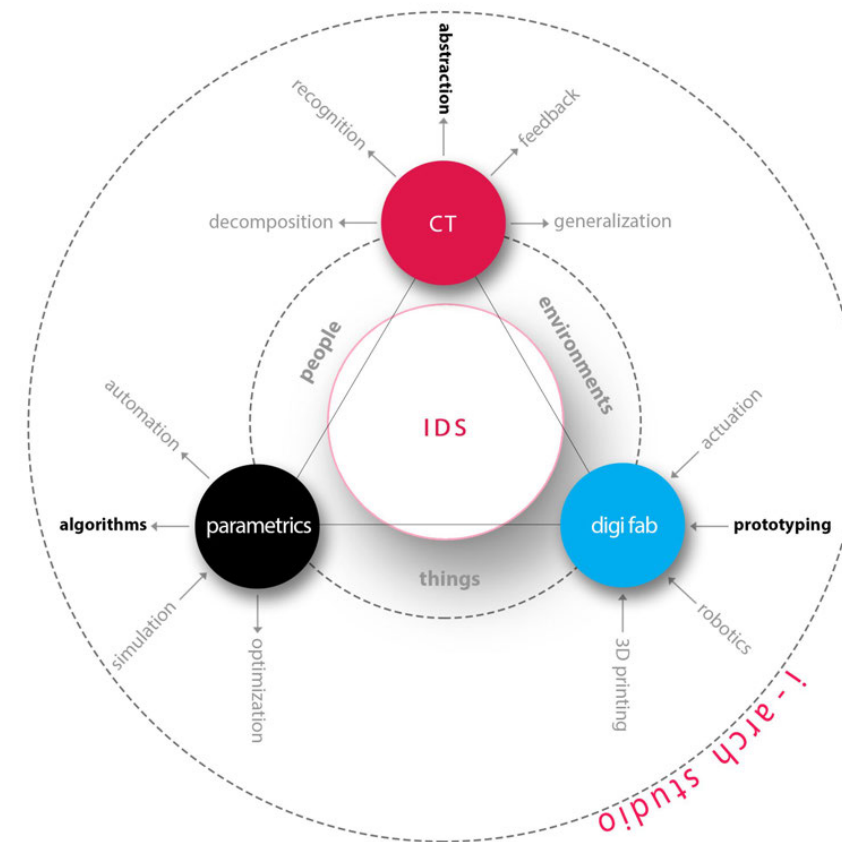


Figure 01. The pillars of i-arch studio introducing an interdisciplinary studio

THE DEVICE

EXPLORATION THROUGH FABRICATION

Design Activity 01 | THE DEVICE: Exploration through Fabrication

After conducting in-depth research to cultivate an understanding of historical and contemporary examples of interactive environments in the context of museums, each design team manifested a definition for the 'modern museum of interactive technology'. Students sought an understanding of how, why and where we consume and create interactive environments. In other words, they investigated how a limited set of materials can create an intelligent system that has the potential to operate, or to be read at multiple scales of the built and natural environments. Subsequently, students designed and fabricated interactive devices by taking three key steps:

- I. Highlighting a specific site condition or set of conditions to conduct further in-depth research.
- II. Developing the design of a device or an instrument which enhances the link between this condition and the manner in which it is presented to and received by the human body.
- III. Fabricating the device at full scale and recording its presence and interaction on the given site.

Link to a video illustrating various devices developed by students:
<https://youtu.be/EpJLU1Hsd7A>

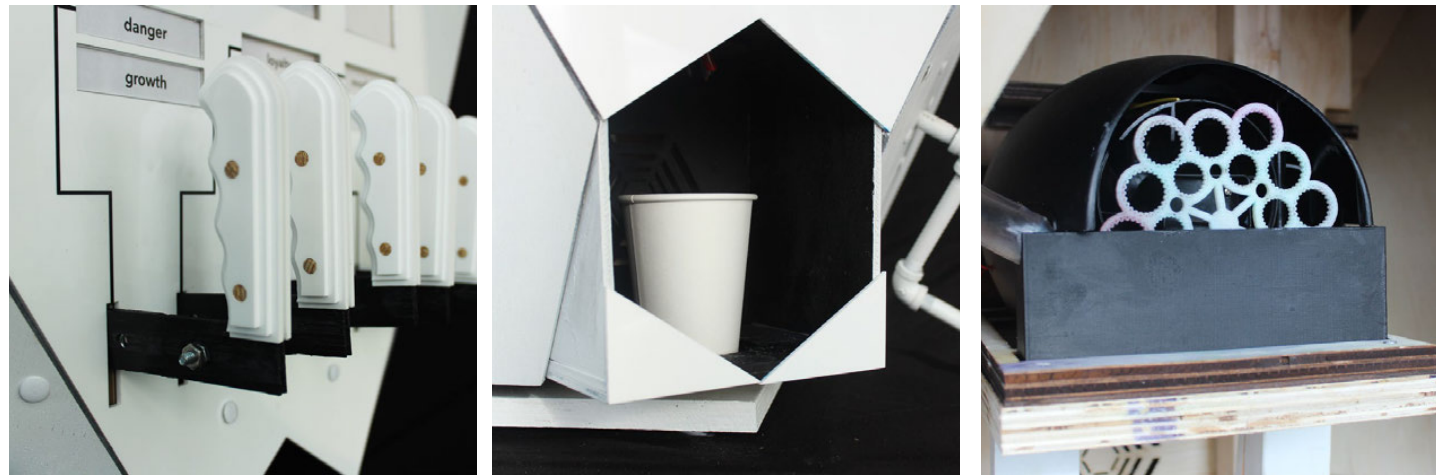
EMOTIONAL BUBBLE MAKER

Jessica Headrick, Caleb Lawrence

<https://youtu.be/3RsUY0btkeU>

The Emotional Bubble Maker analyzes the user's current emotional state via a response to a prompt, dispensing a user-specific colored soap liquid. Each prompt answer is tied to a corresponding color that is representative of an emotion. This solution is then input into a bubble machine to paint the artistic representation of each user's emotion on a larger piece of canvas. Through this process, two pieces of art are created: the stained cup that holds the color-specific solution- representative of the emotion of the individual- and a painted canvas- representative of the emotional collective.

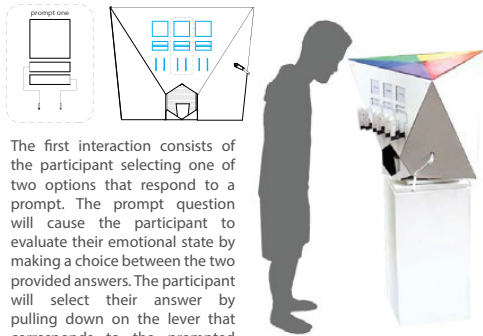




comprising parts of the emotional bubble maker

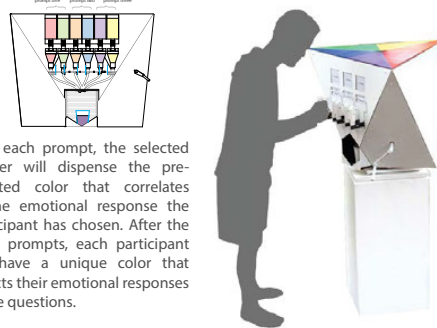
The emotional bubble maker is a simplified physical representation of the dynamic between the environment, the individual, and the landscape formed by the collective. As each user of the device responds to a prompted question, the dialogue of an individual's response to environmental influences is played out. The colors that each user receives represents the emotional palette with which the individual may act with when reacting to external stimuli. With these colors, the user may exhibit their emotions by expression through colored bubbles. Through the creation of the artwork on canvas, this device allows the user to evaluate how one's individual emotions may compare to the larger tapestry of emotions in the people around them. This ultimately results in an expression of individual emotion and an understanding of the dynamic collective emotion.

step one



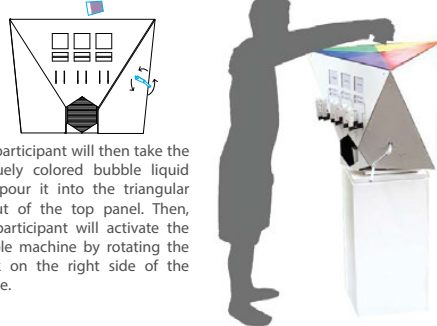
The first interaction consists of the participant selecting one of two options that respond to a prompt. The prompt question will cause the participant to evaluate their emotional state by making a choice between the two provided answers. The participant will select their answer by pulling down on the lever that corresponds to the prompted question.

step two



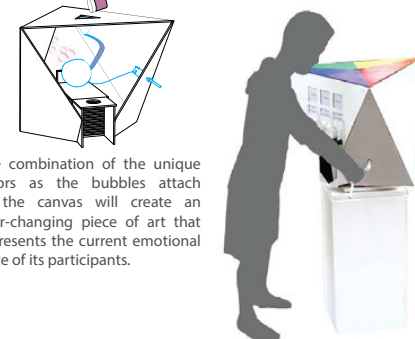
With each prompt, the selected answer will dispense the pre-selected color that correlates to the emotional response the participant has chosen. After the three prompts, each participant will have a unique color that reflects their emotional responses to the questions.

step three



The participant will then take the uniquely colored bubble liquid and pour it into the triangular cutout of the top panel. Then, the participant will activate the bubble machine by rotating the crank on the right side of the device.

step four

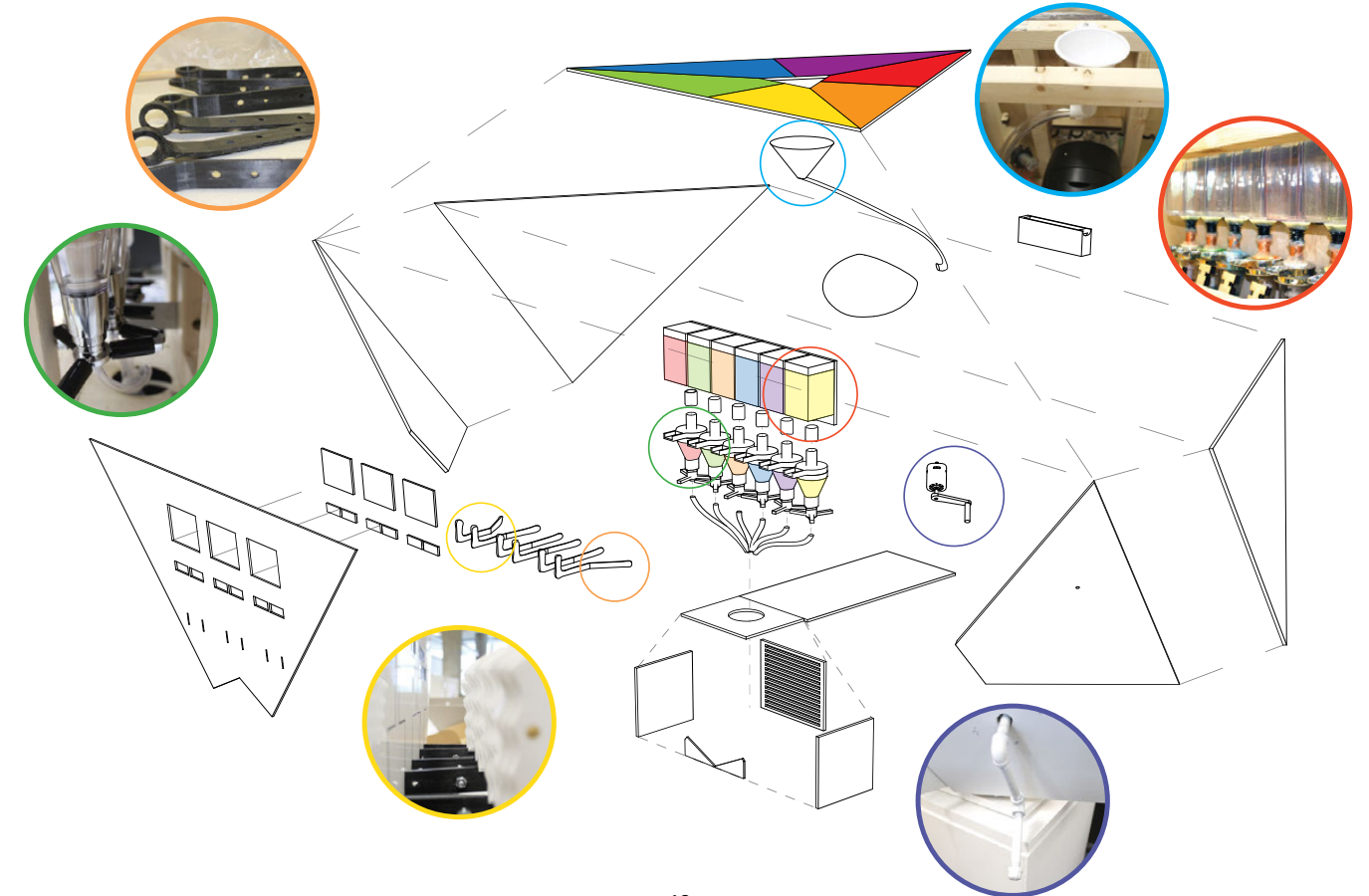
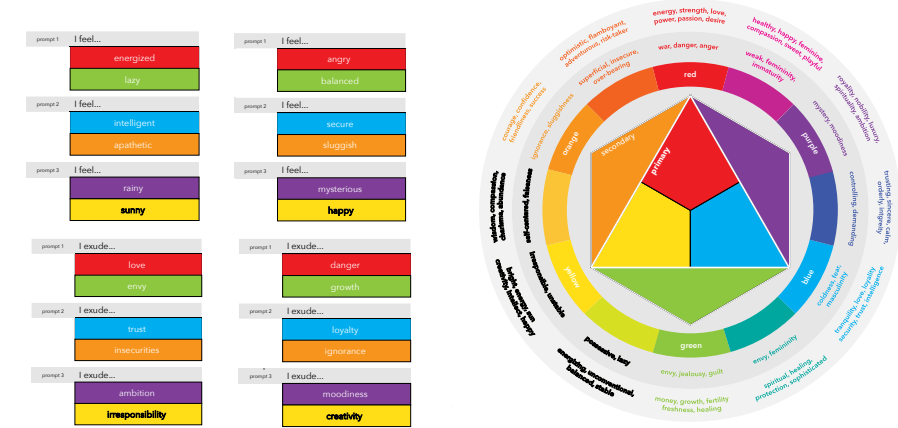


The combination of the unique colors as the bubbles attach to the canvas will create an ever-changing piece of art that represents the current emotional state of its participants.



prompt questions

Each emotion is linked to a specific color on the color wheel which represents the primal impacts the color has on human emotion when perceived in light to those who can perceive color. Each individual is subject to have different perceptions and interpretations with each color. The color chart above represents the standard psychological color chart which dates back to the Egyptians who studied the effects of color on peoples mood and energy.



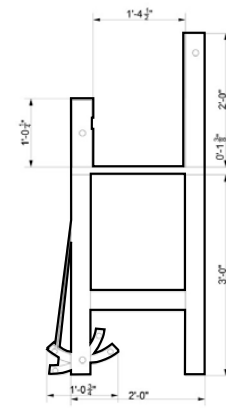
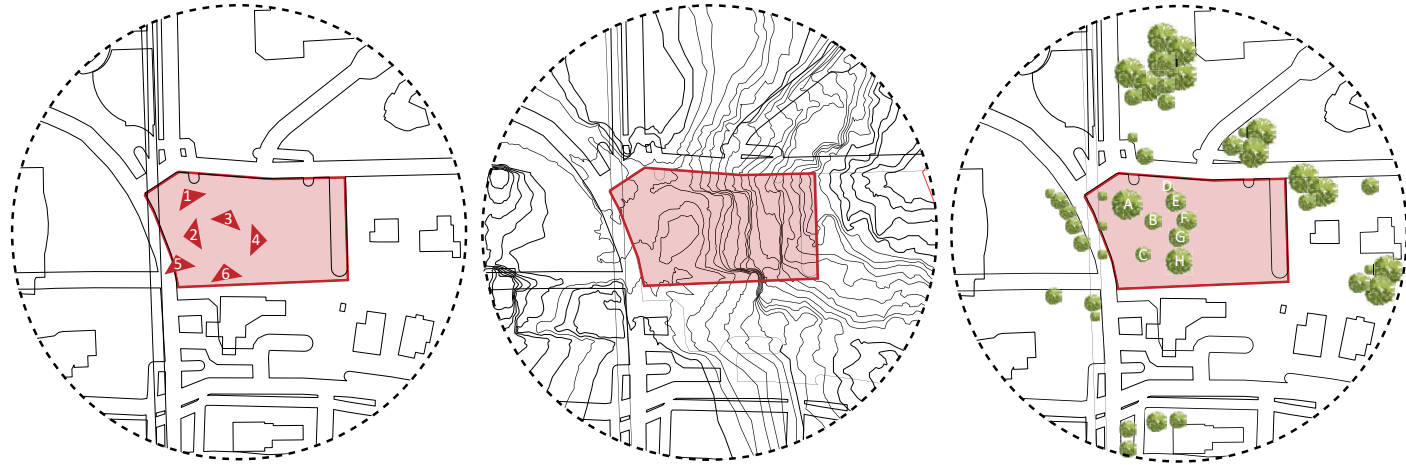
THE PAINTING MACHINE

Nelly Mehrjerdian, Michelle Nguyen

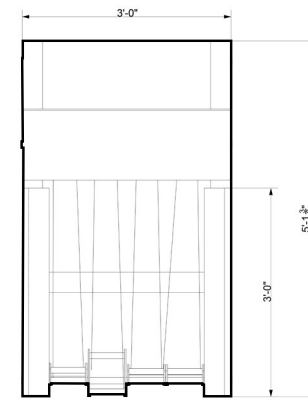
The Painting Machine allows a user to create an abstract painting. The input is the human's force on a foot pedal which pushes paint out of the spray bottles to create a painting on a canvas.



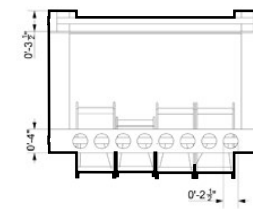
This device is designed using components of the site such as wind patterns, traffic and pedestrian circulation, views from the site, and the existing trees.



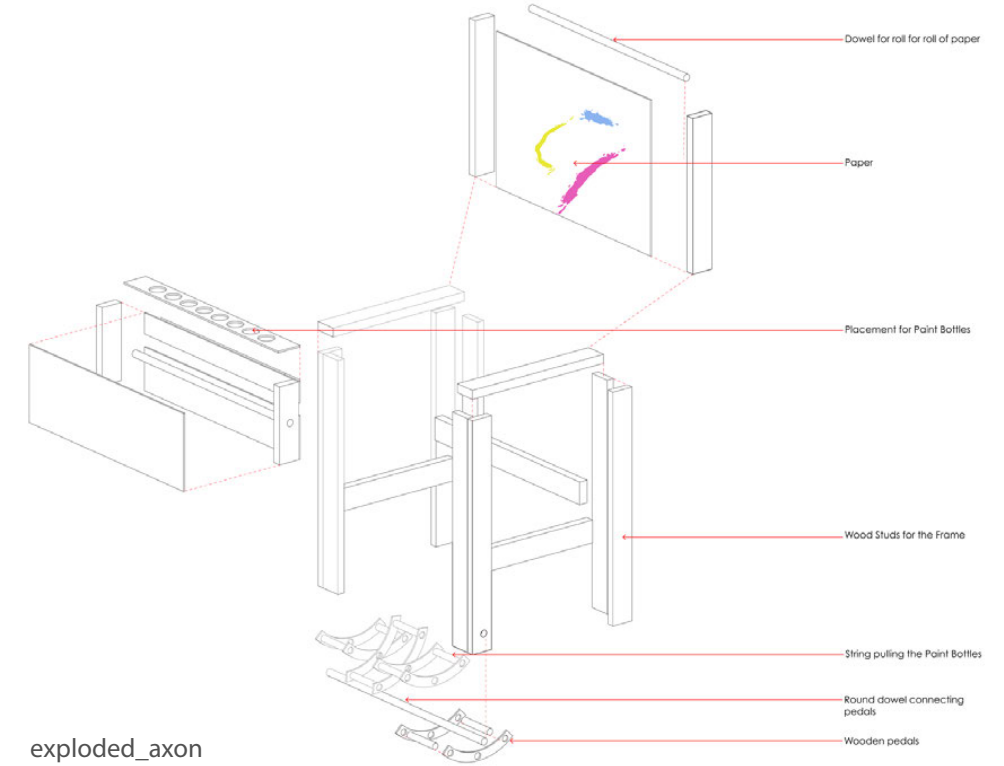
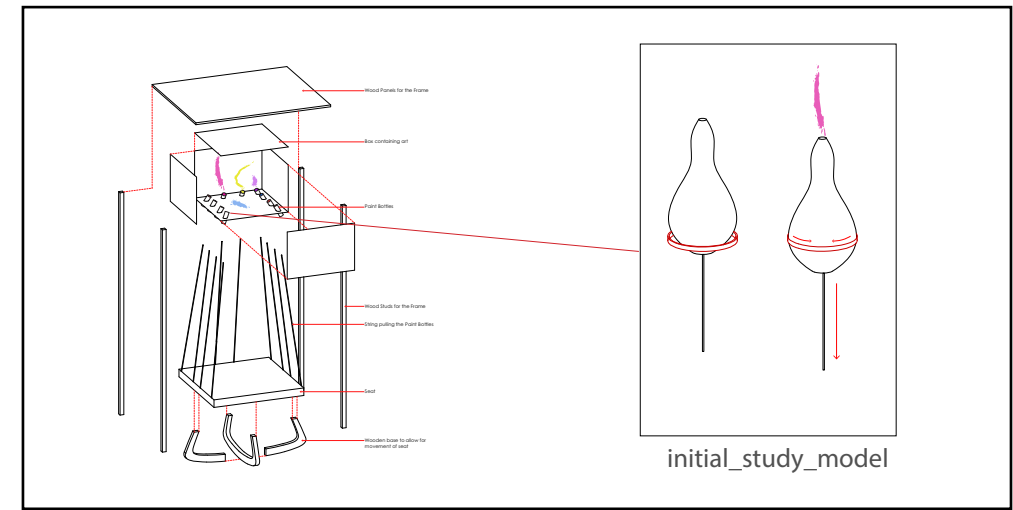
side_elevation



front_elevation



top_elevation



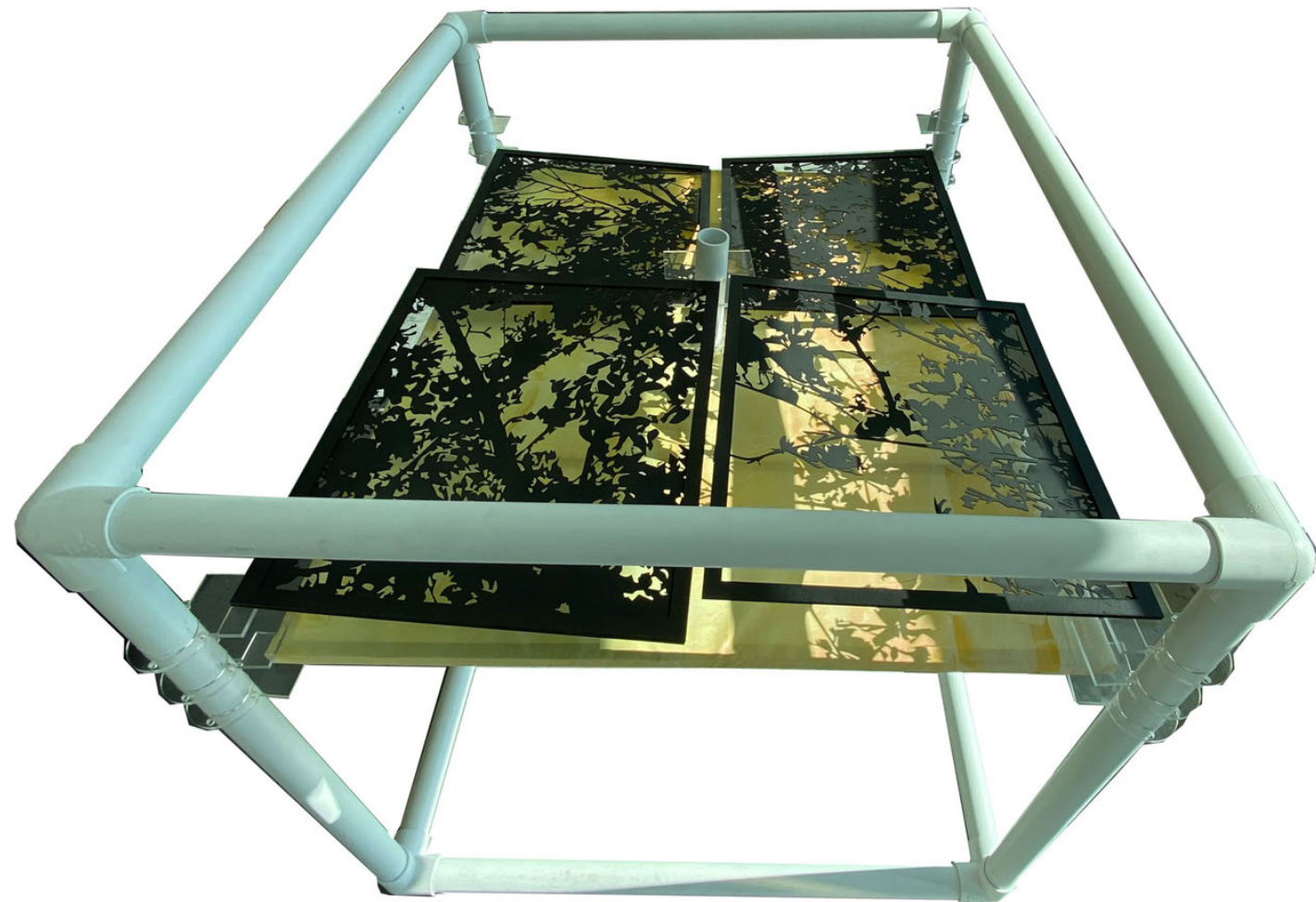
exploded_axon

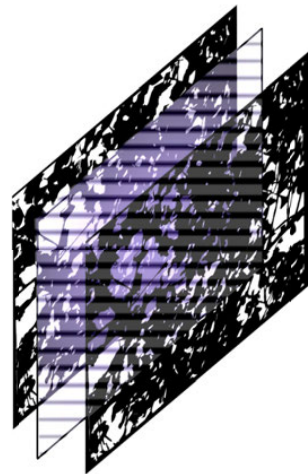
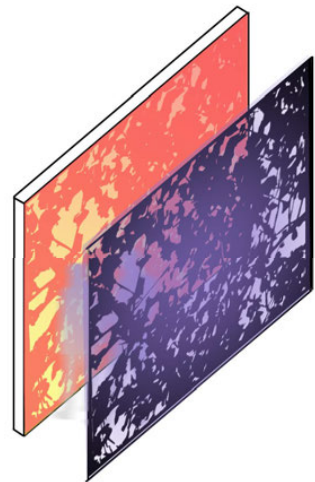
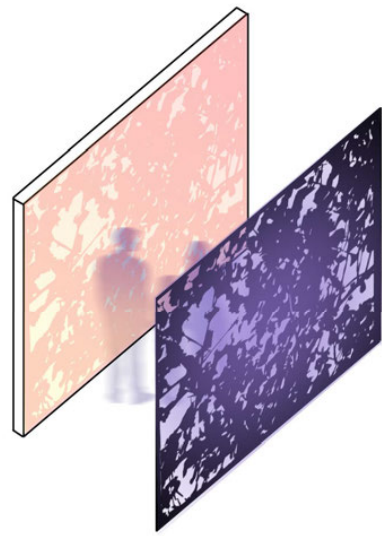
STOMATA

Nhan Luu, Hala Alfalih

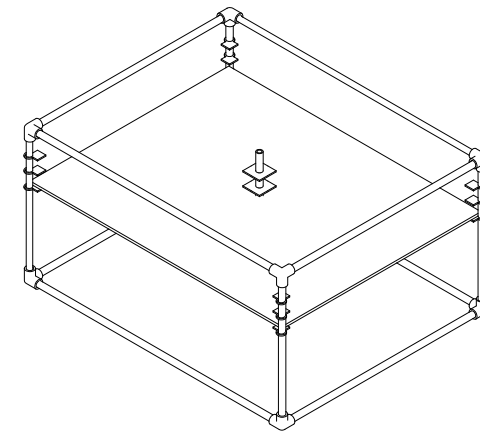
<https://youtu.be/ZxHYAjHIZwU>

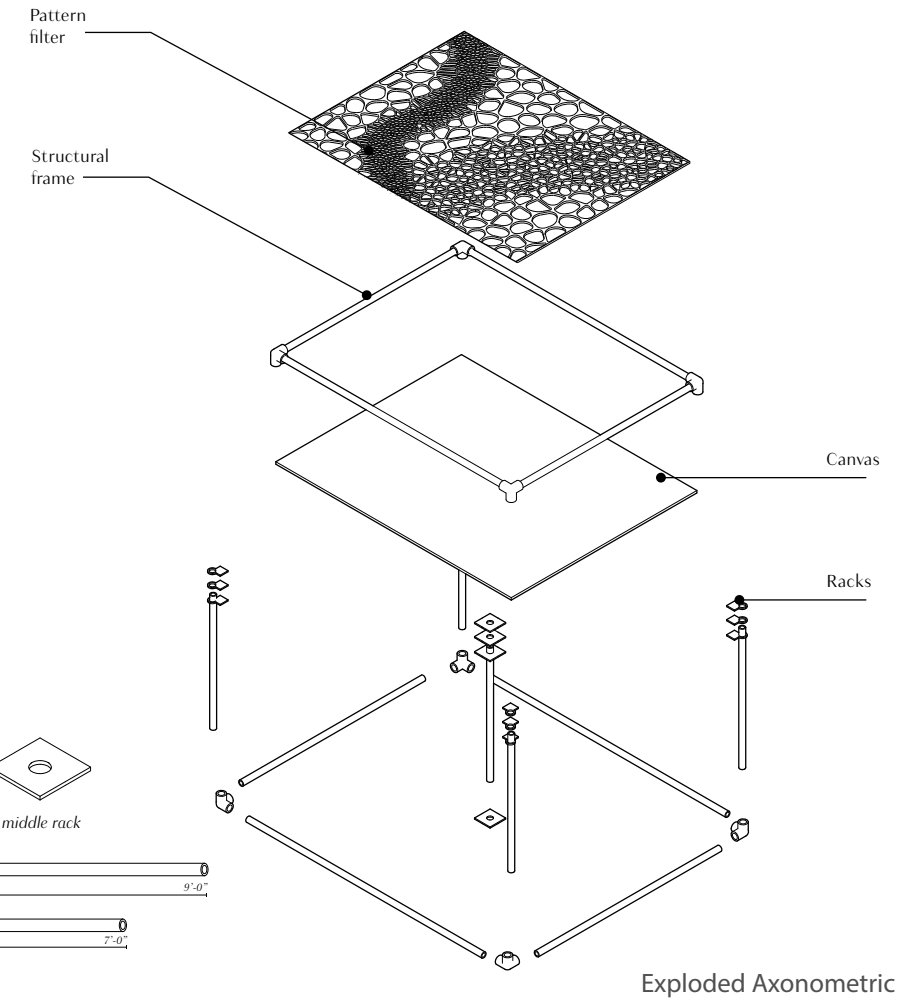
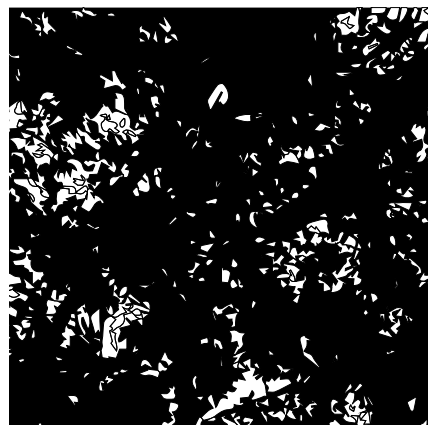
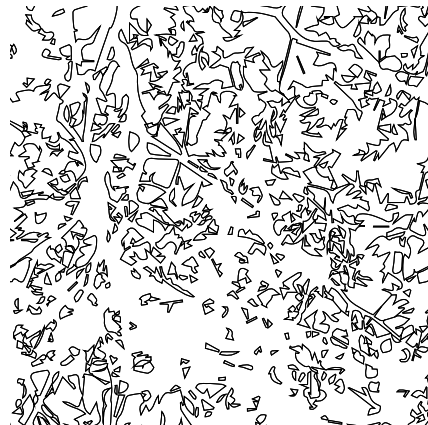
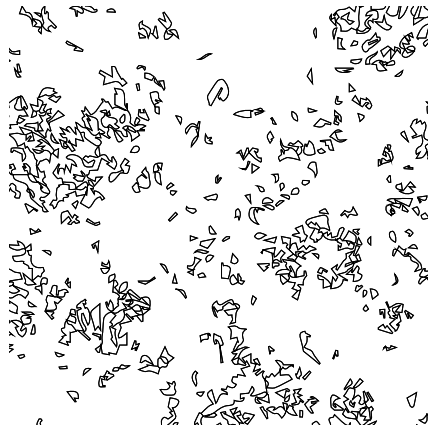
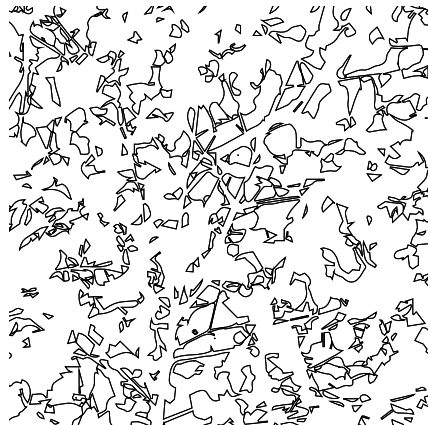
Stomata offers different dialogues to facilitate various outputs onto a canvas with photo-chromic pigment. Different patterns imitate the natural patterns in the environment, allowing the experience of these patterns in a different dimension. Through this process, the canvas changes colors representing the different patterns for a small period of time before returning to the original color.



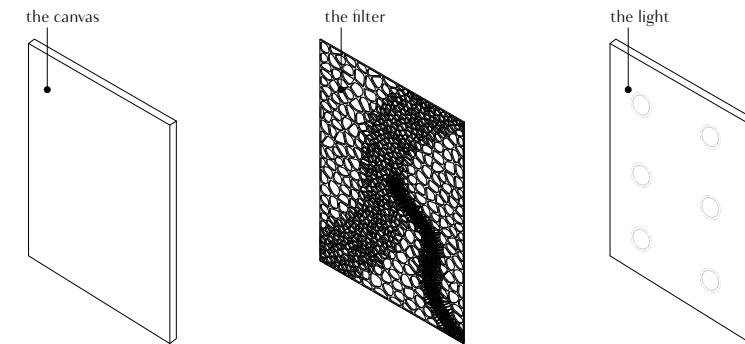
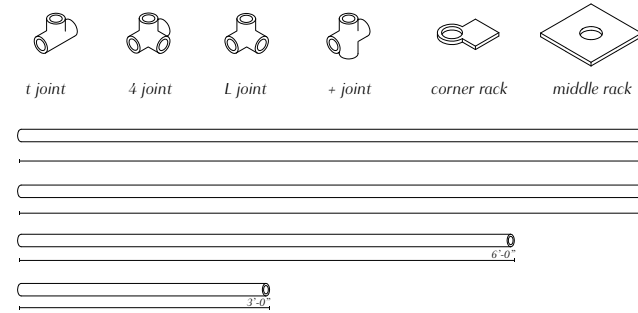


The device represents a dialogue occurring between the environment and the physical body. The dialogue is both conscious and subconscious; the user is consciously moving different patterns and the sun is subconsciously interacting with these filters to create artwork that is experienced as a result.





Kit of Parts



Exploded Axonometric

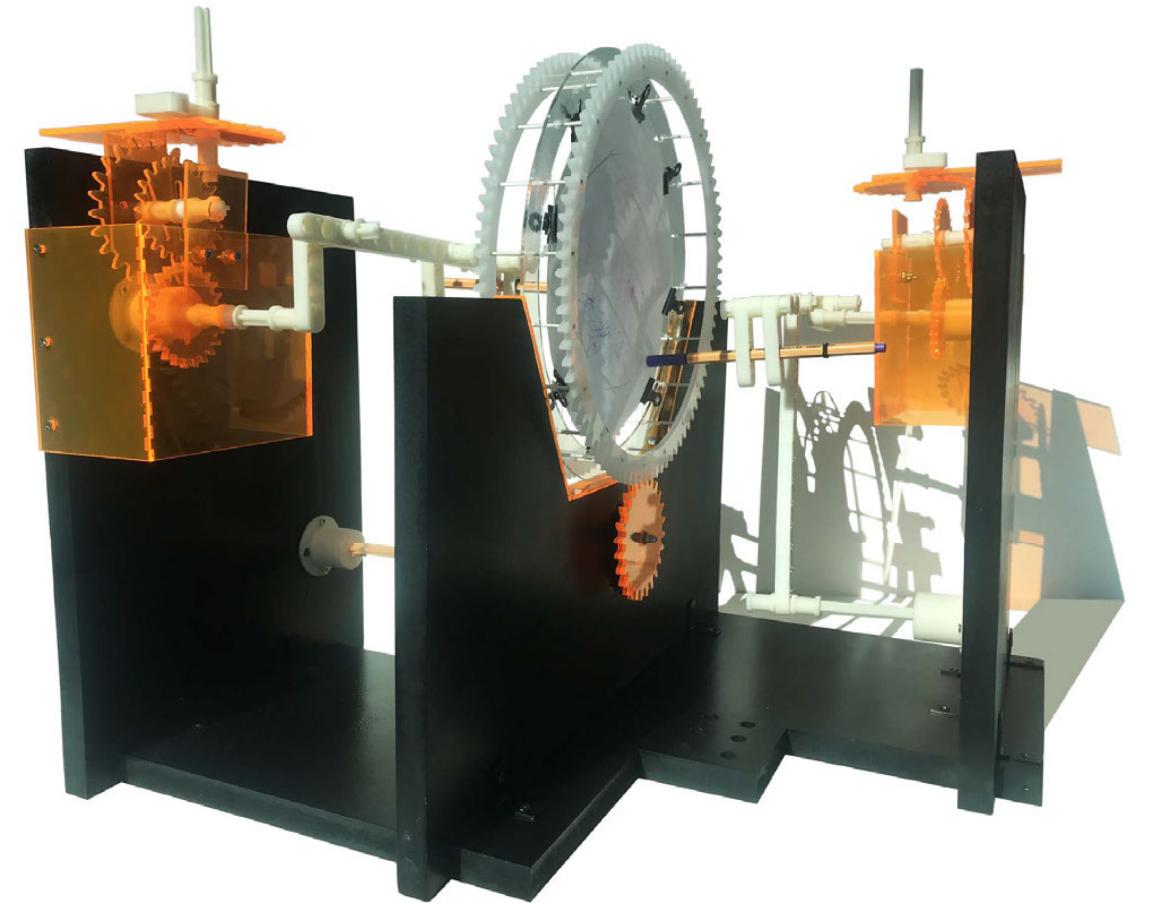
SPIRO

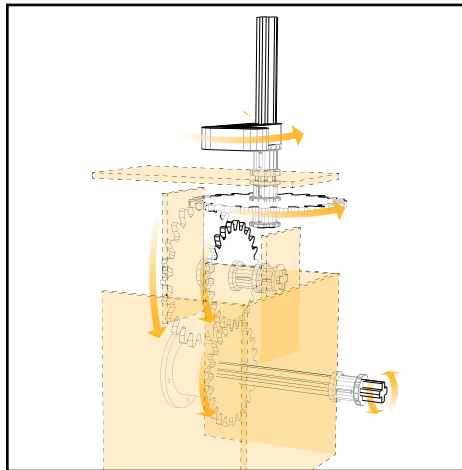
Ana Giron & Asbiel Samaniego

<https://youtu.be/bz9MDx5ZQjg>

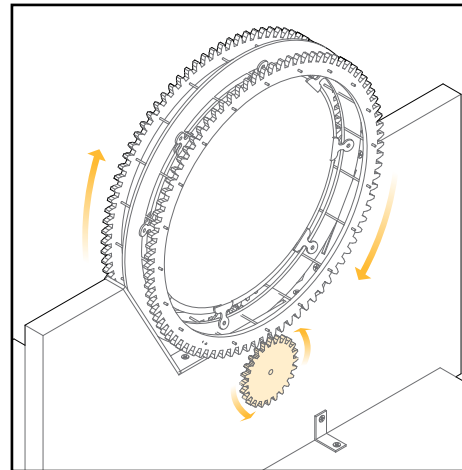
Spiro is a dual-drawing machine that took inspiration from the Spirograph, a geometric drawing toy that produces mathematical roulette curves. The device also builds on the concept of stigmergy, which is defined as a mechanism of indirect coordination, through the environment, between agents or actions. In the case of Spiro, two individuals simultaneously operate two 3d printed arms and have full control as to the amount of spins they manually make, speed, and color of the pen.

The central part of the device consists of a central wheel/gear system which is automated through a motor. The motor was programmed through the Arduino software, specifying it to rotate continuously in only one direction. Once the motor spins it would begin to move the central wheel in which the drawing canvas is located. As the two 3d printed arms get cranked manually the central piece is moving on its own. The end results are very abstract line-work art.

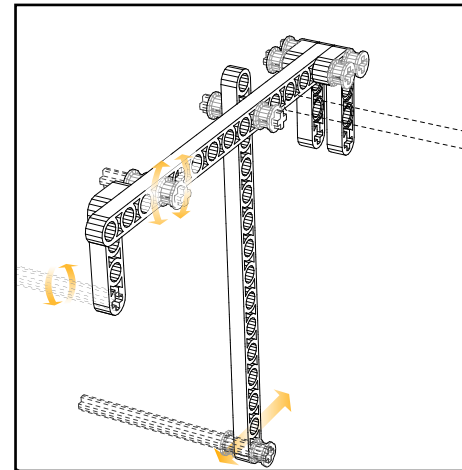




01 HANDLE MOTION_



02 WHEEL ROTATION_



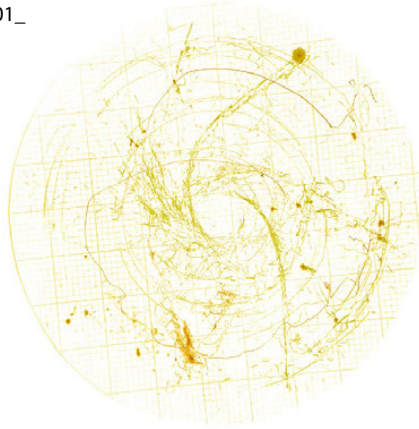
03 ARM ROTATION_

[01] HANDLE MOTION: At the very top a handle is spun manually around a rod that is attached to a horizontal gear. As the handle is spun the gear also begins to rotate and it begins to move the vertical gears.

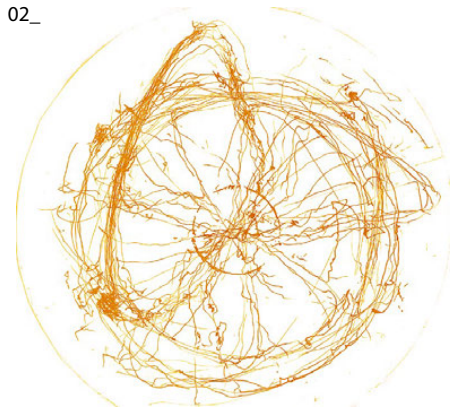
[02] WHEEL ROTATION: The central wheel rotates automatically through a motor that when plugged into a power source begins to rotate a smaller gear. That small gear then pushes and rotates the entire central wheel.

[03] ARM ROTATION: The 3D printed arms rotate by pivoting around the top rod that gets activated when the handle motion is in play. Top and bottom rods are anchored to a base with the arms moving around them.

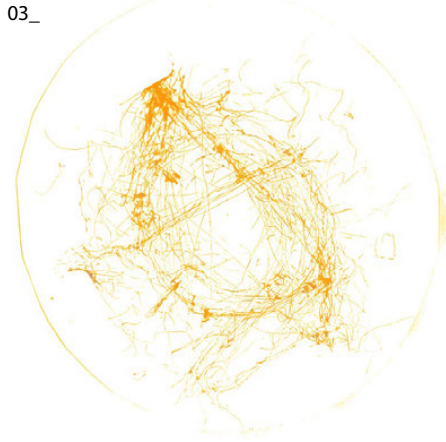
01_



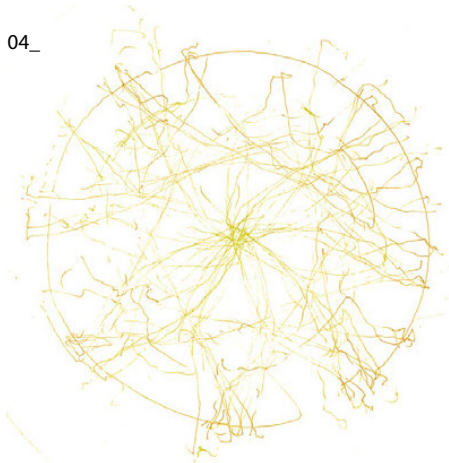
02_



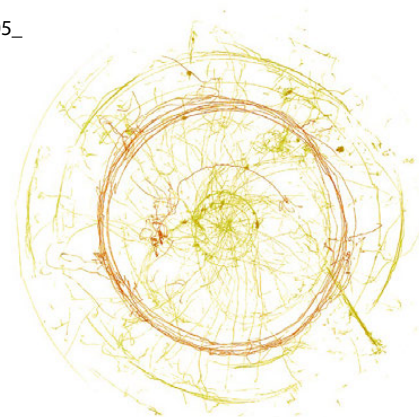
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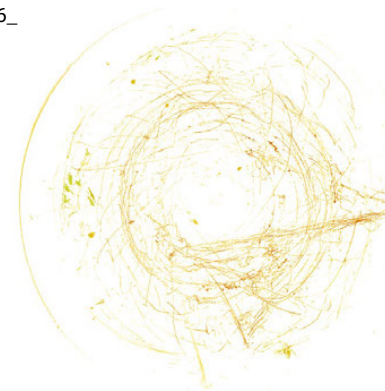
04_



05_



06_



07_



08_



TRIALS_

Eight trials were run using SPIRO with different users each time. The results varied in terms of the line-weight quality and geometric pattern. The outcome was different each time.

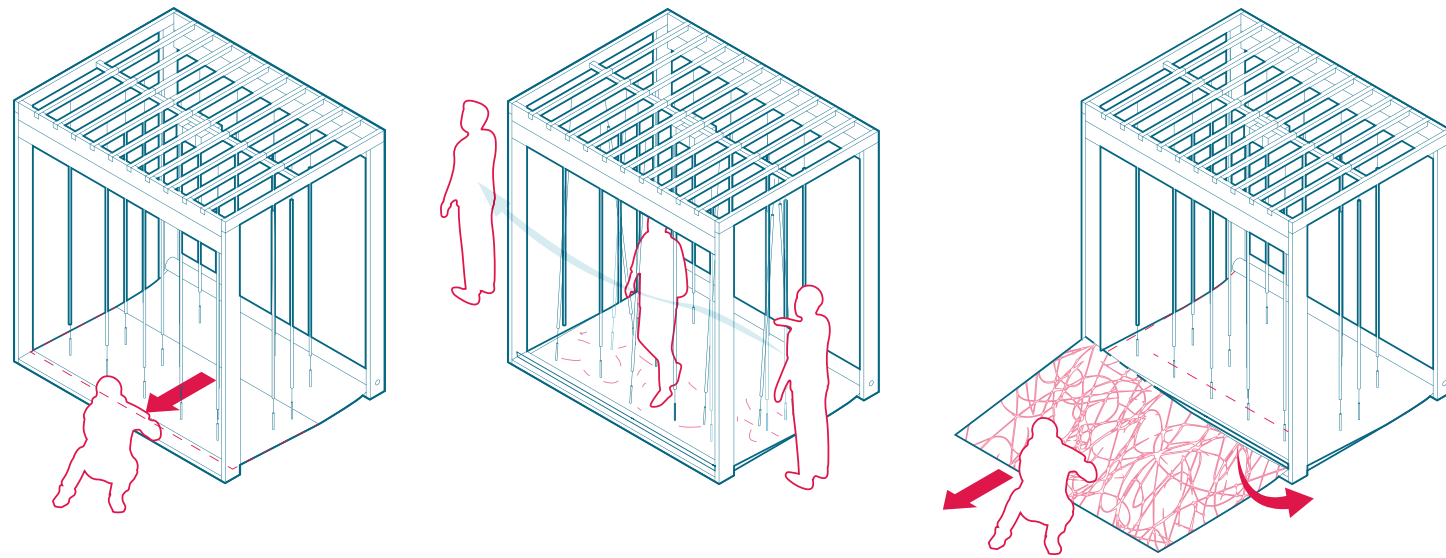
THE DRAWING FOREST

Zach Hart & Huy Ho

<https://youtu.be/swX2CsNnxWg>

The Drawing Forest offers an interactive passage in which users can walk through a field of metallic poles that register the users' motion through art applied to a canvas that serves as the walking surface as well. Depending on the path taken, the speed walked through, and the amount of force used to push through the forest, the resulting swinging motion of the poles varies, in turn, creating unique brush strokes to the canvas below. The more visitors that are allowed to pass through the space, the more dense the painting becomes.



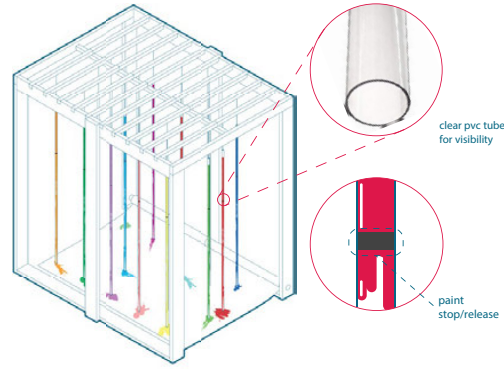


The device is able to be broken down into 3 main pieces: the top piece acts a lintel that fits onto the two open side walls. The hanging poles that make up the forest are able to be detached and reattached to small hooks on the roof piece. The canvas is easily rolled out from a tube hosted on the right side of the device, and after using the device for a given time the canvas can be cut and displayed as an art piece, showcasing each user that interacted with the device through art. The medium used to create the paintings is interchangeable, with holsters hanging at the bottom of the pole being able to be removed and replaced with materials such as paint brushes, chalk, pastels, or charcoal. These different media each have unique properties that give the resulting art unique qualities.

ALTERNATIVE DEVICE OUTPUTS

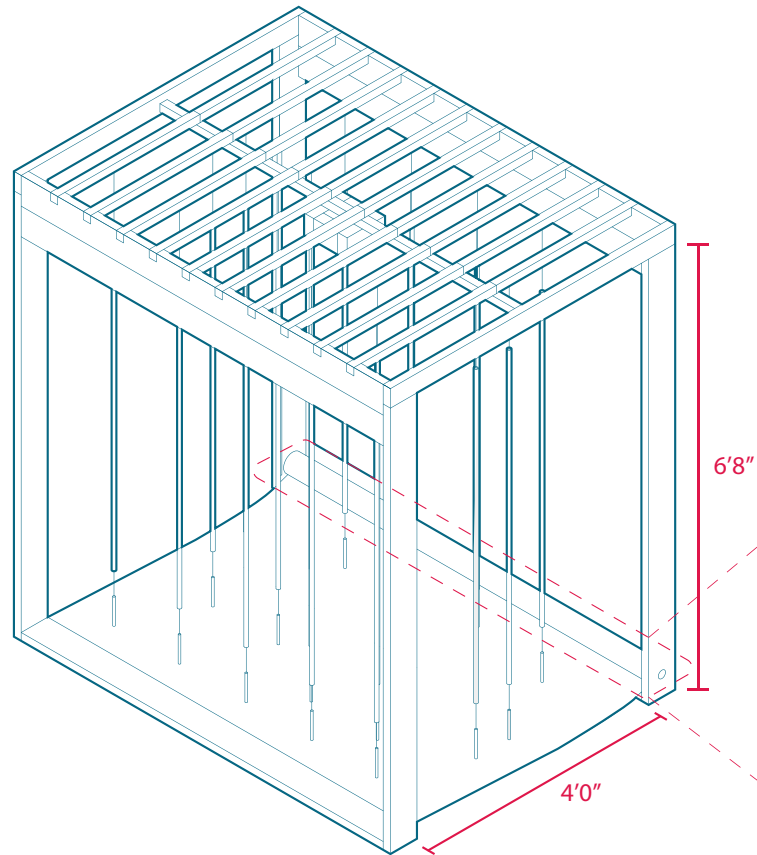
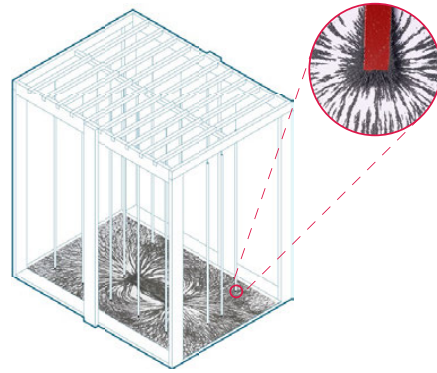
1 colored rain

This proposal replaces the tubes with a clear pvc material, and fills them with paint that is able to be started/stopped, so that the paint can drip down the tubes like colorful rain, creating an interesting visual experience for the user and colorful canvas art below



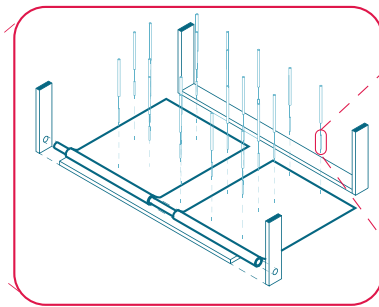
2 magnetic field

This proposal replaces the tube ends with strong magnets, and fills the canvas with a magnetic sand covered by an acrylic walking surface, so that the sand is pushed & pulled by the magnets depending on how the user travels through the space

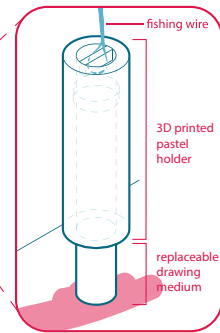


6'8"

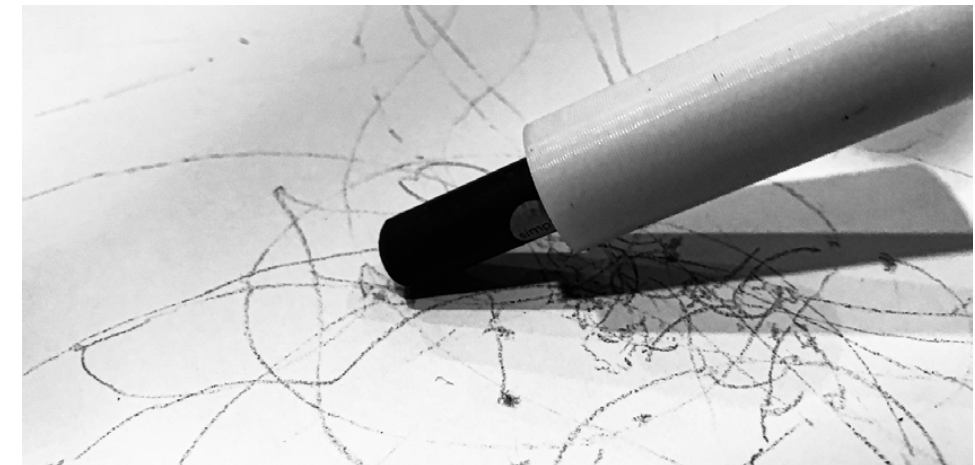
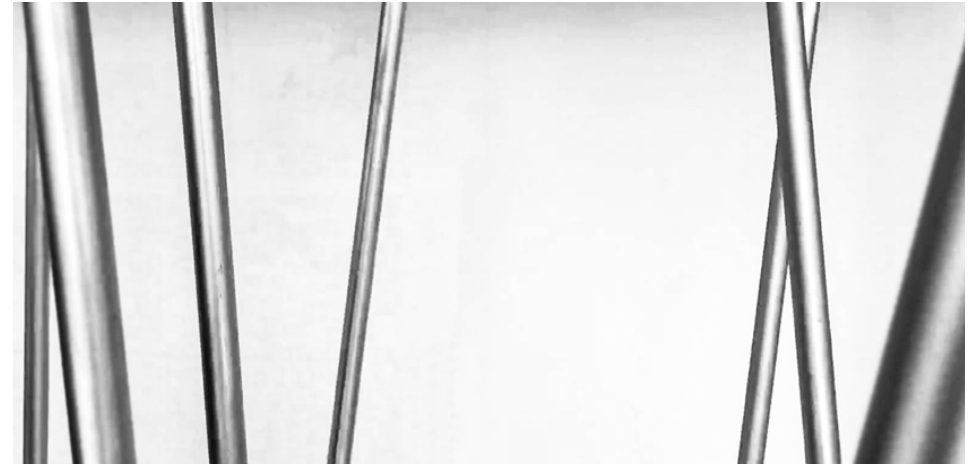
4'0"



exploded paper roll detail



pastel holder detail



THE SPACE

ARCHITECTURAL INTEGRATION

Design Activity 02 | THE SPACE: Architectural Integration

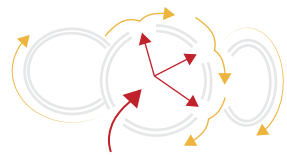
In this phase, students investigated how the device and spatial exhibitions may inform architectural spaces and how the space may enhance the experience and operation of the device. As a result, students established a tectonic language for a wider architecture and developed their museum based on initial interests coupled with site design. The end results, the 'museum of interactive technology', aim to engage visitors actively in new kinds of experiences in the city of Atlanta, Georgia.

THE COLOR MUSEUM

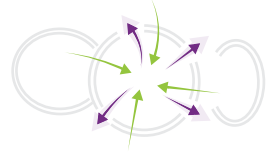
Jessica Headrick, Caleb Lawrence

The Color Museum facilitates the discourse between the environments and visitors by offering a space, which affects the body. It facilitates emotional self-expressions through color, and a collective influence of these self-expressions on the space resulting in dynamic architecture.

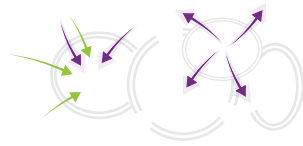




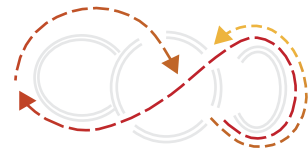
The entire circulation area benefits the visitor with the rounded shapes which encourage natural movements and progression.



The cone of color gets daylight from the skylight. The city wide emotional representation of color peaks through the halos space reminding the user of the collective emotion.



The museum actively engages with the city by capturing the collective emotion. It engages with the street presence by altering the sculpture garden and also provides a 180°+ view of the city for further reflection.

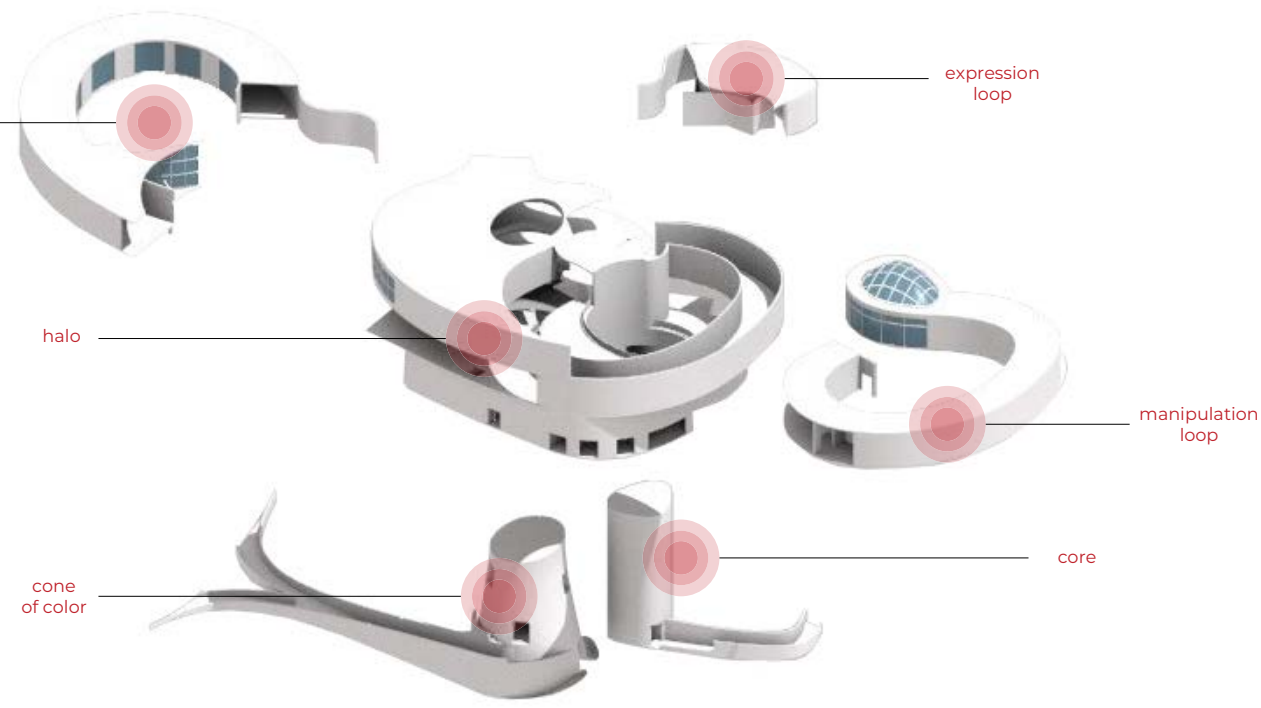


The circulation encourages the users to continuously flow back through the cone of color which is a collection of single expressions.



expression loop

theory loop



halo

expression loop

manipulation loop

cone of color

core



reflection room



cone of color

theory loop

EXIT

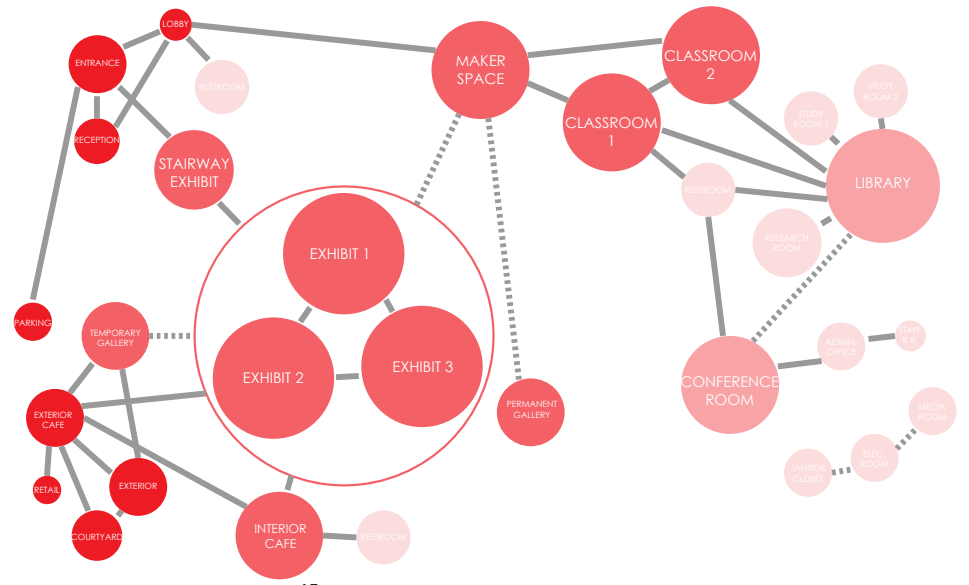
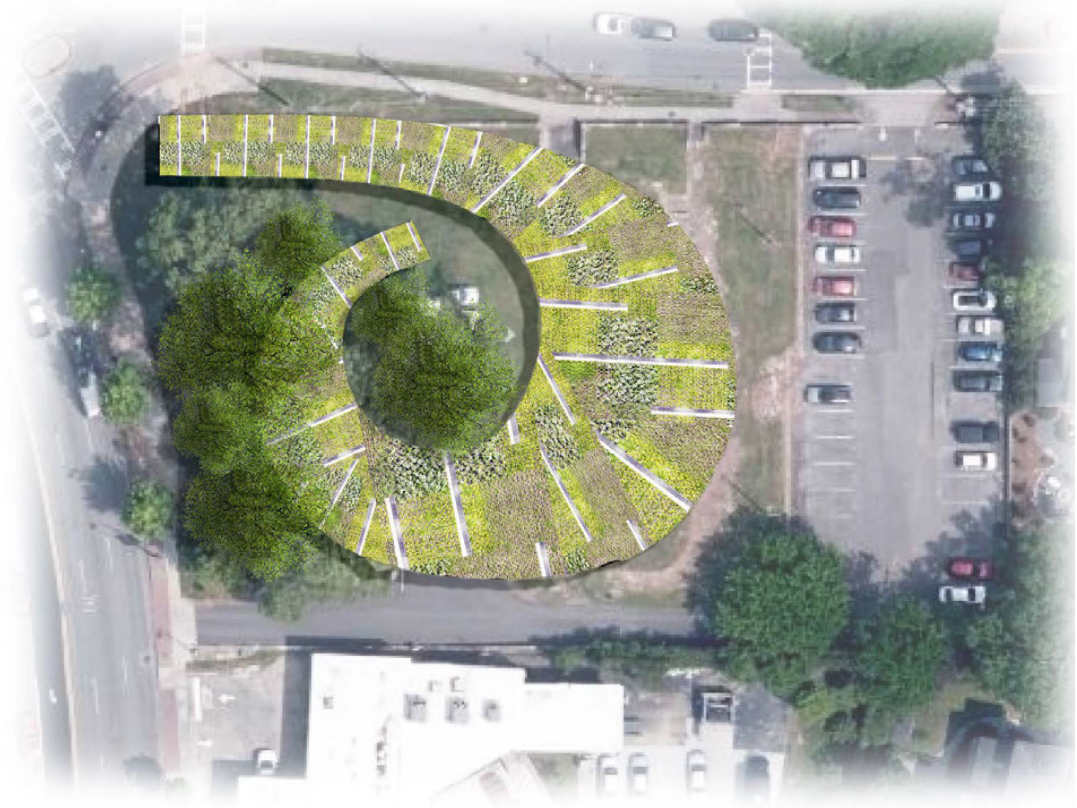
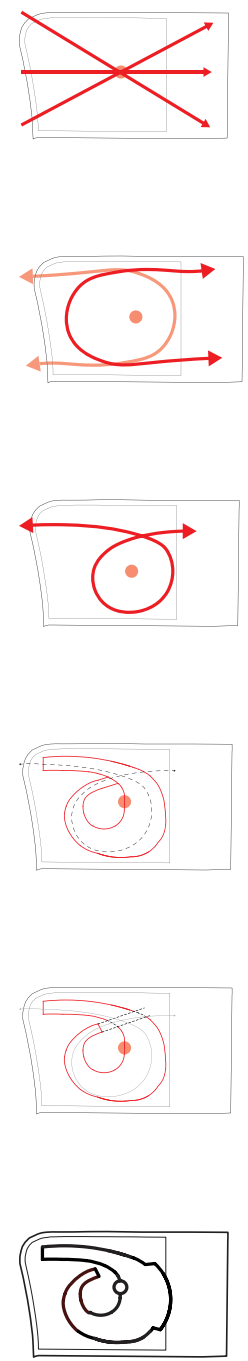
THE COLOR MUSEUM

Nelly Mehrjerdian, Michelle Nguyen

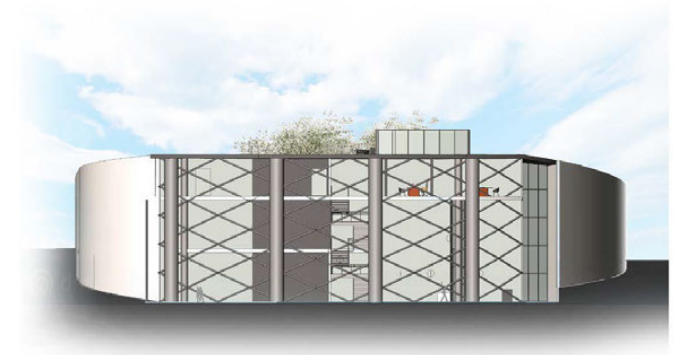
The Color Museum is based off the idea of a museum of interaction which was defined as an environment to stimulate active participation through collaboration, production, and exhibition. The museum attracts social interaction and experiential encounters in order to provoke curiosity, specifically through the play of color.

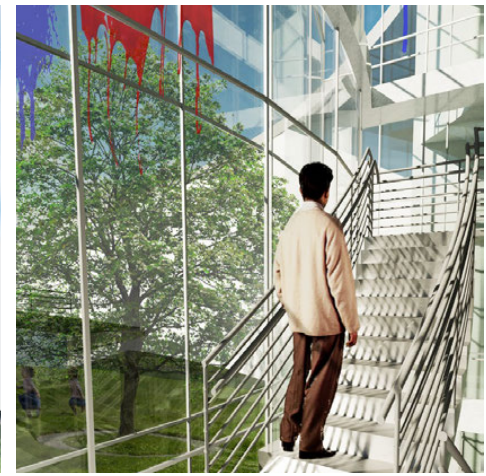
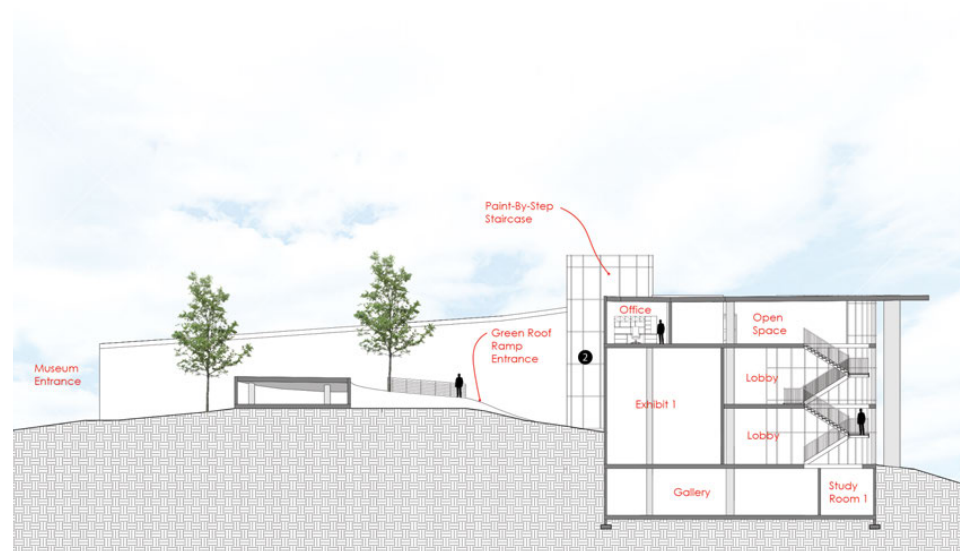
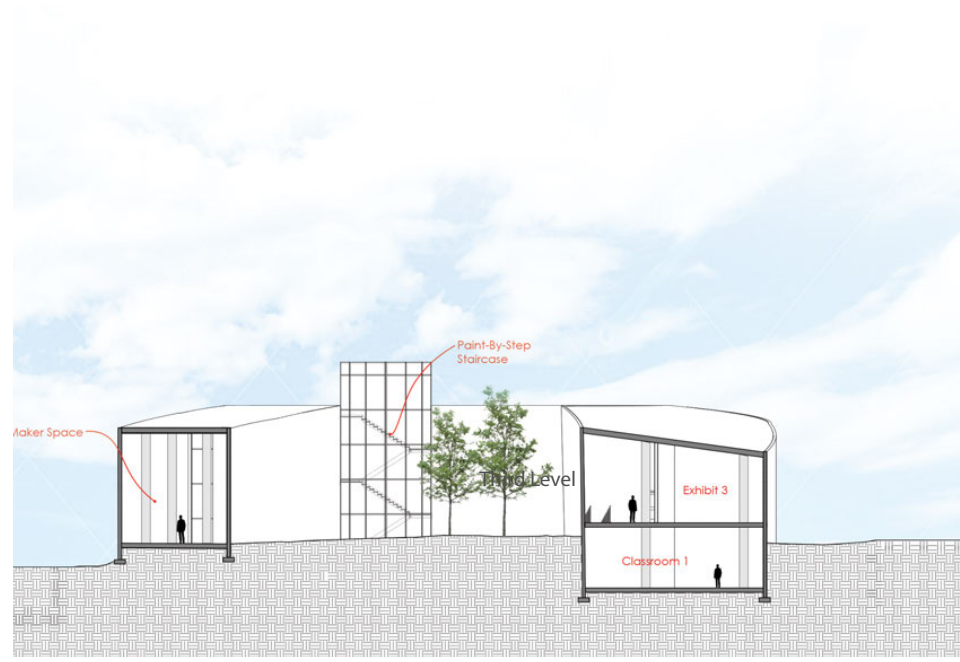
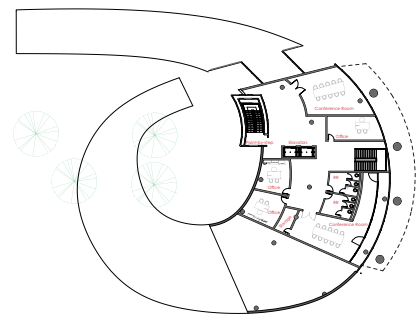
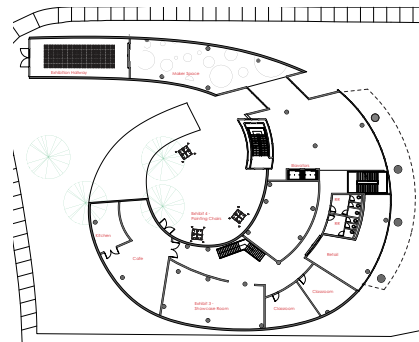
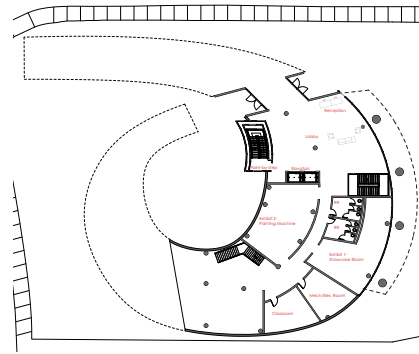
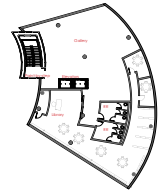


Conceptual Explorations



East and West Elevations

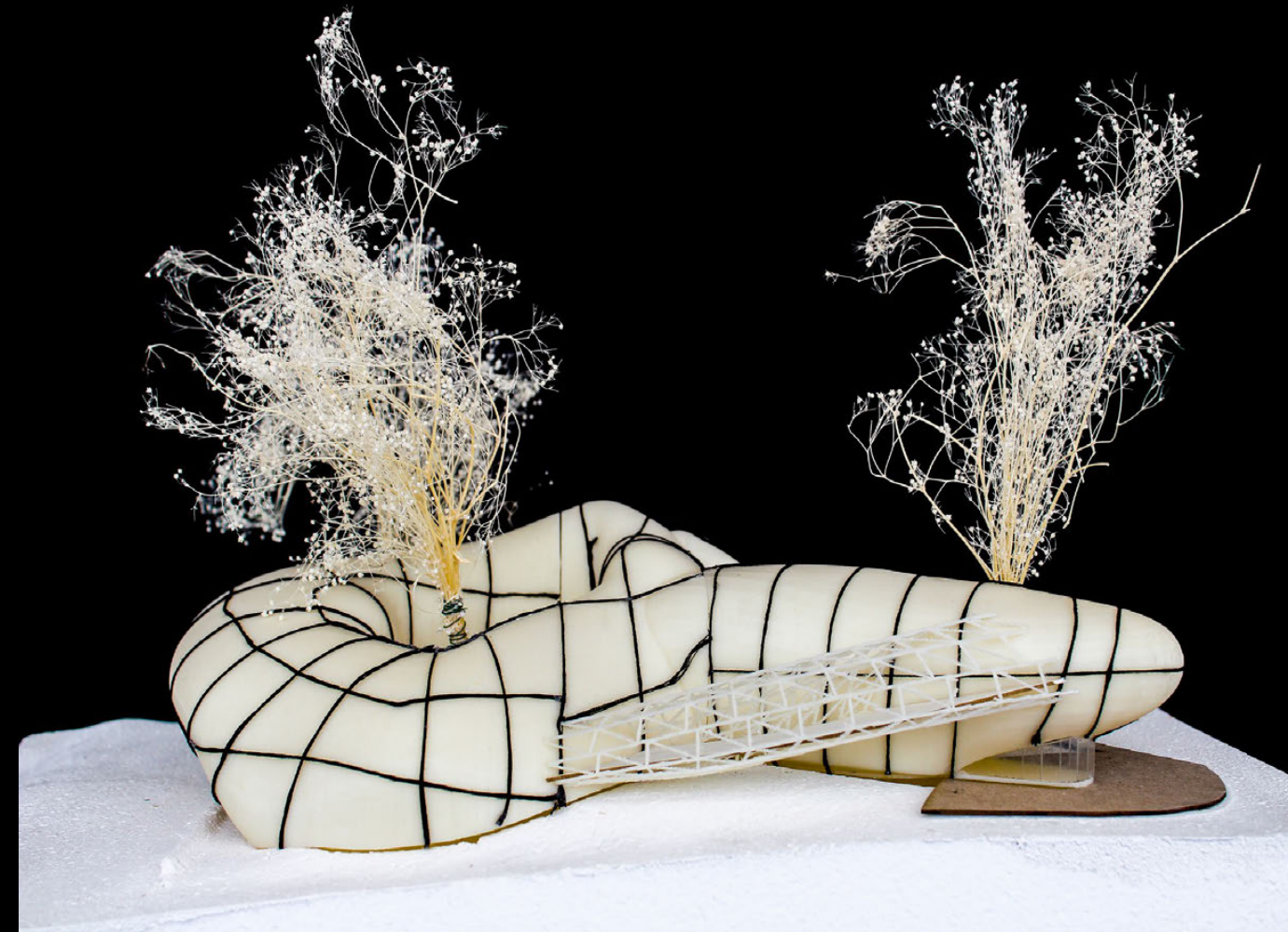




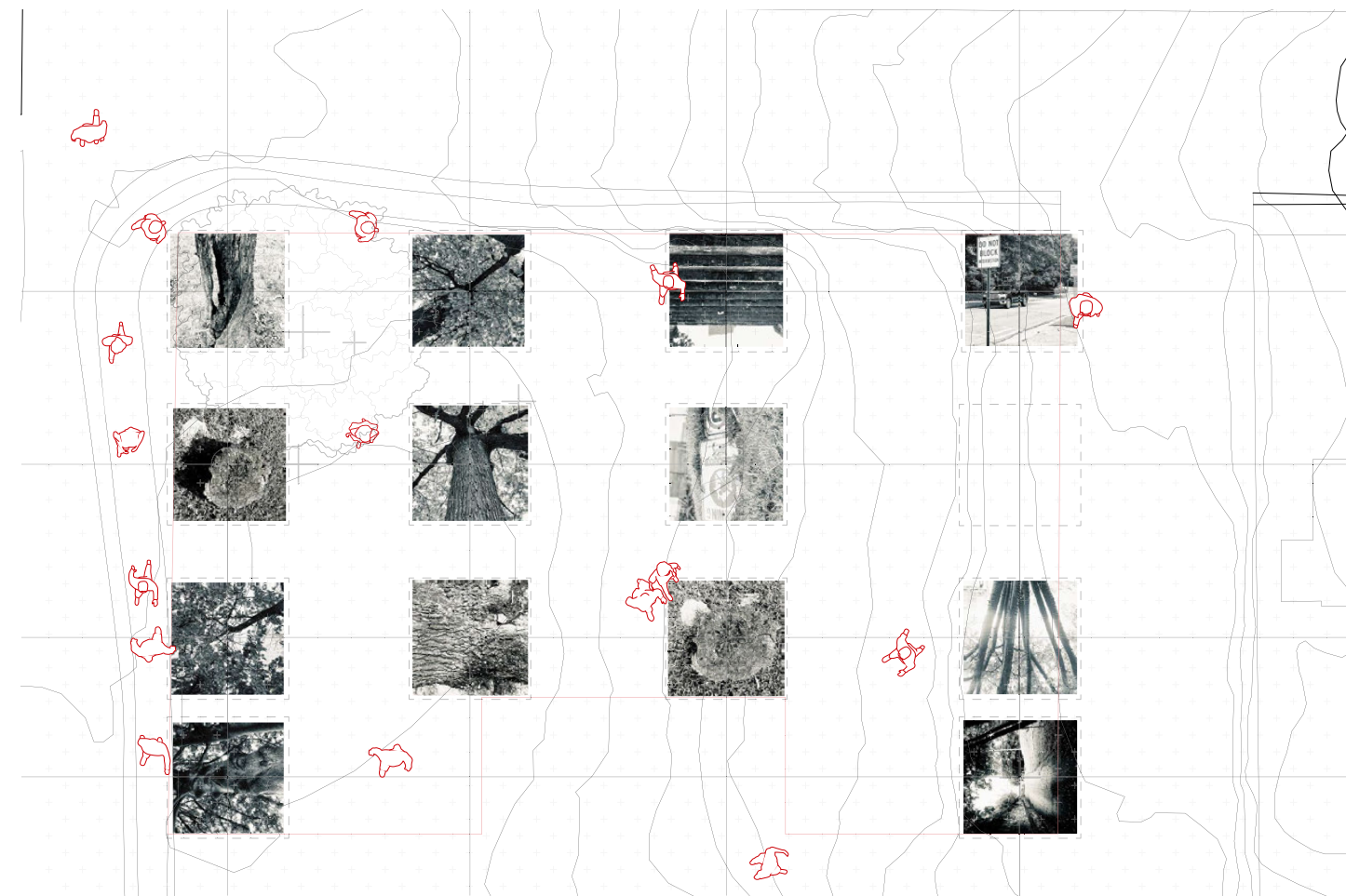
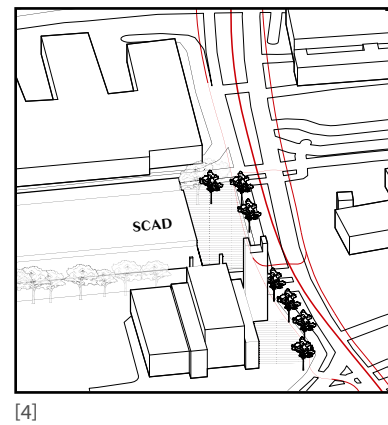
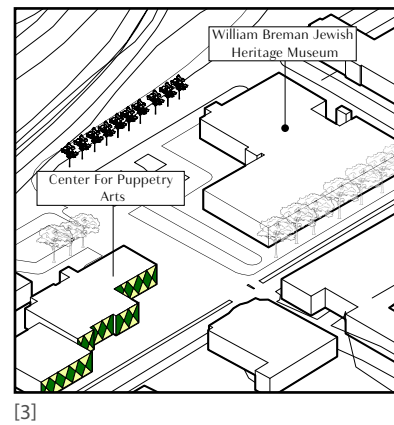
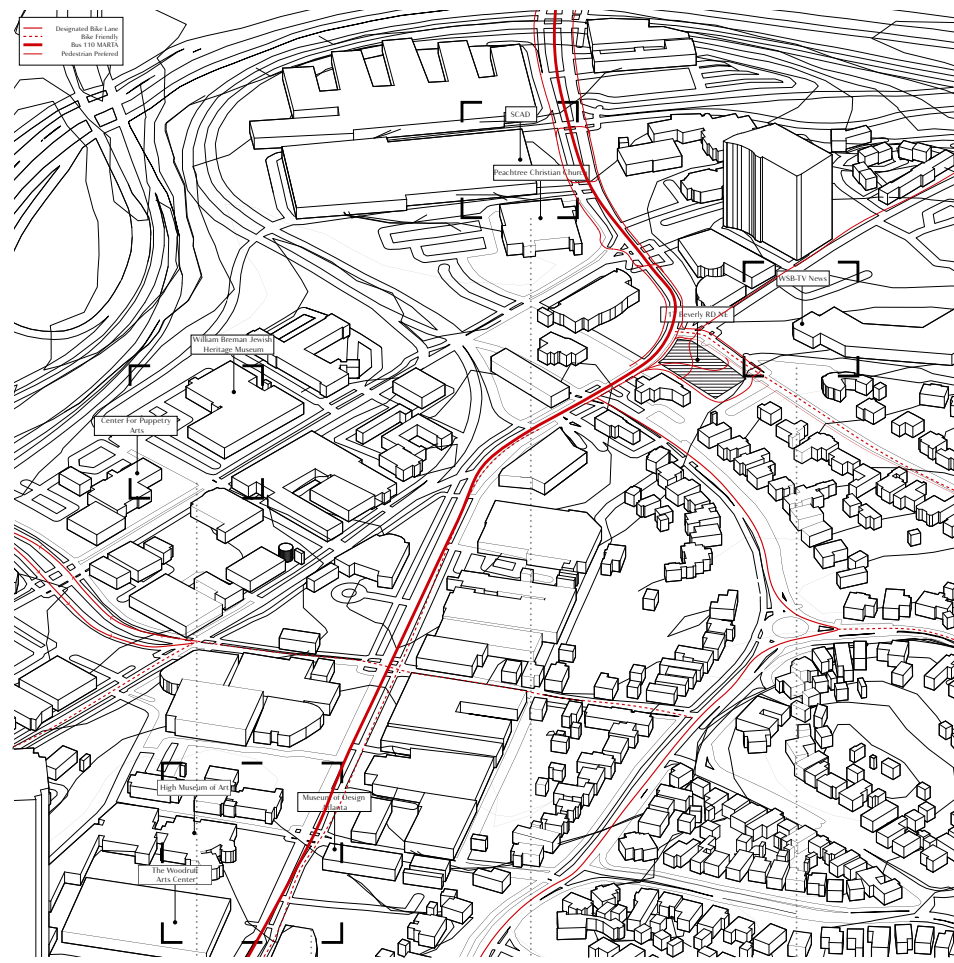
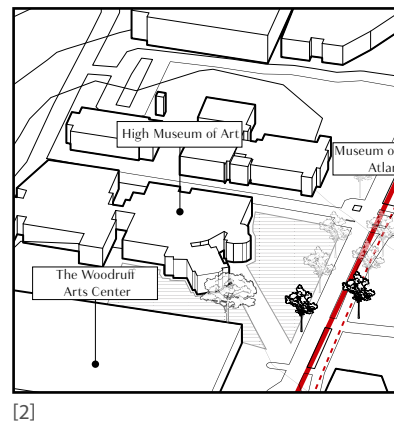
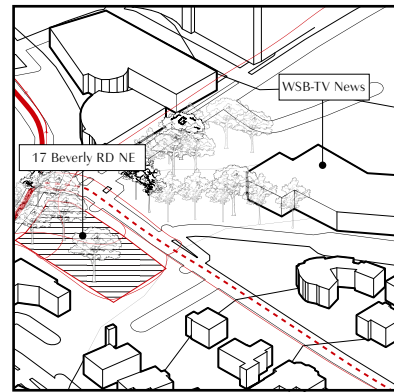
THE MUSEUM OF DIALOGUE

Hala Alfalih, Nhan Luu

The Museum of Dialogue explores the dialogue between the passive and active circulations. It integrates these types of circulations by embodying physical paths which the user can experience. Through multiple various paths, the visitor can discover different parts of the museum while immersing themselves in the local art.

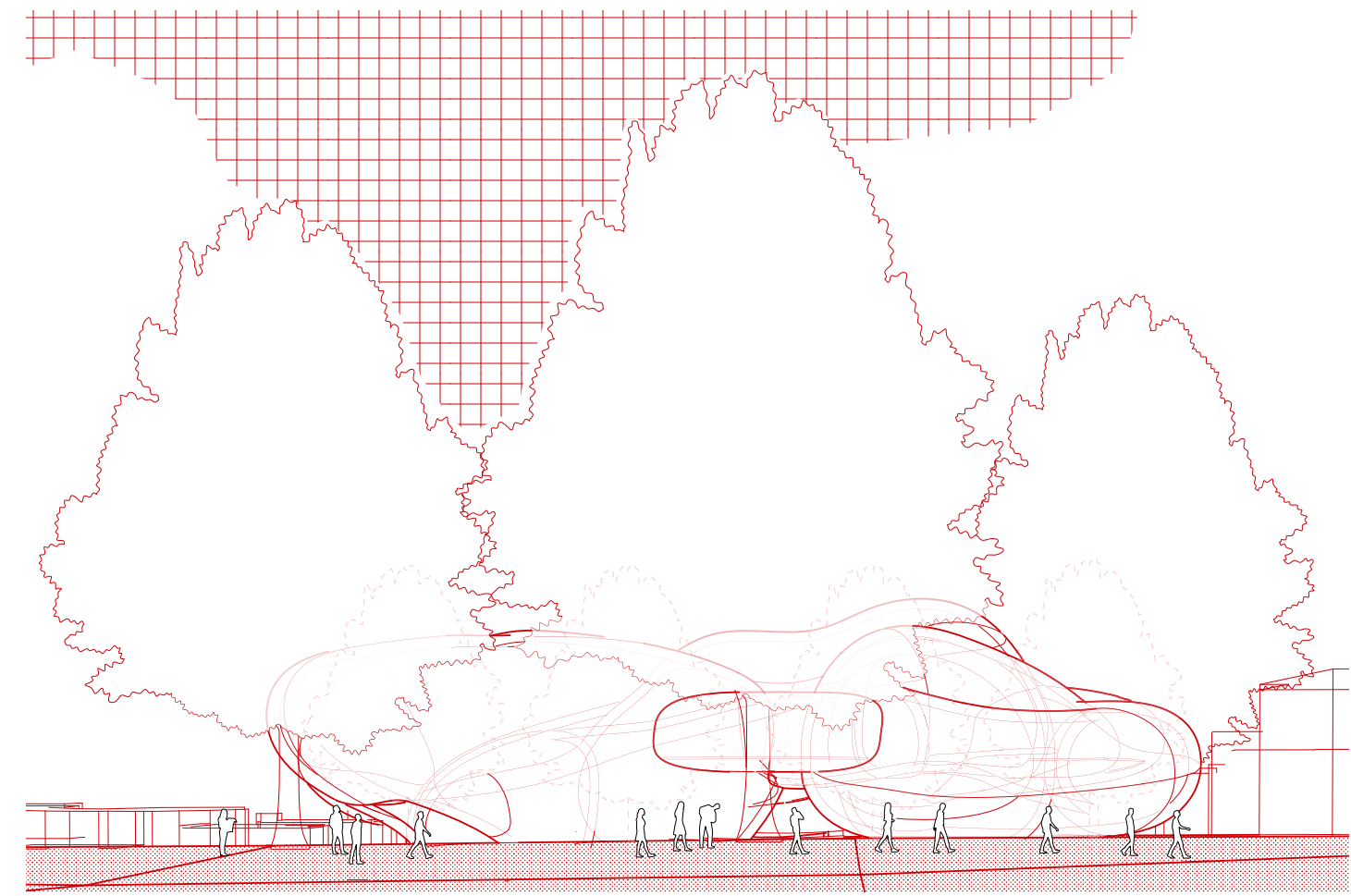
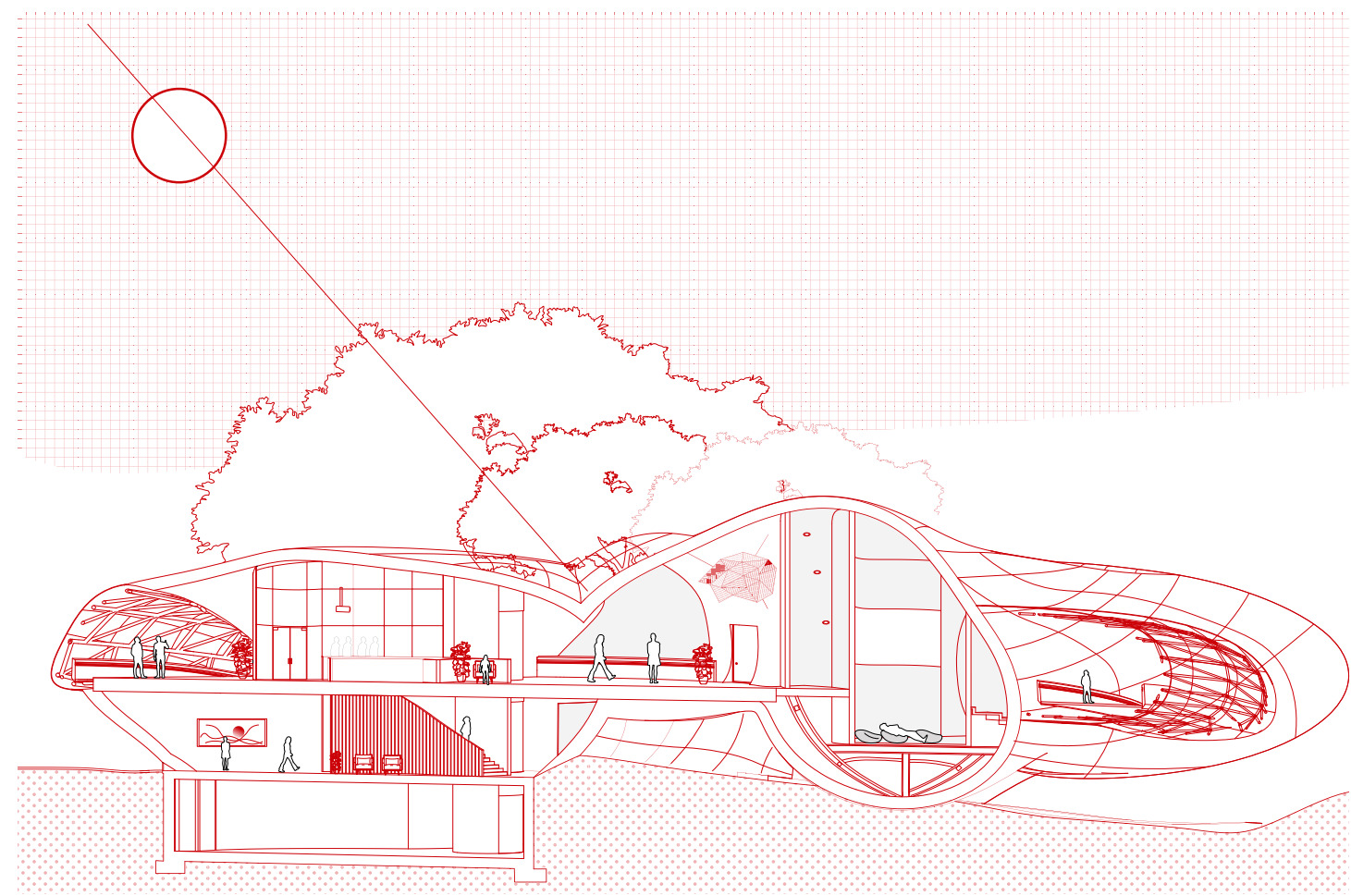
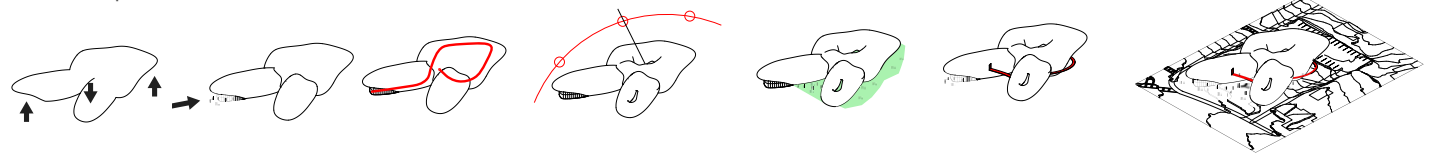


Being located in an artistic site; [1. The WSB-TV News Station is located to the Northeast, 2. High Museum of Art located to the Southwest, 3. Center for Puppetry Arts located to the West, 4. The Savannah College of Art and Design located to the Northwest] The site will use its strategic location on Peachtree Road, it is a prime spot to curate and showcase local talents.



Entering the museum from Peachtree Road, you follow a ramp up to the second floor while experiencing the exhibits and galleries. On the second floor you can support local art by buying some of the pieces which are being auctioned off in the private gallery. There is also an entry from the Eastern side which gives you access to the basement level and offices, this is also where the parking is located.

Mass Development

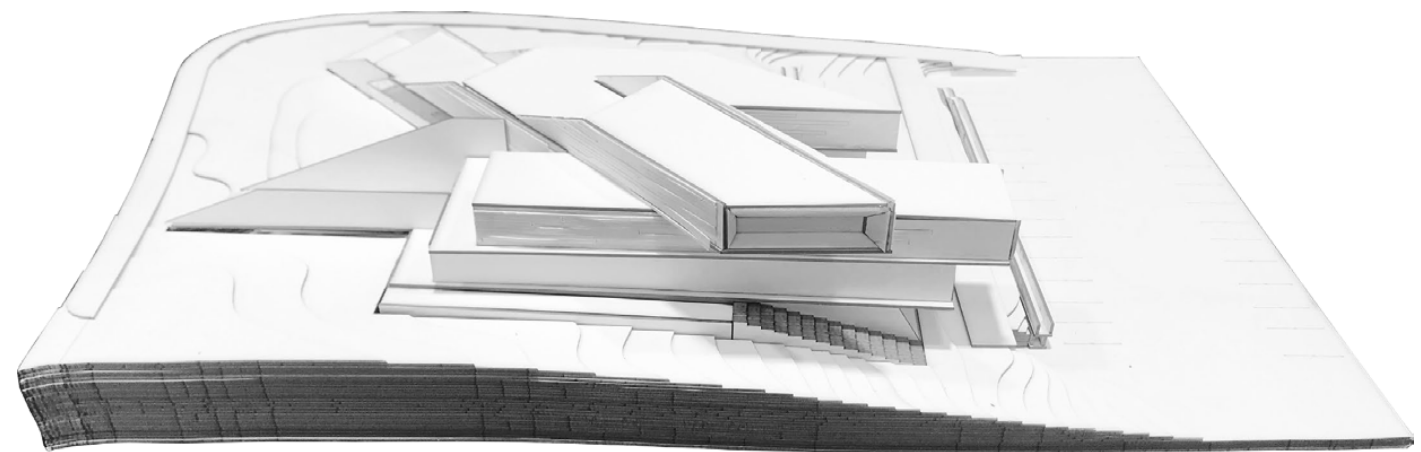


MUSEUM OF STIGMERGY

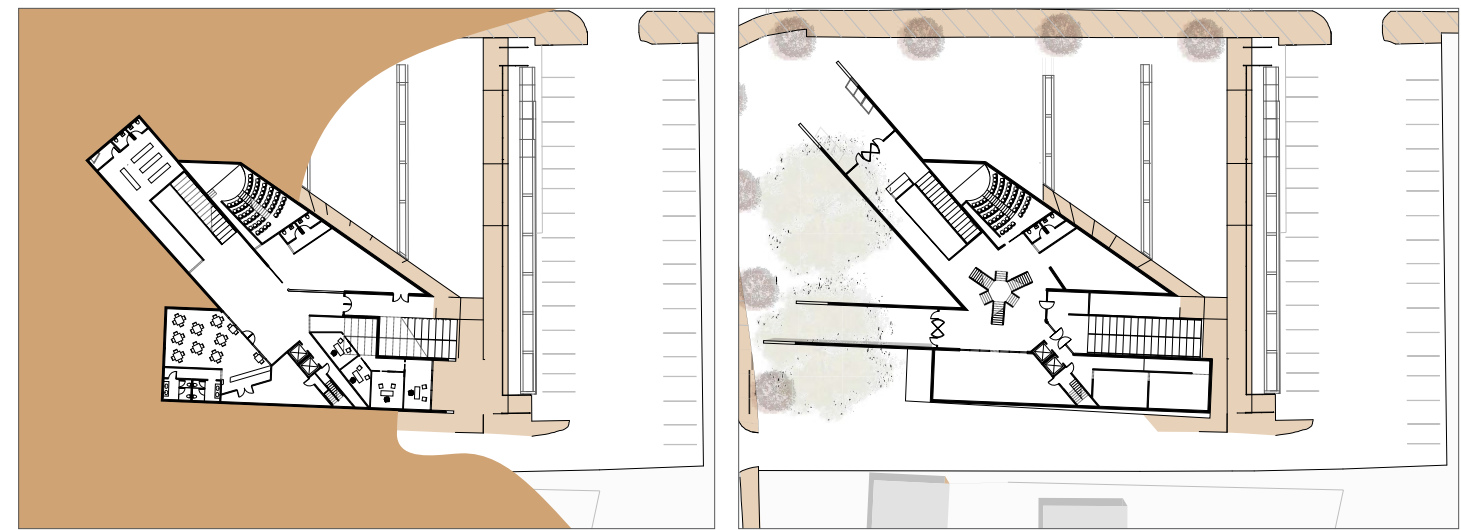
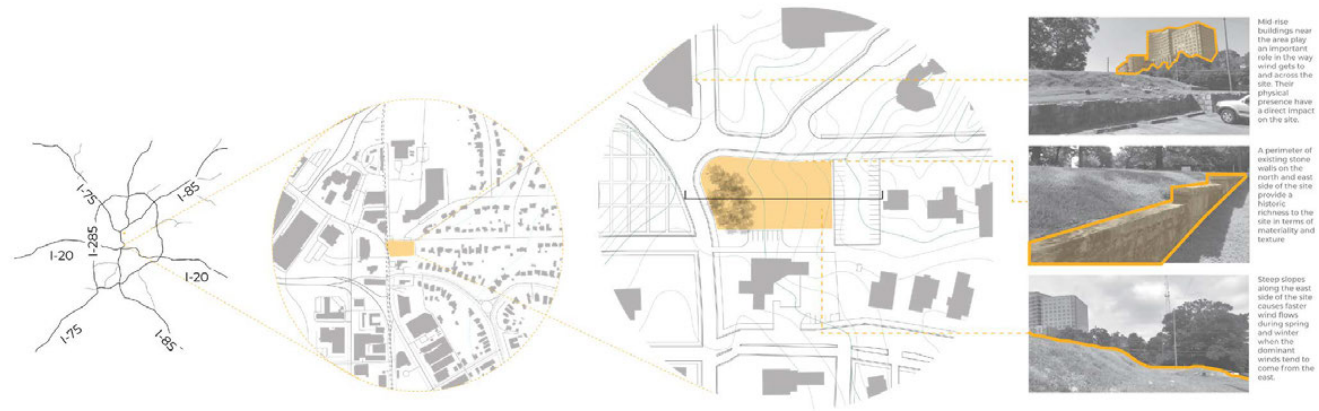
Ana Giron, Asbiel Samaniego

[A Museum of Interactions and Processions]

The Museum of Interactions and Processions offers dynamic series of spaces that elicit a response from the human body, through direct or indirect coordination or interaction, to create a feedback loop. In particular, Stigmergy creates a mechanism of indirect coordination, through the environment, between agents or actions.



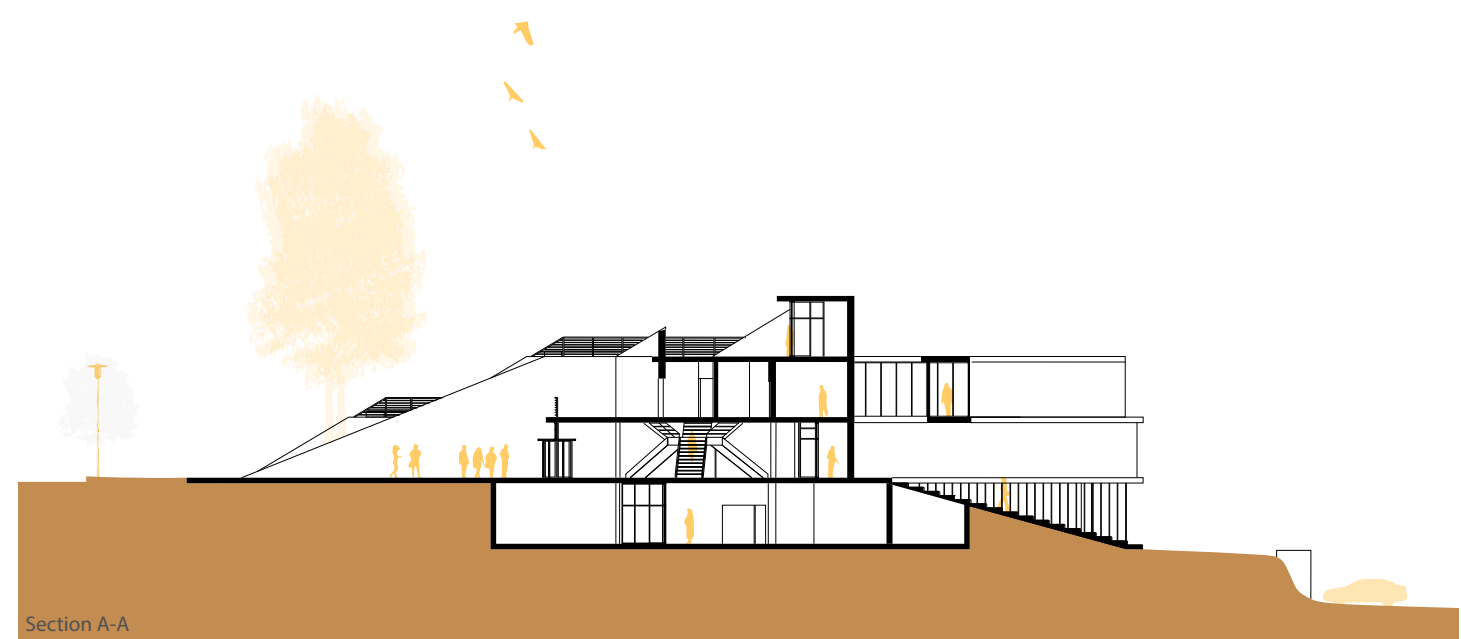
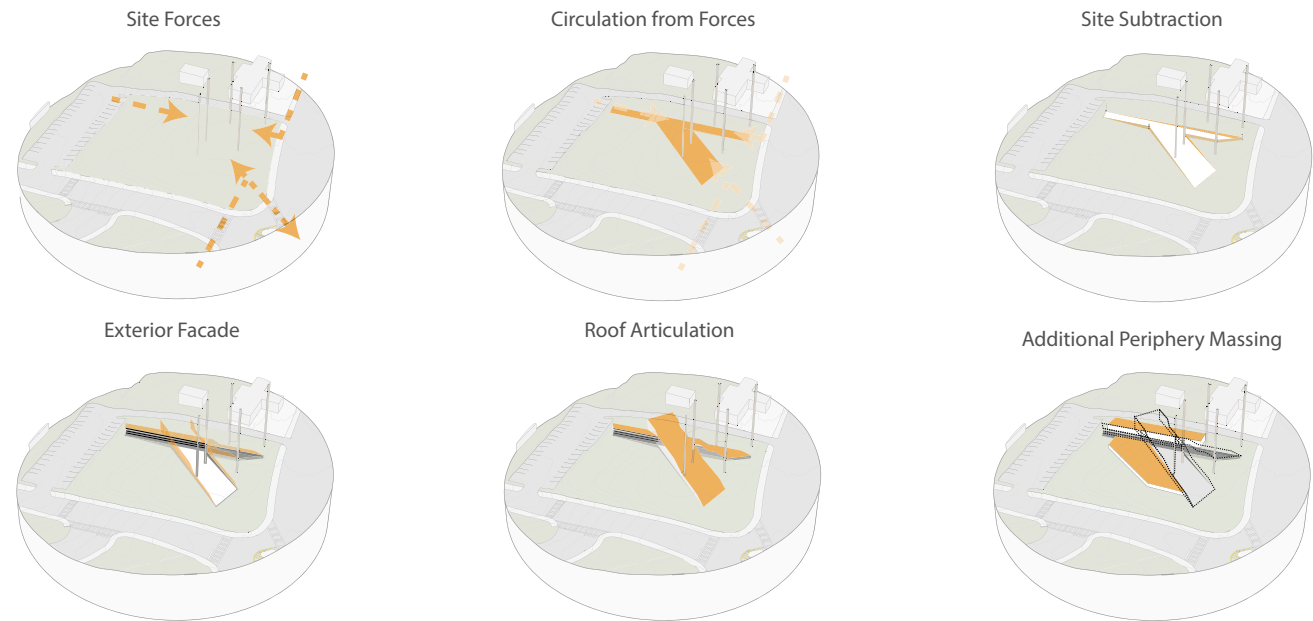
Site Analysis



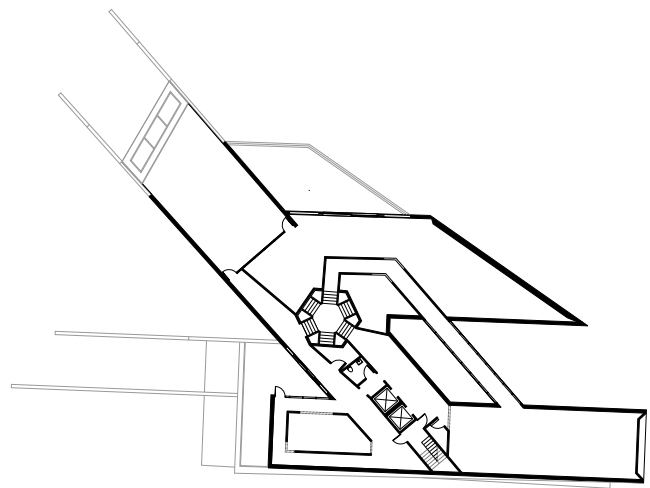
Basement Level Plan

Ground Level Plan

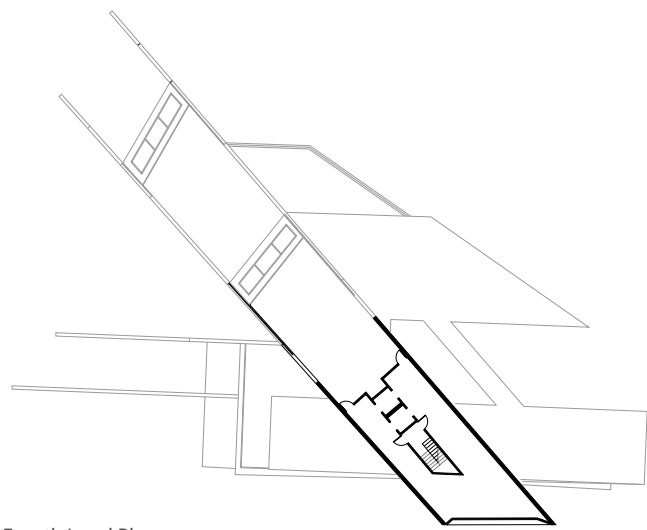
Form Development



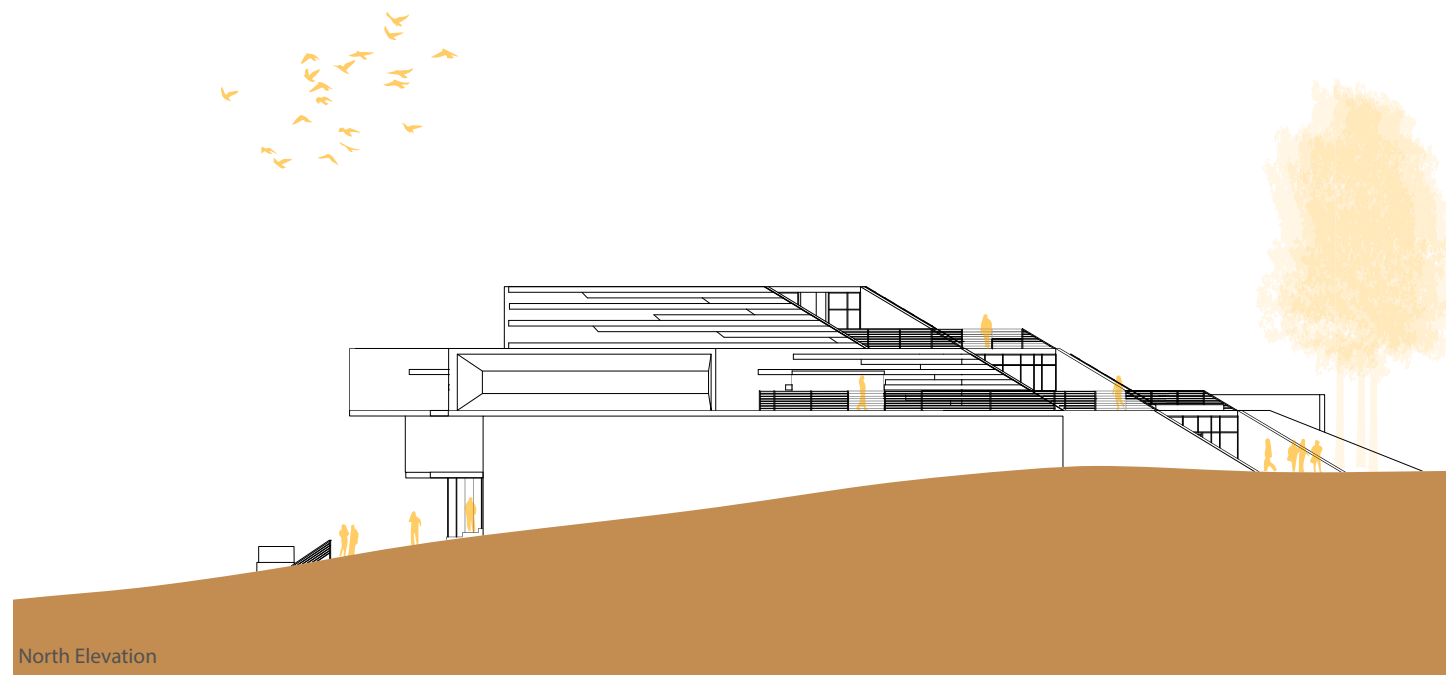
Section A-A



Third Level Plan



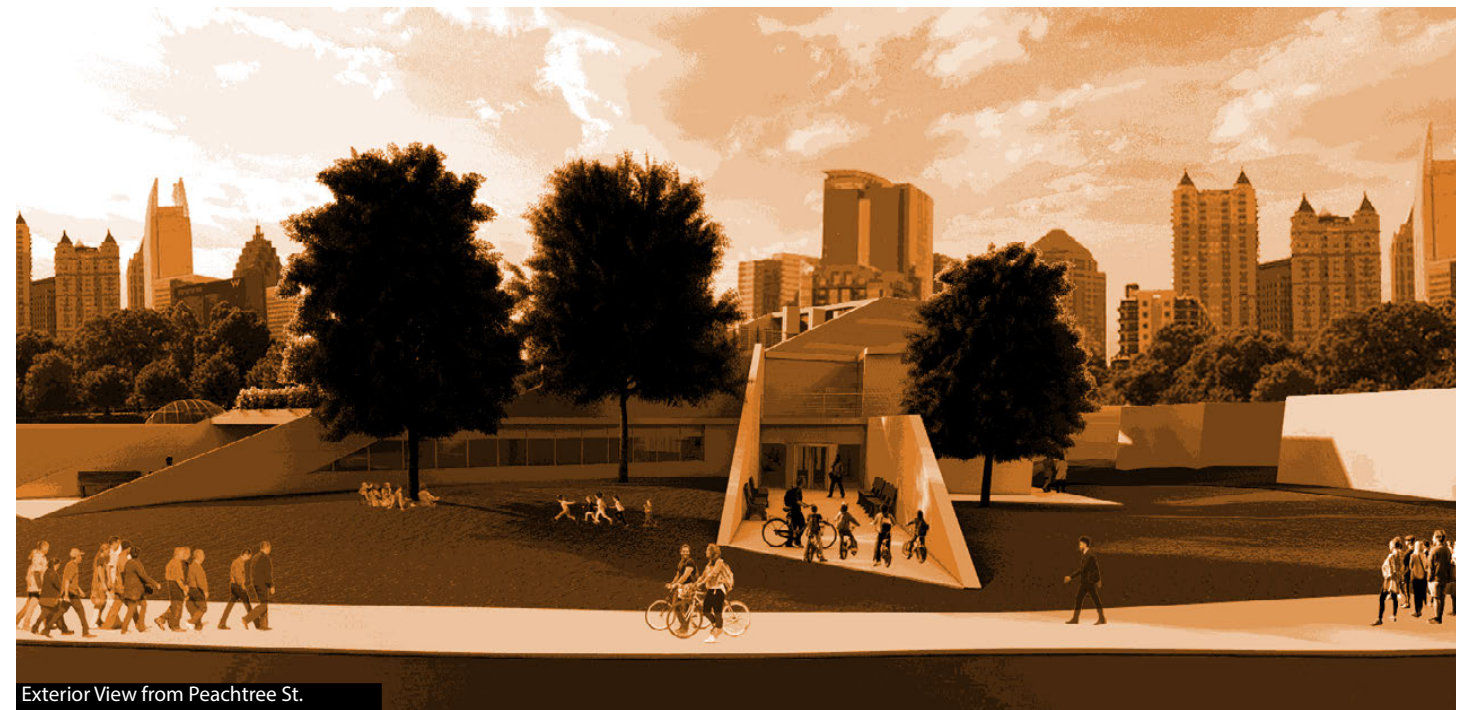
Fourth Level Plan



North Elevation



Exterior View of Third Level Terrace



Exterior View from Peachtree St.

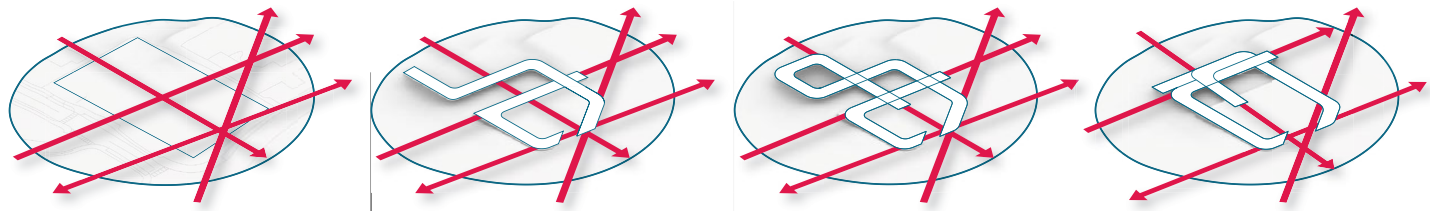
iMAS

Zach Hart, Huy Ho

[The Intersectional Museum of Art & Science]

The Intersectional Museum of Art & Science (iMAS) is a space designed to let visitors become an essential part of the exhibit themselves. Various aspects of science are displayed both inside and outside of the museum's walls, each showcased in an artistic light. Properties of physics in the museum create art through a variety of media. Rotational kinematics become a method of creating unconscious light shows, swinging pendulums become a method of painting that tracks visitors movements, and sound waves become visible on shifting canvases of water.

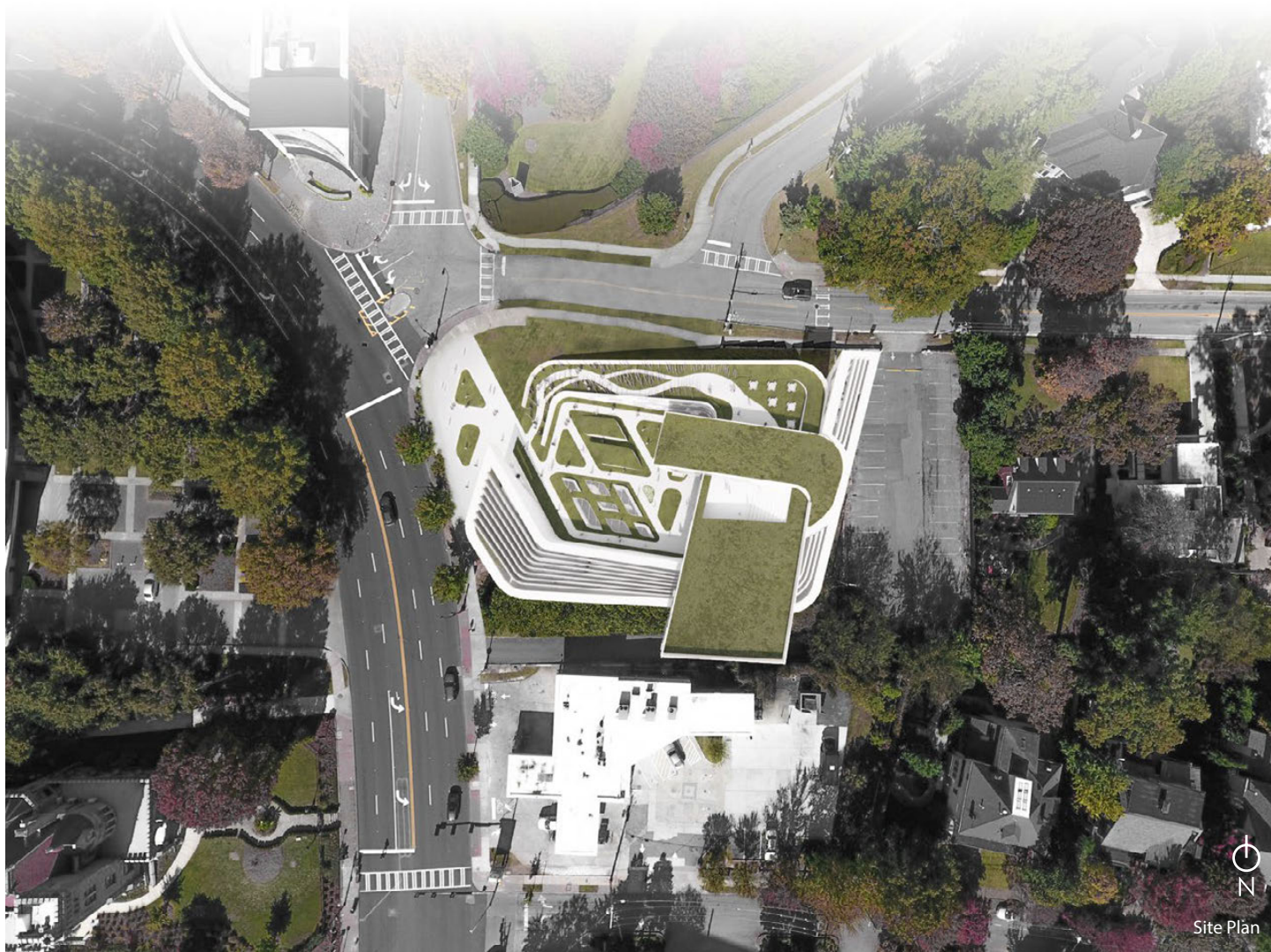




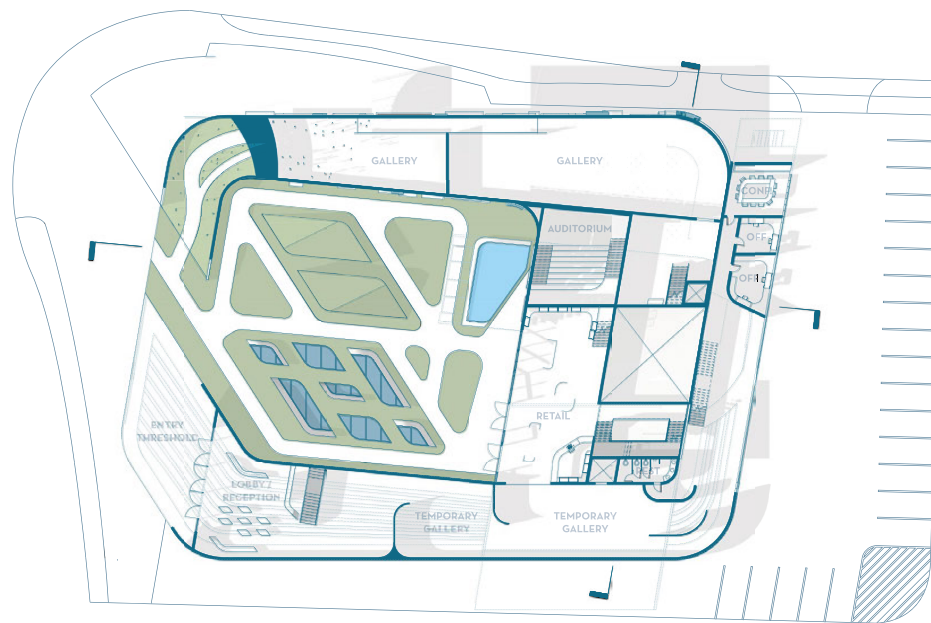
Design Iterations



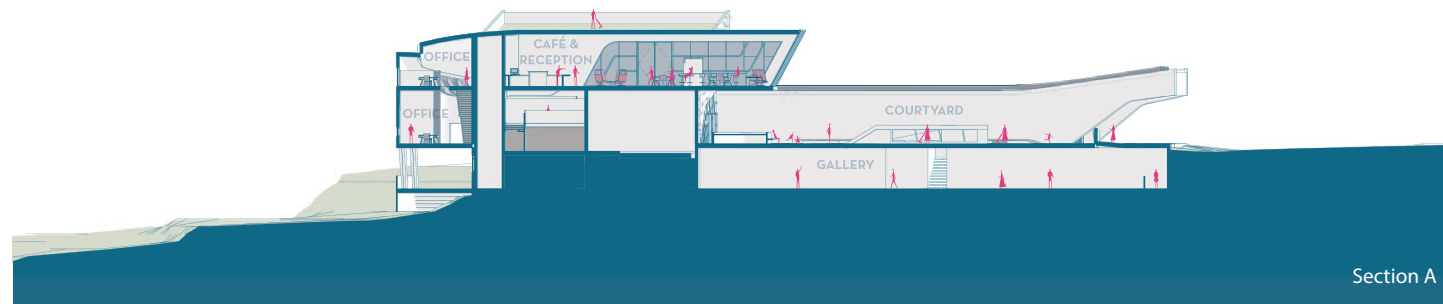
Form Finding Diagrams



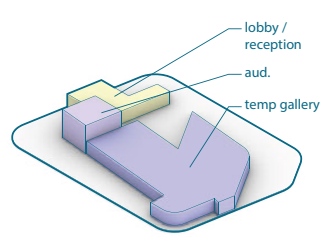
Site Plan



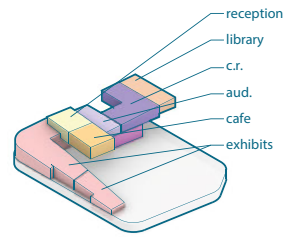
Ground Floor Plan



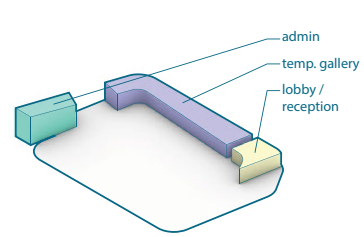
Section A



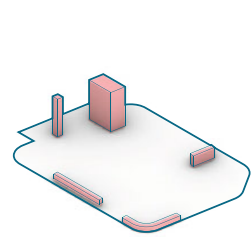
basement programming



gallery wing programming

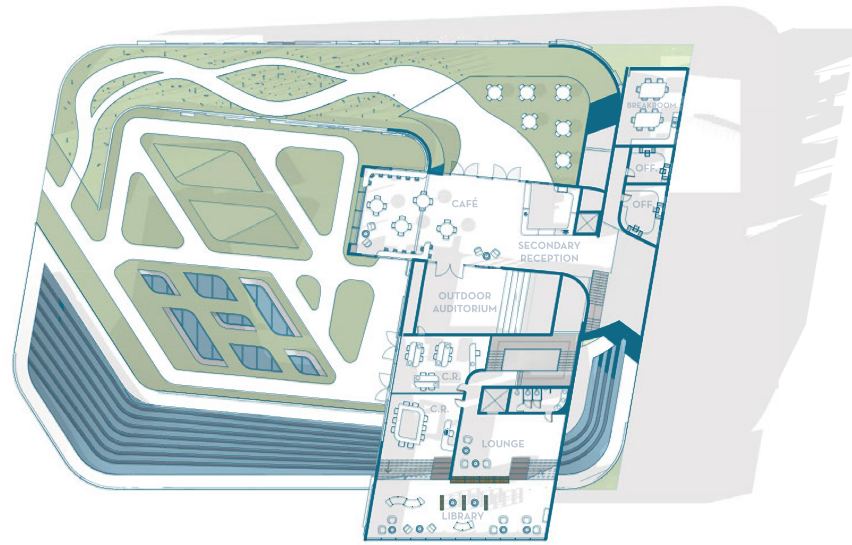


entry wing programming

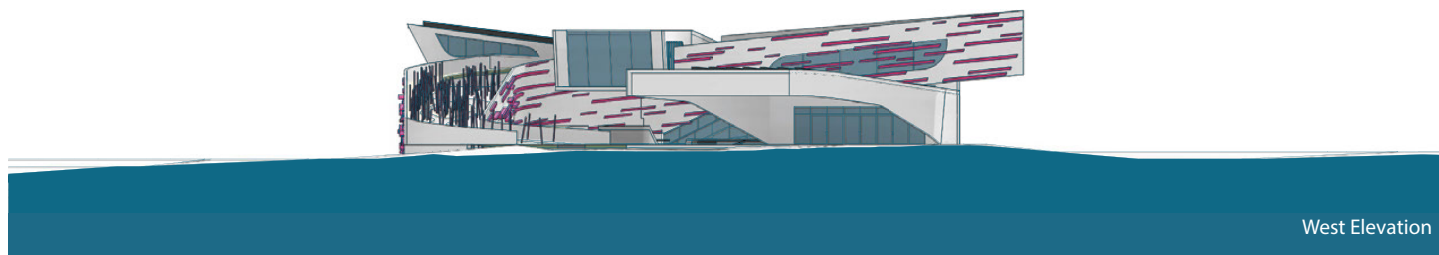


vertical circulation

Program Diagrams



Upper Floor Plan



West Elevation



Interior Light Show

Green Roof Interactive Poles



Night-time Façade View

Night-time Courtyard View From Green Roof



Courtyard View

MUSEUM OF INTERACTIVE TECHNOLOGY
KENNESAW STATE UNIVERSITY | FALL 2019

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