

# **GSAPP GRADUATION PORTFOLIO**

**ZHEXU YANG**

SELECTED WORKS  
2023-2024

MS. Advanced Architectural Design  
Columbia University  
Graduate School of Architecture, Planning and Preservation

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# 01 Data Mourning

## Town Hall for Recording Intangible Heritage

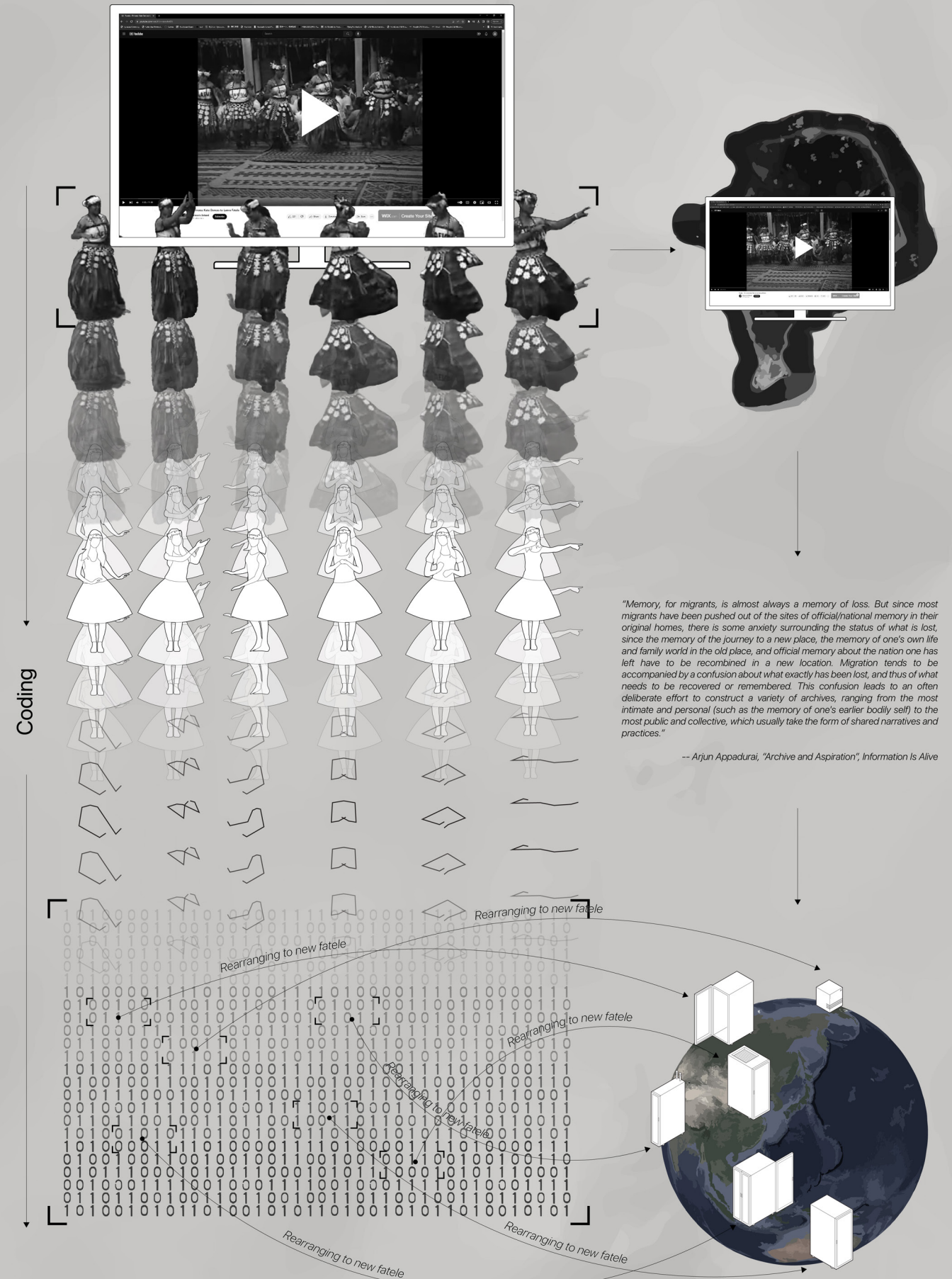
ARCH 4105 Studio Work  
 Instructors: Marina Otero Verzier & Farah Alkhoury  
 Team Members: Zhexu Yang, Jinyue Han

Tuvalu's ambition to upload themselves to the metaverse follows the preservation of its memories and sovereignty. Our project explores this complex terrain by considering how to preserve Tuvalu's heritage beyond what's tangible, which is its intangible cultural heritage. The Tuvaluans have this fear that when the nation is submerged, digitalized, or in a diaspora, they might lose their valuable cultural heritage and what has shaped their identities and forms of belonging. Therefore, the project is a digital archive as a collective practice and form of governance over a community's memory.

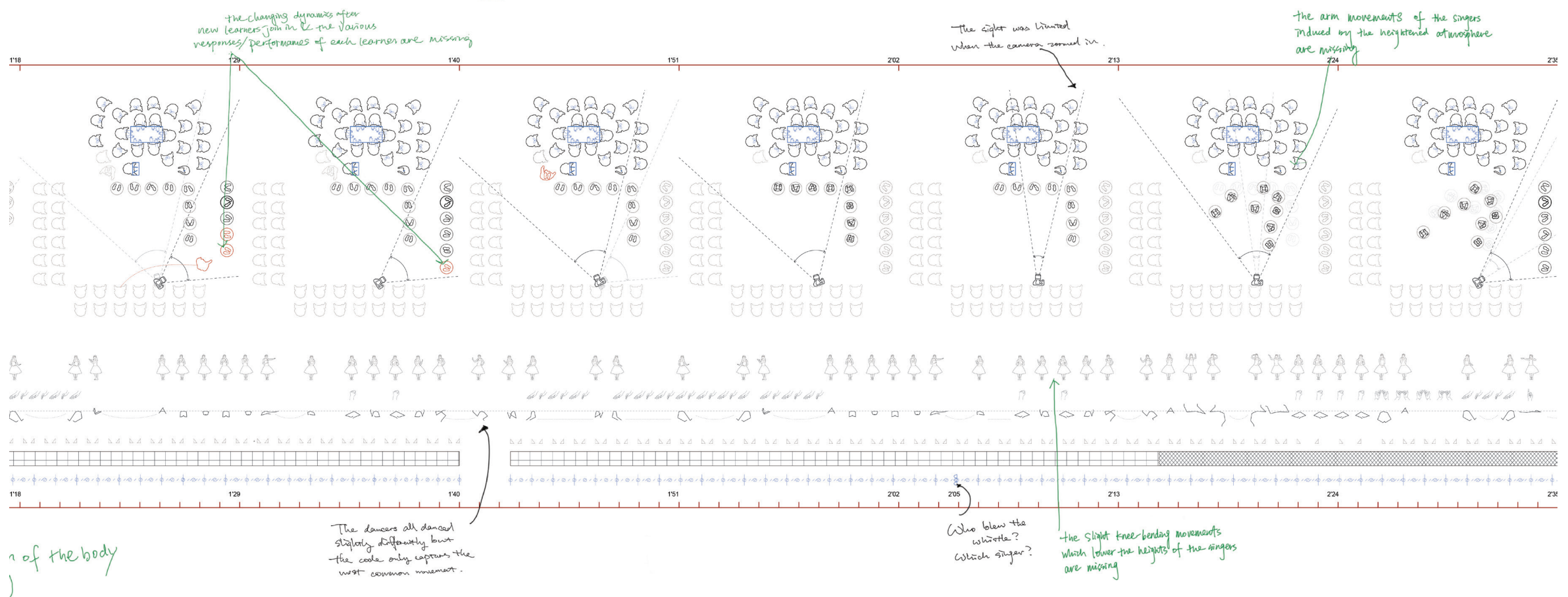
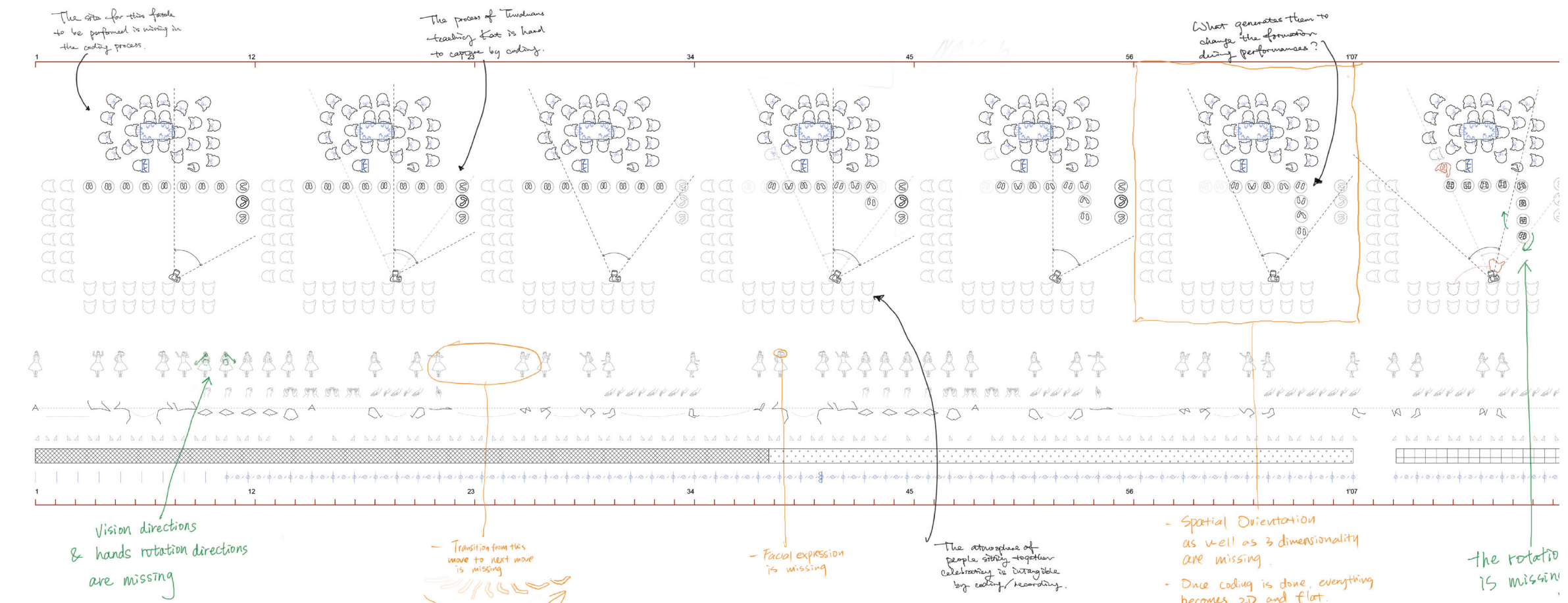
The design is an architecture for re-ritualizing the practice of data recording, remembrance, mourning and enacting data sovereignty. In this reimagined framework, the project aims to clarify the specific areas and contents that could be recorded, while transparently highlighting what may be left unrecorded, no matter intended or unconsciously.

The Town Hall consists of four kinds of intangible cultural heritage and recording – dancing, weaving, storytelling, and music. Spaces, furniture and recording devices and techniques are built specifically for the activities performed in each room. Yet, far from aiming for complete surveillance, recording will always remain incomplete as the architecture facilitates blockages and glitches while the final decision of what to preserve remains with the community, not the technology. Empowered by the decision-making space, the Tuvaluans can make collective decisions about documenting their stories, fostering a more inclusive and participatory representation of their cherished cultural practices. Therefore, the center of the architecture is the decision-making space, giving Tuvaluans who come here to record their cultural practices the opportunity to decide what to be captured, recorded, and mourned.

The Town Hall is an architecture for gathering, for mourning what's lost, while celebrating the resilience of Tuvalu culture and fostering a sense of pride and responsibility for its continued existence.

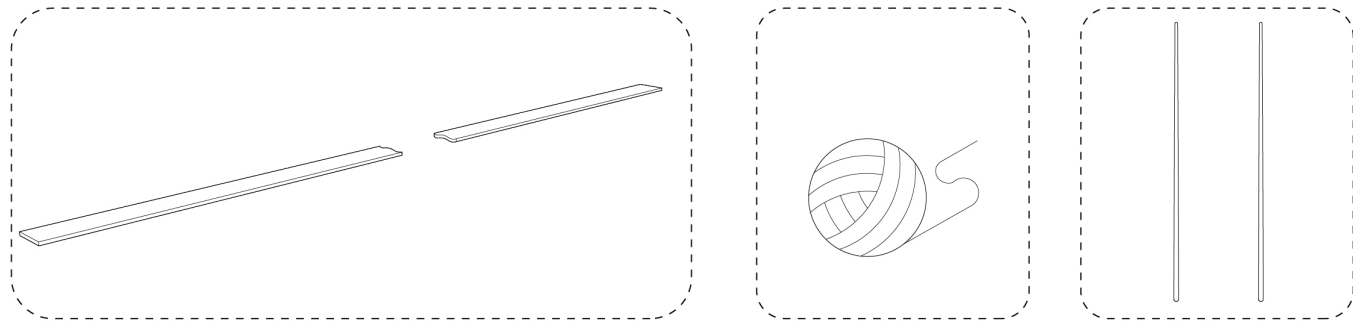




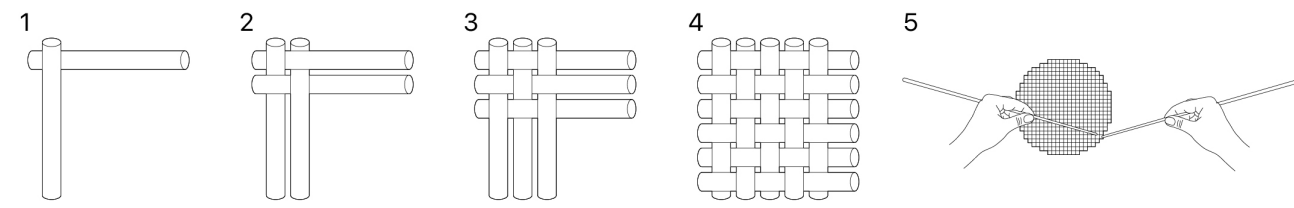




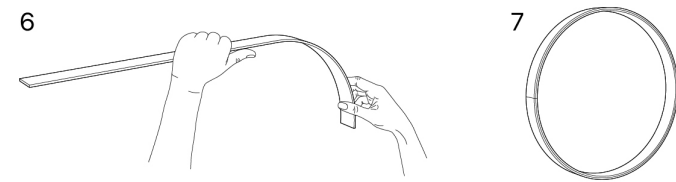
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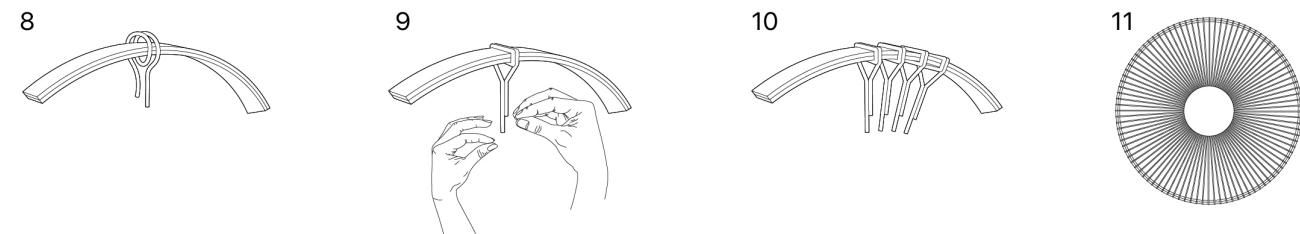
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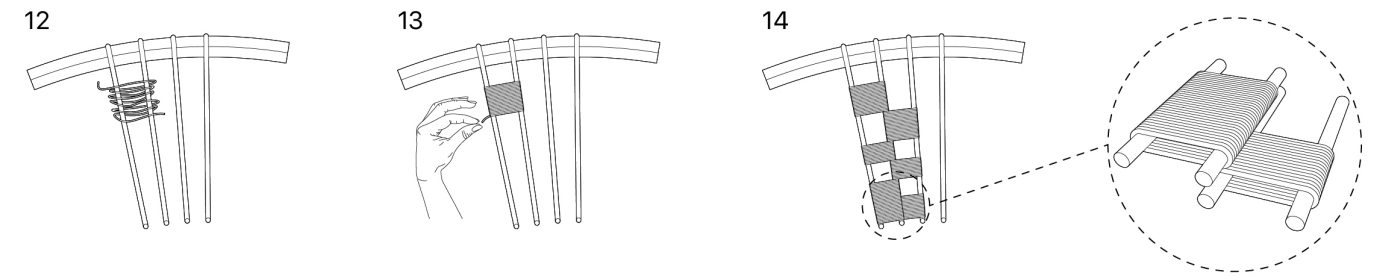
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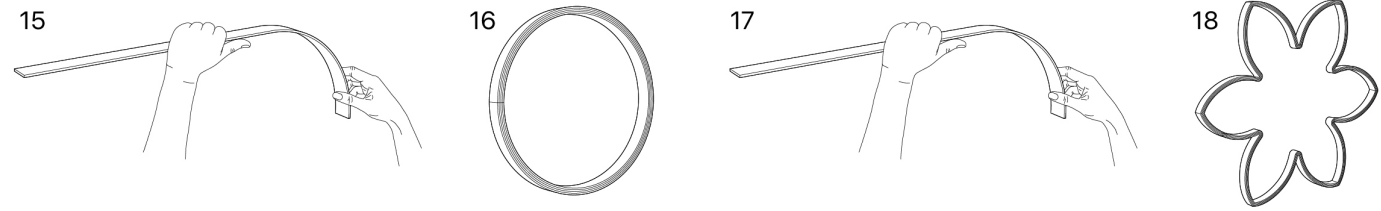
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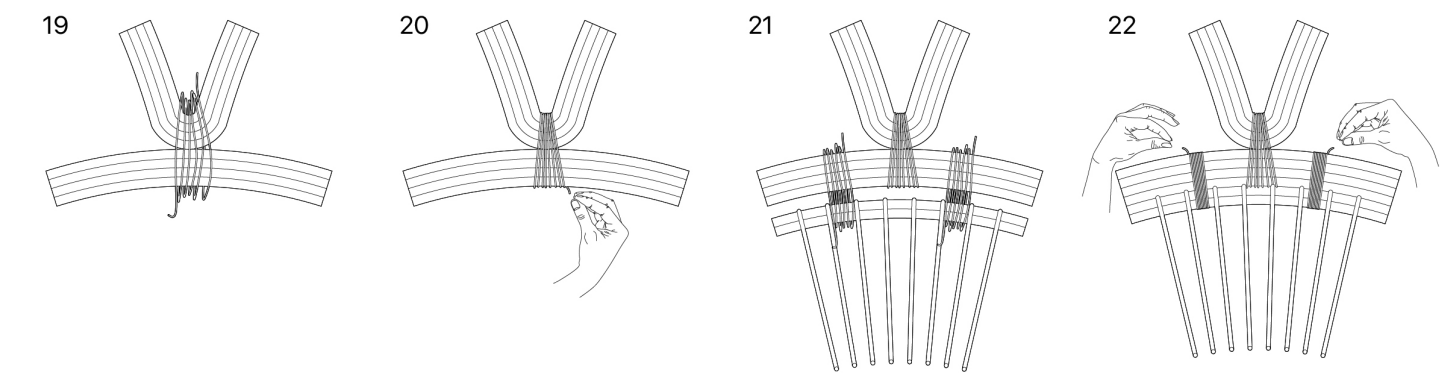
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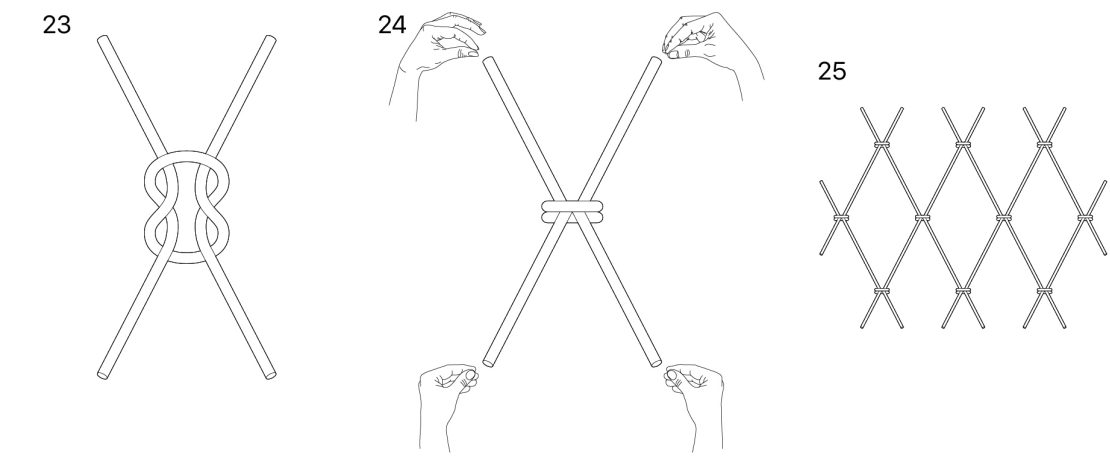
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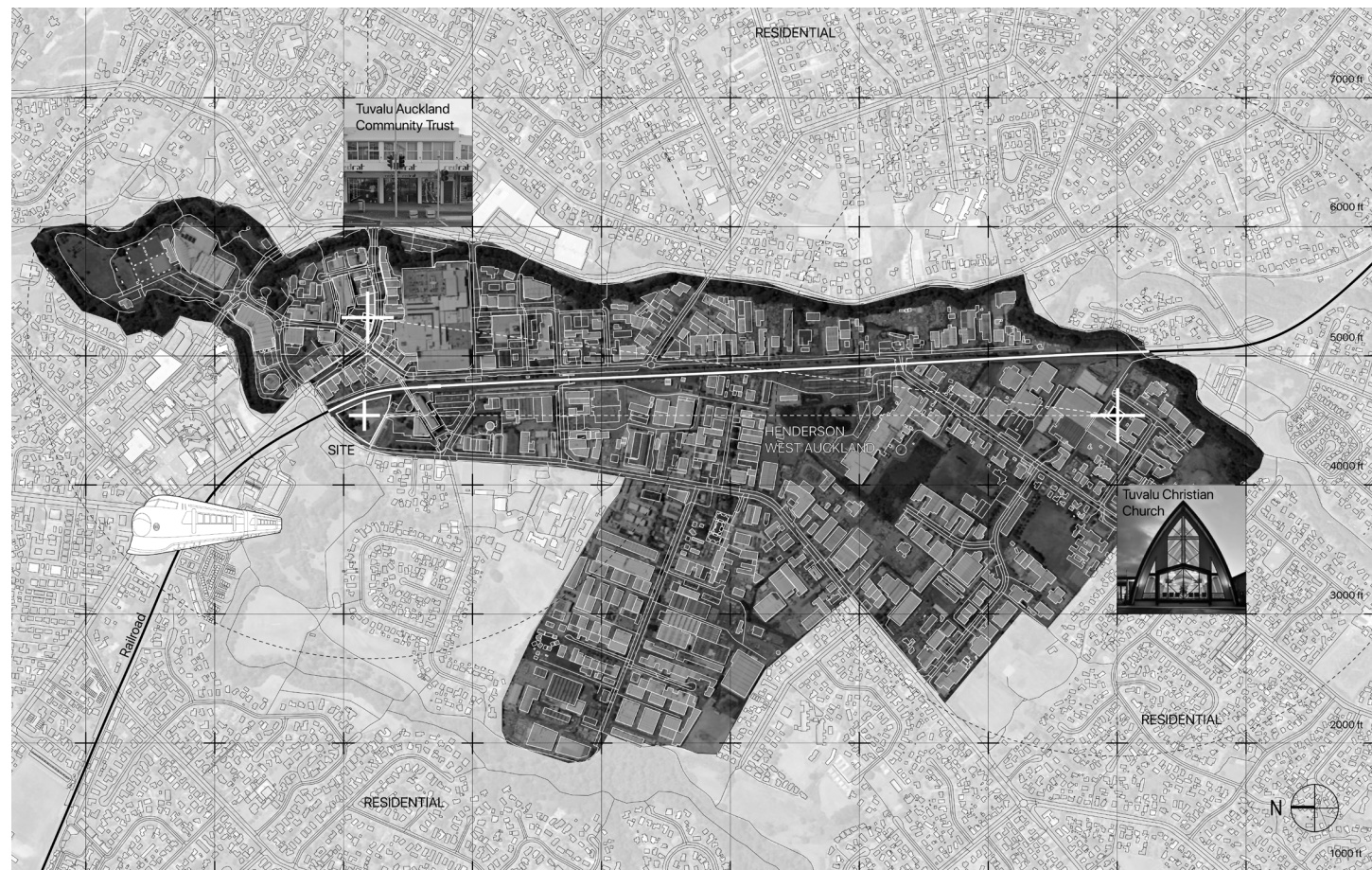
Step 6:



Step 7:



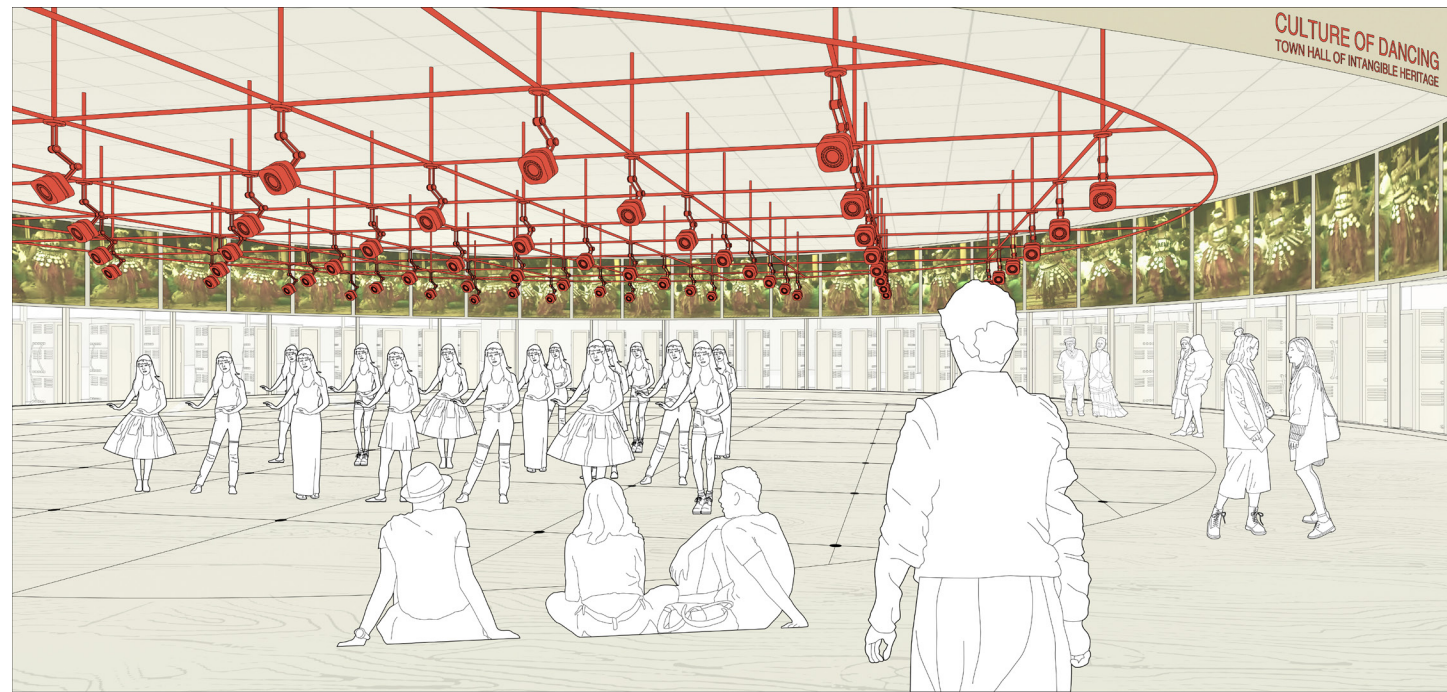




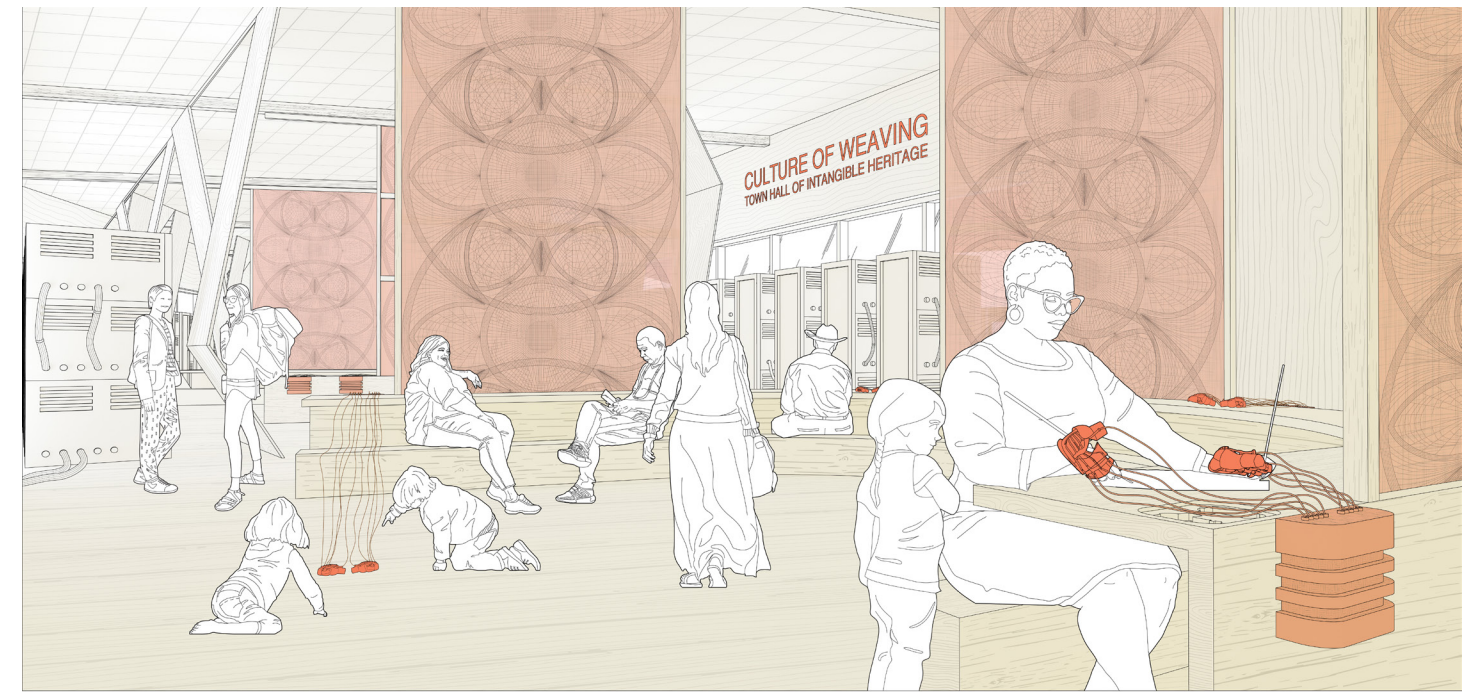
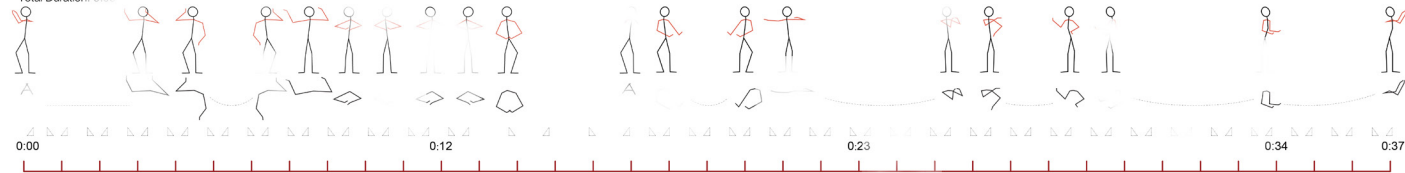
West Auckland Site Analysis



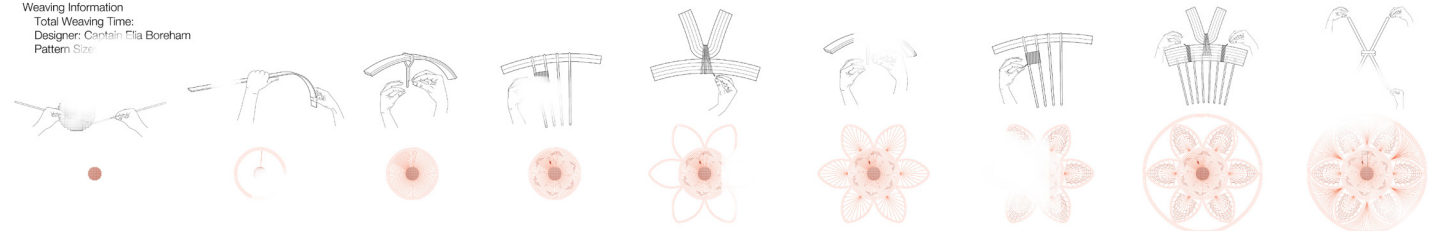




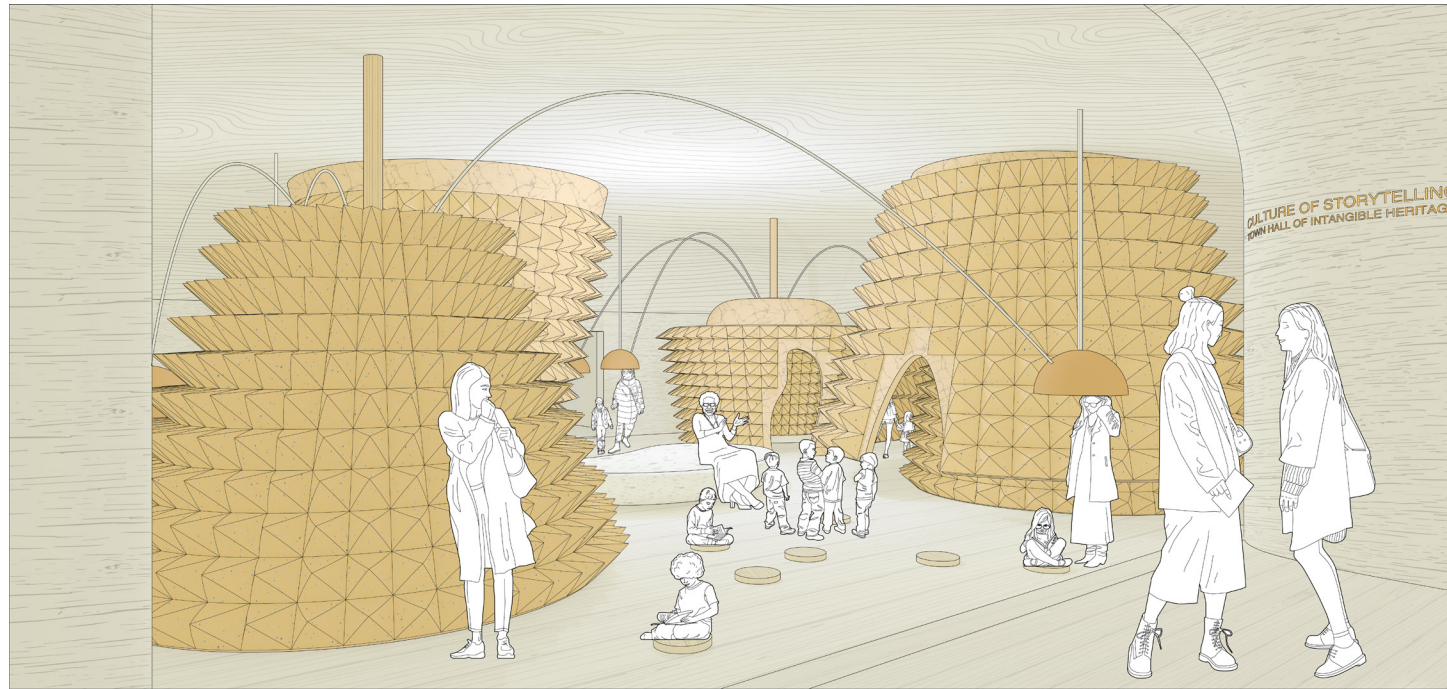
Dance Information  
 Except from a Laevan Fatele that Princess Ratu Tokolika learned during their royal visit to Tuvaku end of Sept 2012.  
 Number of the Dancers: 8  
 Total Duration: 0:37



Weaving Information  
 Total Weaving Time:  
 Designer: Clarissa Boreham  
 Pattern Size:







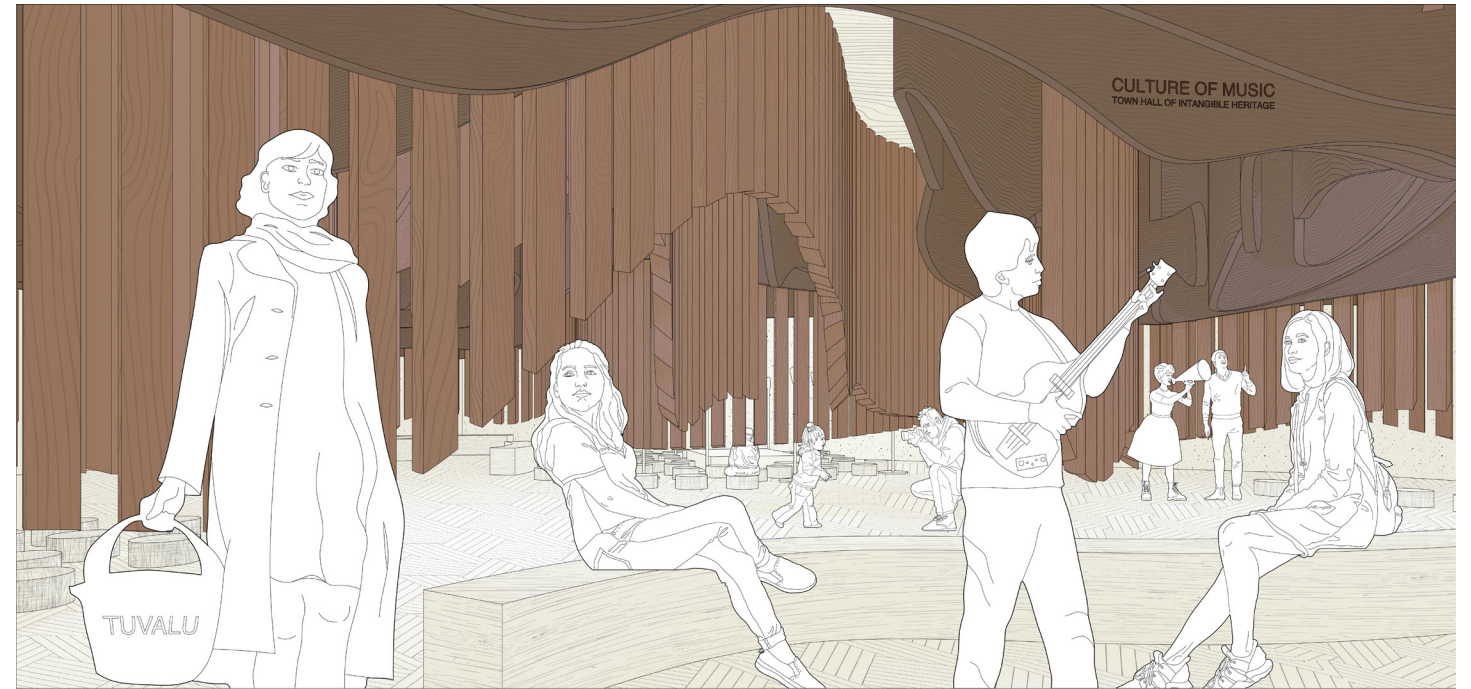
Voice Memos of Te Aso o te Paula: the Day of the Bomb

**Speaker:** Penileta Uluenua of Funafuti, Aukilani  
**Recorded Date:** 04/16/23  
 This was the day my island Funafuti was bombed by the Japanese in the war.

**Fajalosa Natano Funafuti Community**  
**Recorded Date:** 04/16/23  
 Well today is Te Aso o te Paula, which brings all of Funafuti together as one whole family.

**Peter McQuarrie**  
**Author:** His book about Tuvalu and the second world war  
**Recorded Date:** 04/15/23  
 When the bombs fell, the next morning, cuz it was dark when the bombs fell, in the daylight, people would just say "what has happened". Just a day, know, and they really got to...so they started moving the next day.

**Veisimas Manoa**  
**Survivor Aso o te Paula:** She was a teenager when the Japanese arrived at Funafuti in 1942. Funafuti became a significant navy and airbase for the Japanese. And the ships started coming in, 2 sometimes 3 at a time in the Lagoon. They filled up all the way to the passage of Funamanu. Some people ran to the church because it's the biggest building in Funafuti at the time. As soon as the people ran to the church, the bomb fell on the church. It (Te Aso o te Paula) started on the 1st of April and it has become a ceremony for Funafuti. It was the day that Funafuti survived the bombing.



Song Information  
 Excerpt from the song TERIKAI  
 Singer: Captain Elia Boreham  
 Total Duration: 4:24

**Chorus**  
 B B B B G#m G#m G#m F# F# B B B B G#m G#m G#m G#m F# F# B E E B B E E F# B F# B

**Lyrics**  
 D E E F# T E V A L O E E E K O U L U K U T E F E N J A E E O F A I F A T E L E T E V A L O E E E K O U L U K U T E F E N J A E E O F A I F A T E L E E E S A I T O U T I T I S P E T O U P O U L A N I M A K I L A U F U T I S M A M A M A N G A N E A S M A M A M B E S A I T E I T O S I F E T O U F U L U K E S M A I F A I F U T I S M A M A N A N E A S M A M A M M E K E D E R E F O R A N E A M Y E R A F A F E E F A I N G O P E A N E T E R I K A I S A R A E E

**Meaning**  
 Tuvalu e e he. Tuvalu e e he. This world, it's building. Tuvalu e e he. This world, it's building. D E E S A I T O U T I T I S P E T O U P O U L A N I M A K I L A U F U T I S M A M A M A N G A N E A S M A M A M B E S A I T E I T O S I F E T O U F U L U K E S M A I F A I F U T I S M A M A N A N E A S M A M A M M E K E D E R E F O R A N E A M Y E R A F A F E E F A I N G O P E A N E T E R I K A I S A R A E E D E E S A I T O U T I T I S P E T O U P O U L A N I M A K I L A U F U T I S M A M A M A N G A N E A S M A M A M B E S A I T E I T O S I F E T O U F U L U K E S M A I F A I F U T I S M A M A N A N E A S M A M A M M E K E D E R E F O R A N E A M Y E R A F A F E E F A I N G O P E A N E T E R I K A I S A R A E E Like you are a boy from the village of TERIKAI. Like you are a girl from the village of TERIKAI.



## 02 Monster Island

ARCH 6853 Studio Work  
Instructors: Michael Loverich & Antonio Torres  
Individual Work

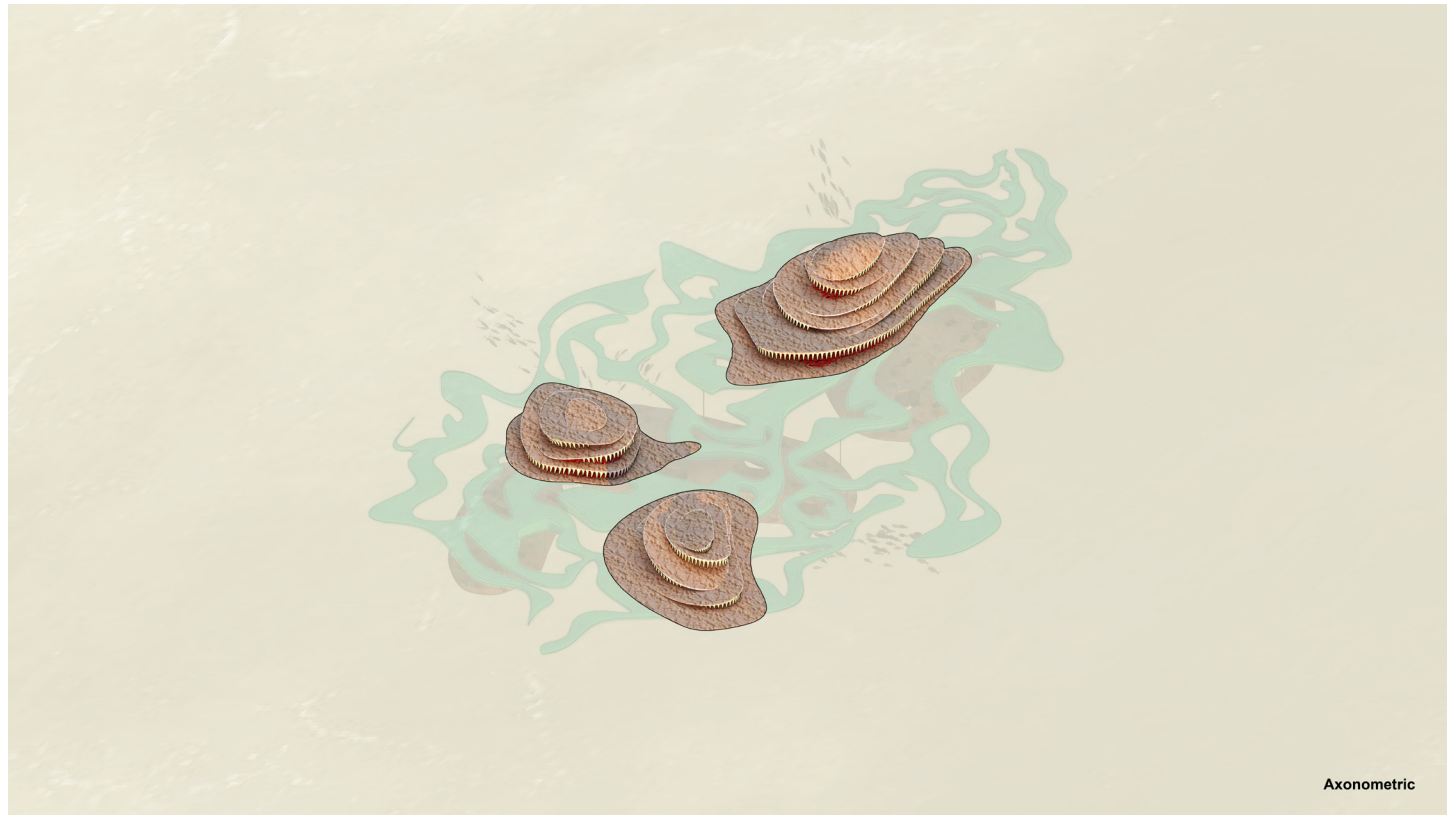
The island is an autonomous organic bio-community that combines above-water landform monsters, a middle island covered with sea grass, and underwater coral reefs. Instead of a regular island which is mostly made of geological components like soil or rock, my island is a living creature that responds to other living organisms and explores the active life aspect that can inform different possibilities. It explores the possibilities of self-maintenance through how the monsters can capture and consume the nutrients of insects and transfer them into calcium to protect and stimulate underwater coral reefs and marine life that relies on coral reefs. Each monster has a tail that anchors into the slots of the middle grassland, which enables them to move freely within the slot.

The spatial orientation of the island follows the logic of sectional layering as well as clusters of individual islands both in plan and section that come together to form an integrated floating island. By pulling and stretching out different parts, different dimensions of spaces are created and start to inform different habitats for species and how they can interact. The interaction starts to form an ecosystem that functions as a cycle of life.

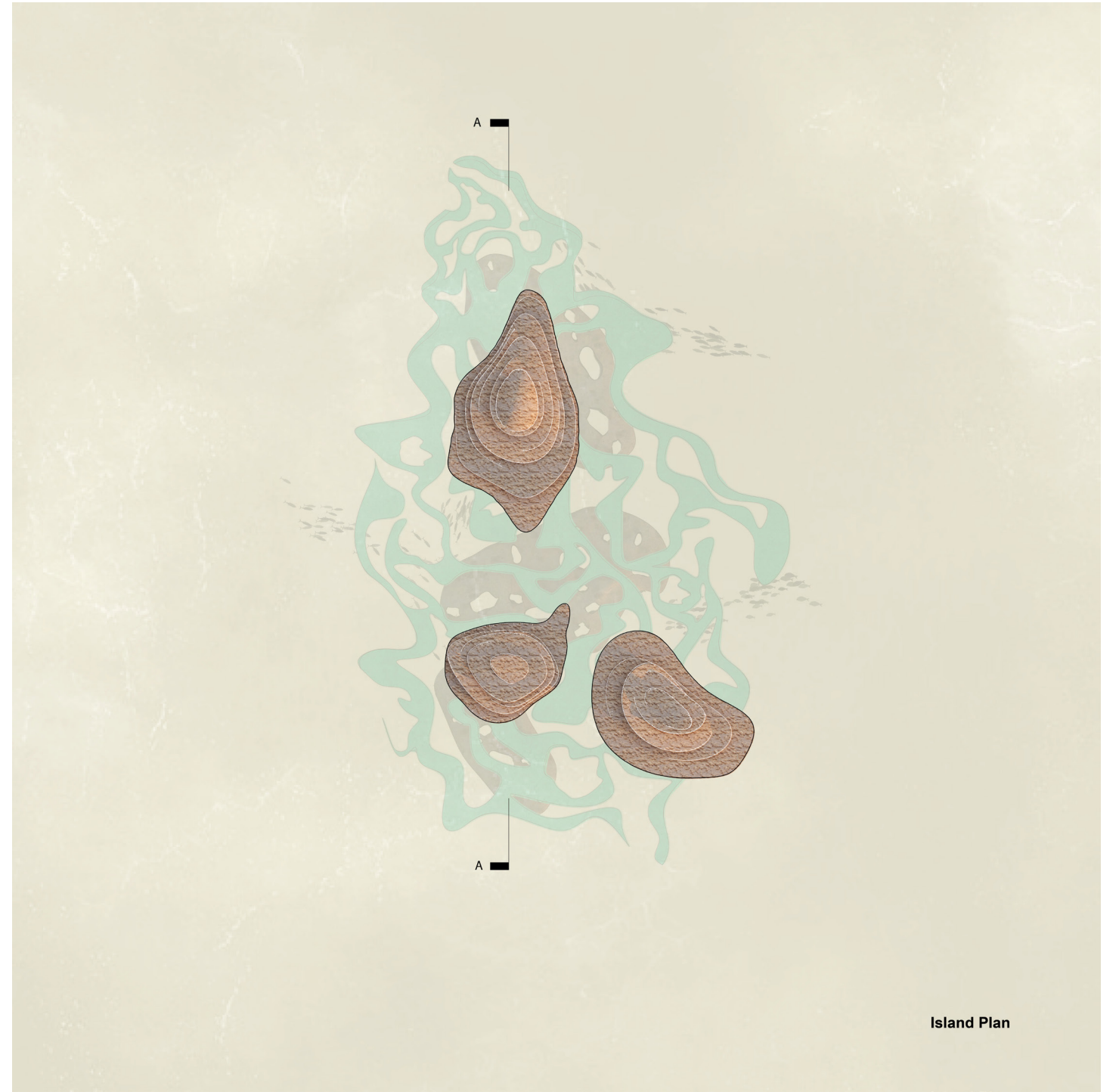
In this ecosystem, the monsters, which have several layers of land spreading out from a central core at different angles, would use an odor to attract insects, mainly mosquitos, and in-between those land spaces, dangling carnivorous plants are dropping down from the ceiling, oozing mucus, and sucking nutrients out of them. The carcasses of the insects will then drop to the ground to feed the soil. On the edge of the land layers, there is a row of teeth dropping down for wind protection, trapping and maintaining the odor inside. This mosquito ecosystem above water creates a horrendous stinky environment inside of these monsters. The monsters will be able to digest the nutrients like protein and etc., but they cannot digest calcium, which will then be excreted as waste. Under the water, there is a piece of porous grassland that allows marine animals to come out and sunlight to penetrate. Three pieces of coral reefs are attached underwater, which serves as homes to marine life and will keep expanding. The calcium that the monsters produce will start to accumulate as sediment onto the coral reefs, which helps them grow, expand, host more marine life, and maintain the underwater ecosystem.





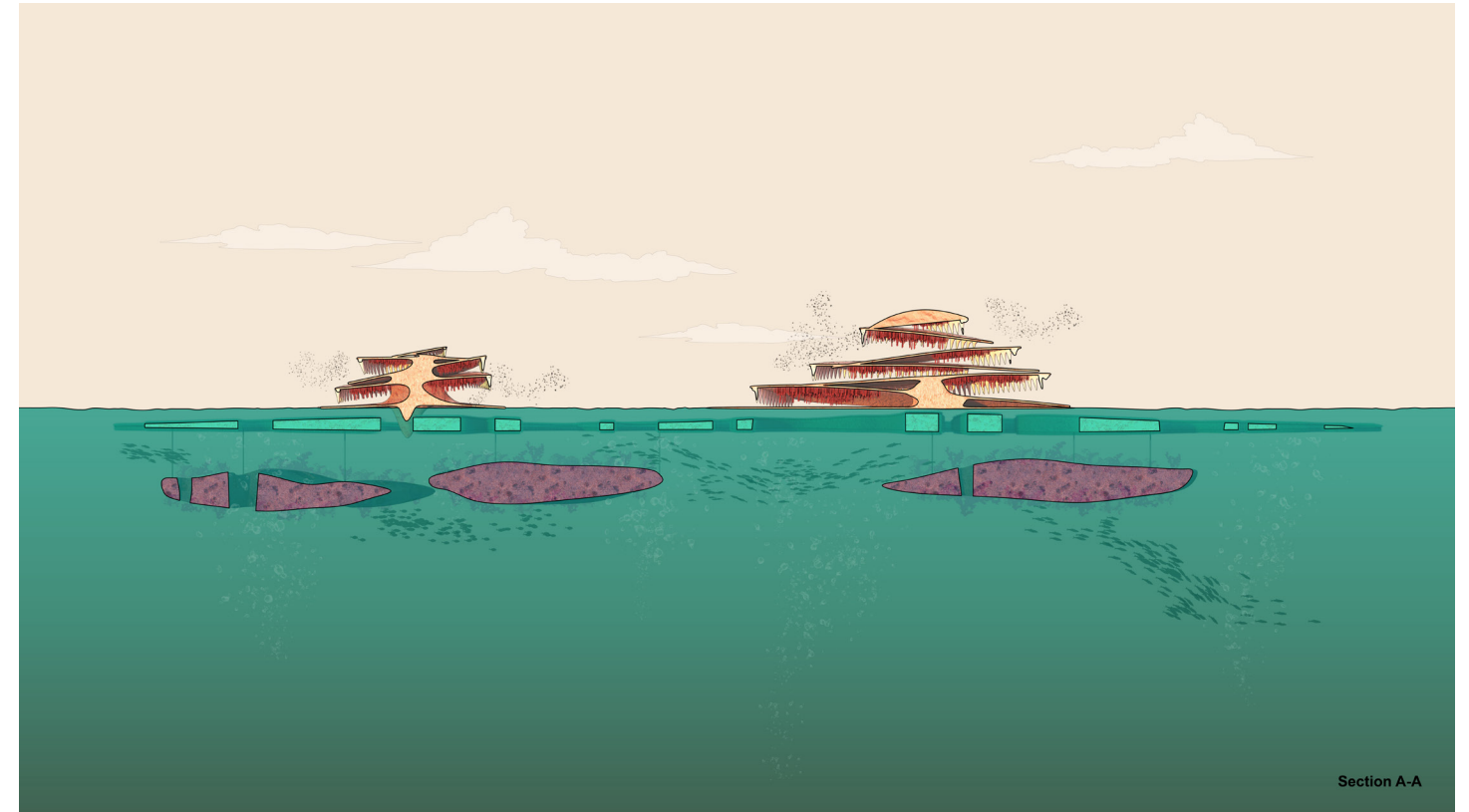


Axonometric



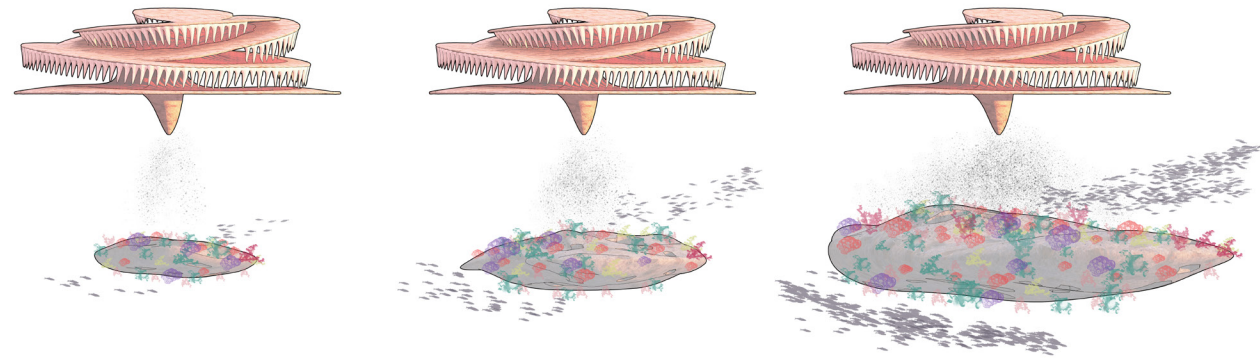
Island Plan



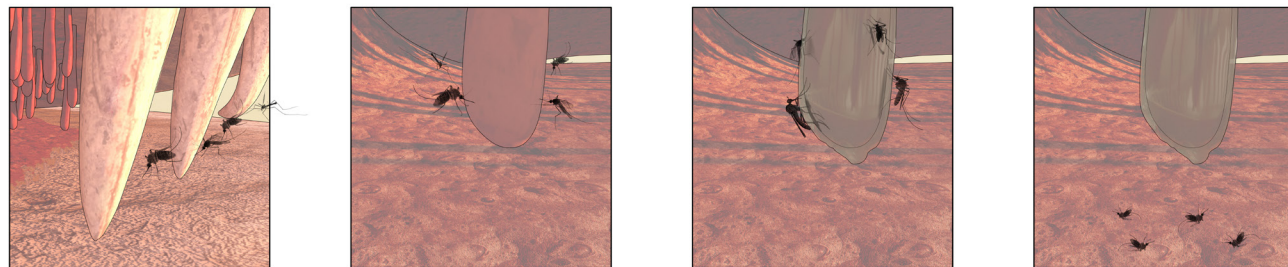




Calcium Reef Formation



Mosquito Diagram

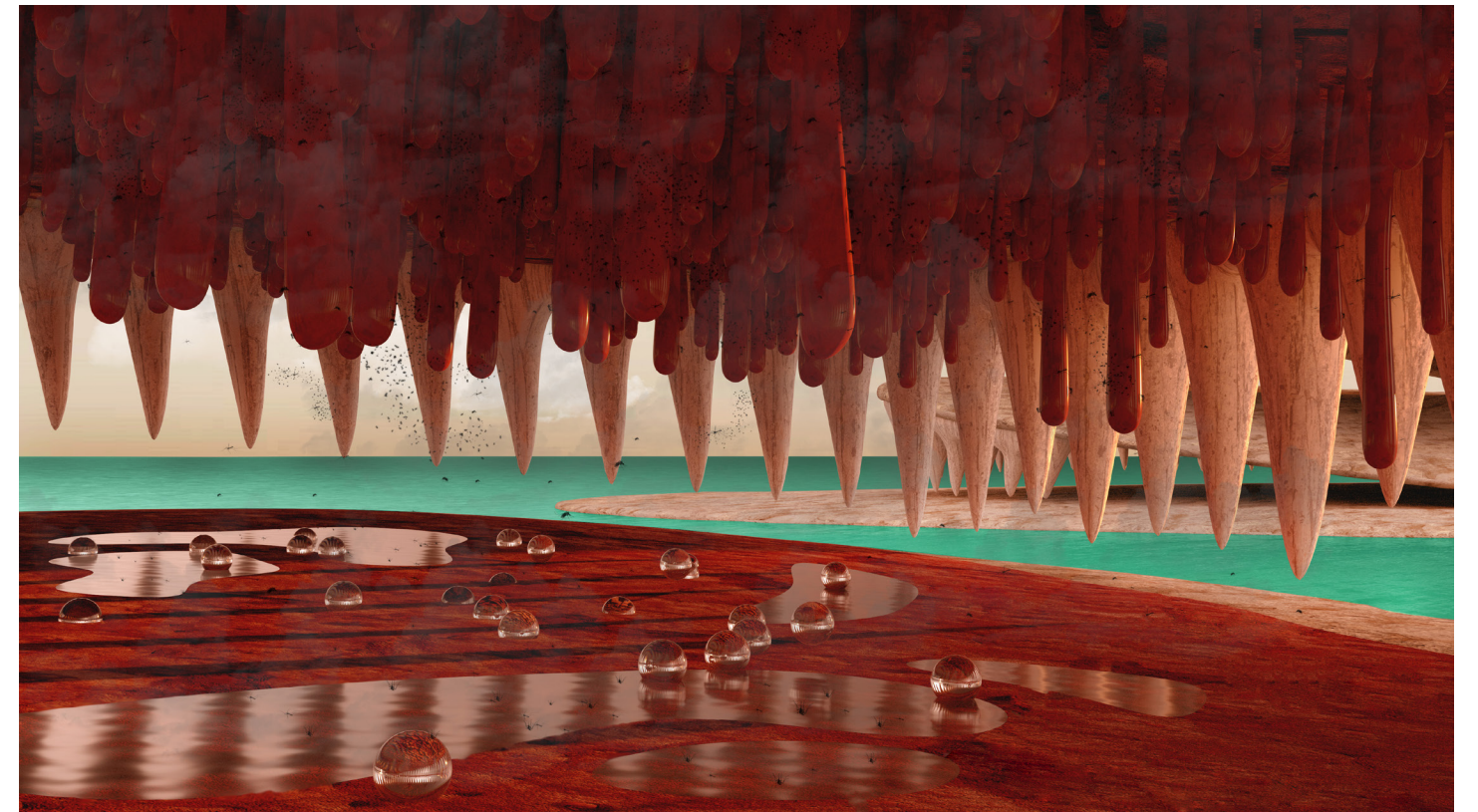


Flying to the monster

Attracted by odor

Trapped and nutrients sucked out

Dead

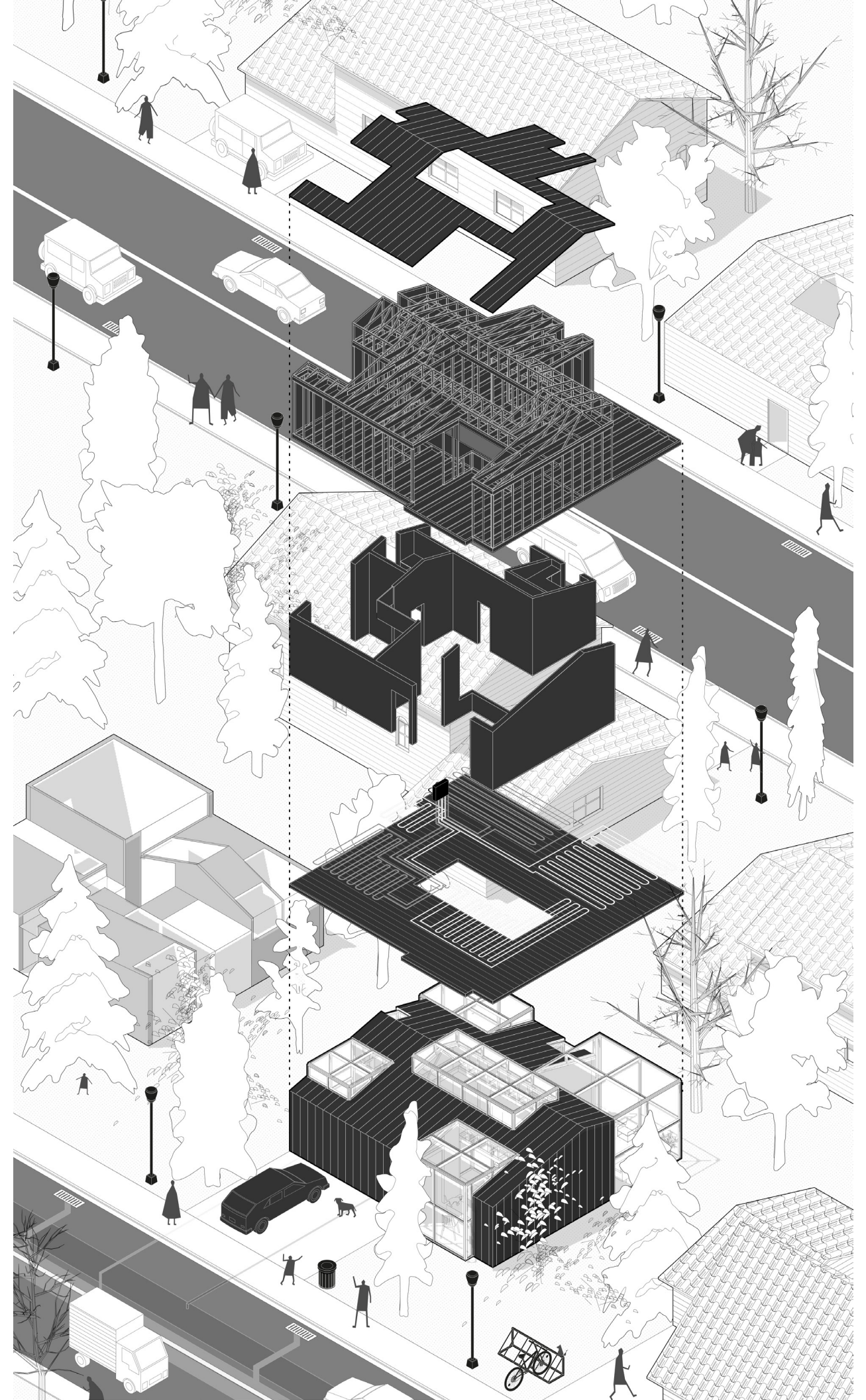




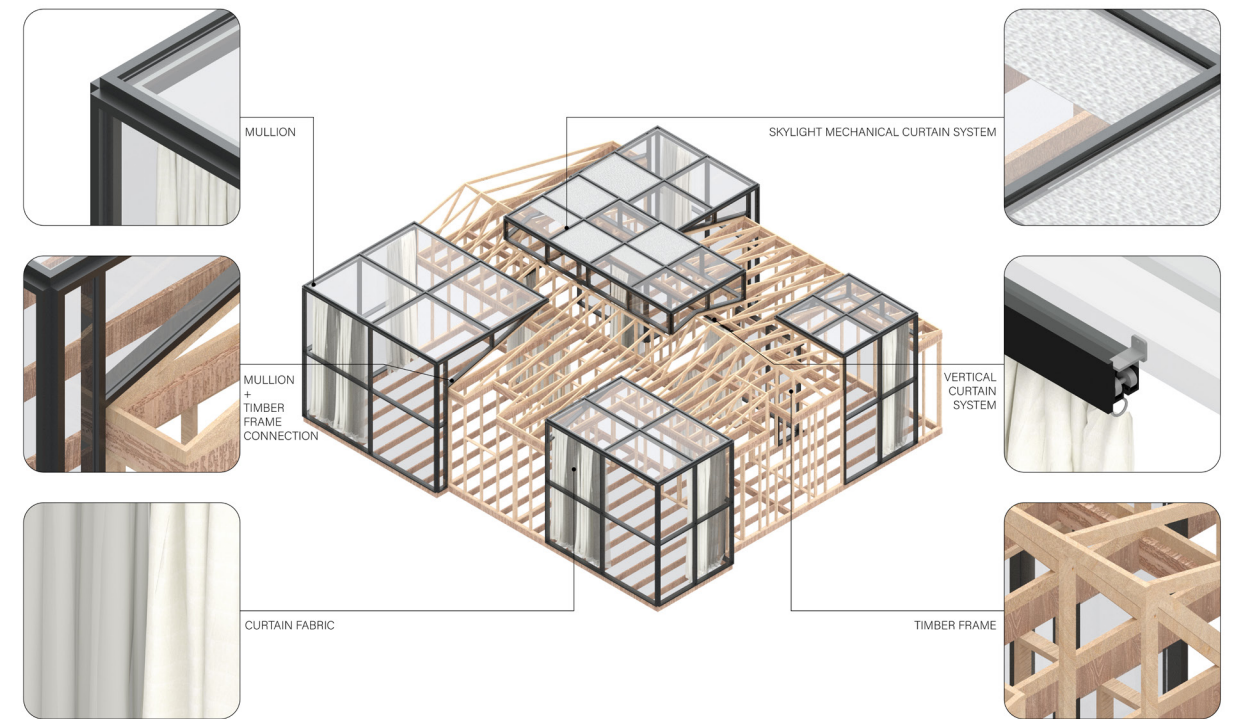
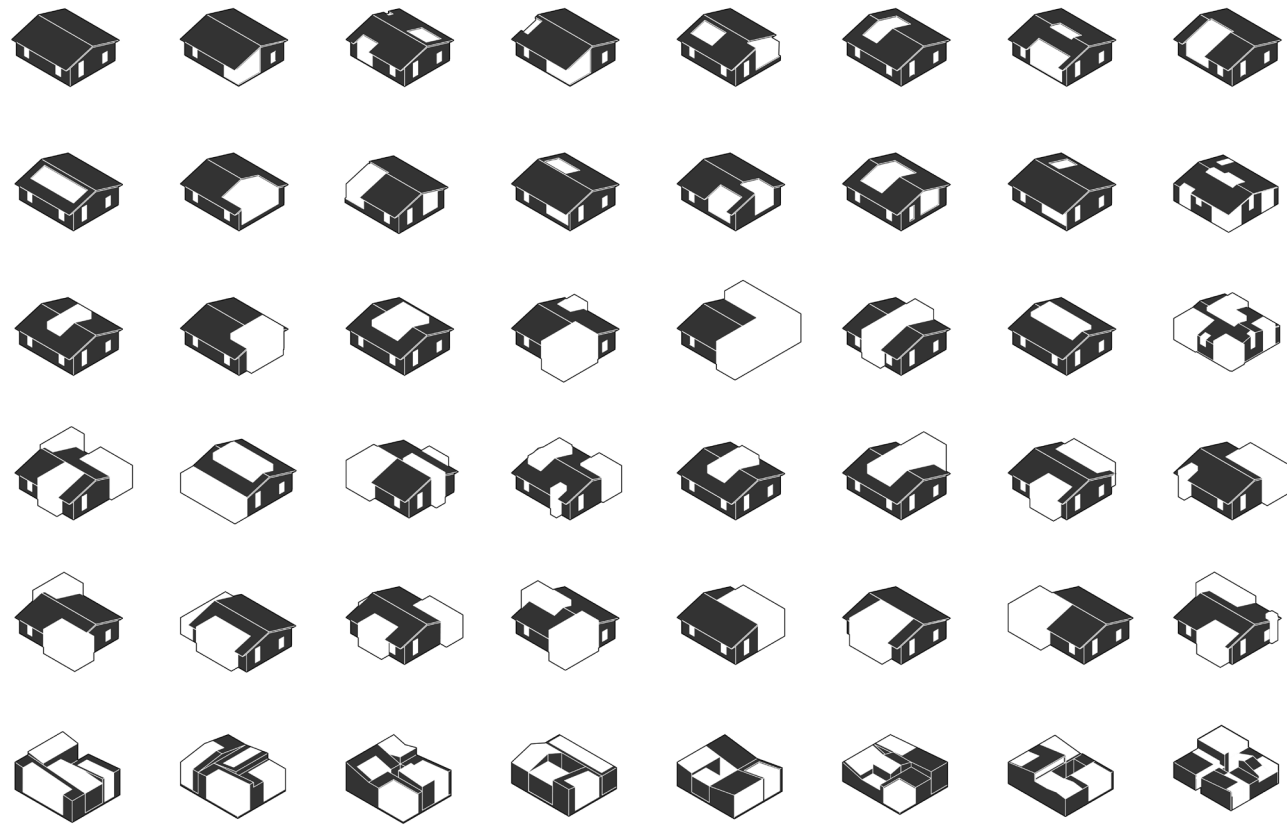
## 03 Lightvittown

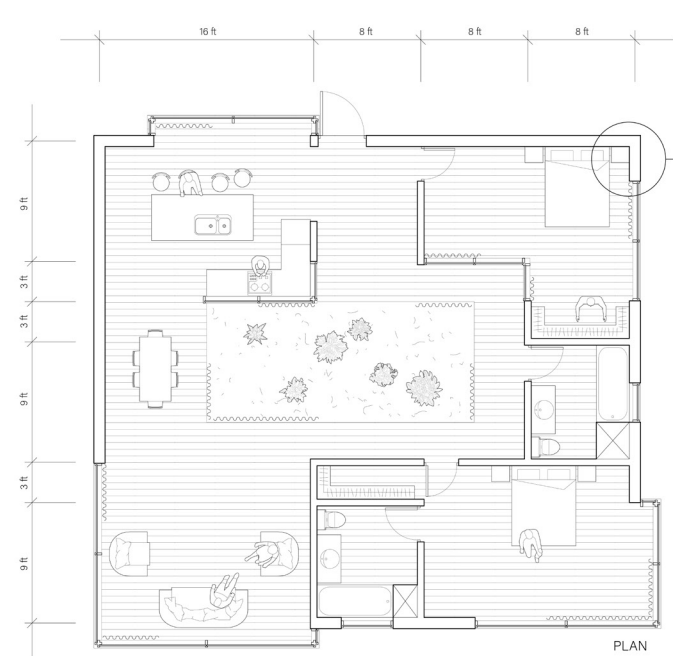
ARCH 4106 Studio Work  
Instructors: Michael Bell  
Team Members: Zhexu Yang, Nuo Lyu

The quasi-commodity practices of Levittown are well known for their efficiency and newly assembly line like organization. The flatness found in drywall or lath and plaster Levittown; Formica (plastic laminate) counters and metal/glass bathroom mirrors (cabinets); thick large cementitious rippled shingles and light window and door trims is in the work of Lightvittown dramatically cut open even as the scale and flatness is preserved. The space extended with a slicing quality afforded by a newly inserted glass structure that adds little actual volume but dramatically cuts the container like quality of Levittown open. Revealing a sky above the new structures instigate a vertical orientation to space. The horizontal orientation is not removed but its is incrementally expanded by a newly "fluted" and upholstered wall of fabrics and curtains. The linear circulation of the Levittown house is now made more rotational giving the occupants an orbital quality to life—around light from above.

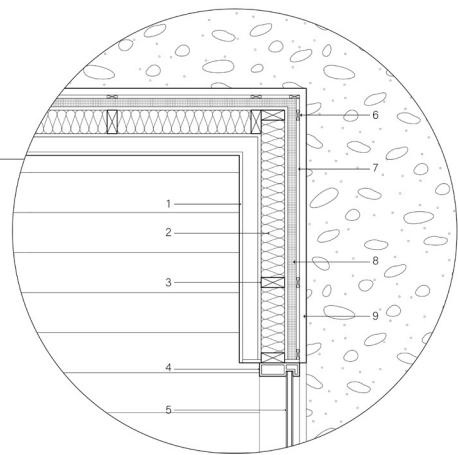




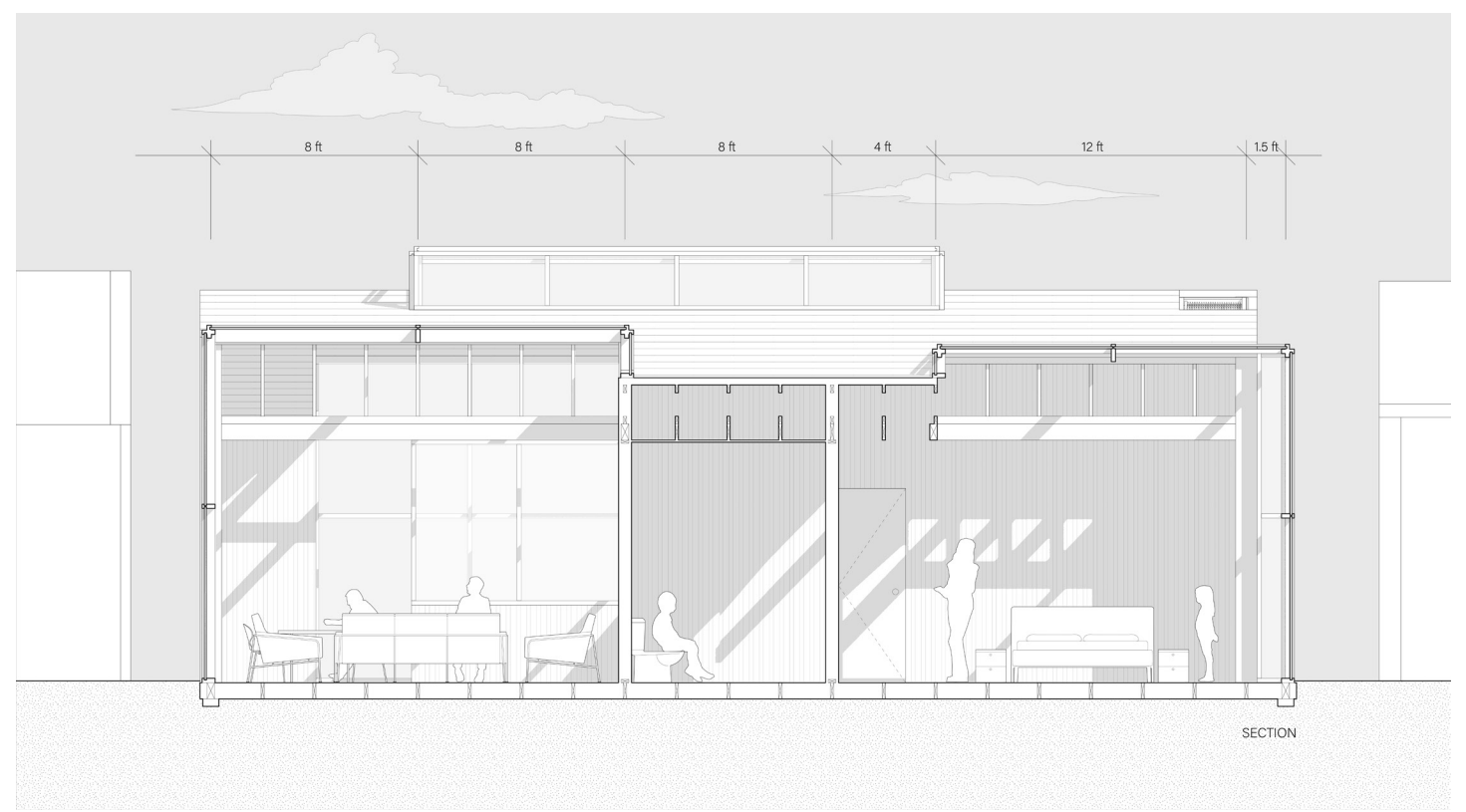




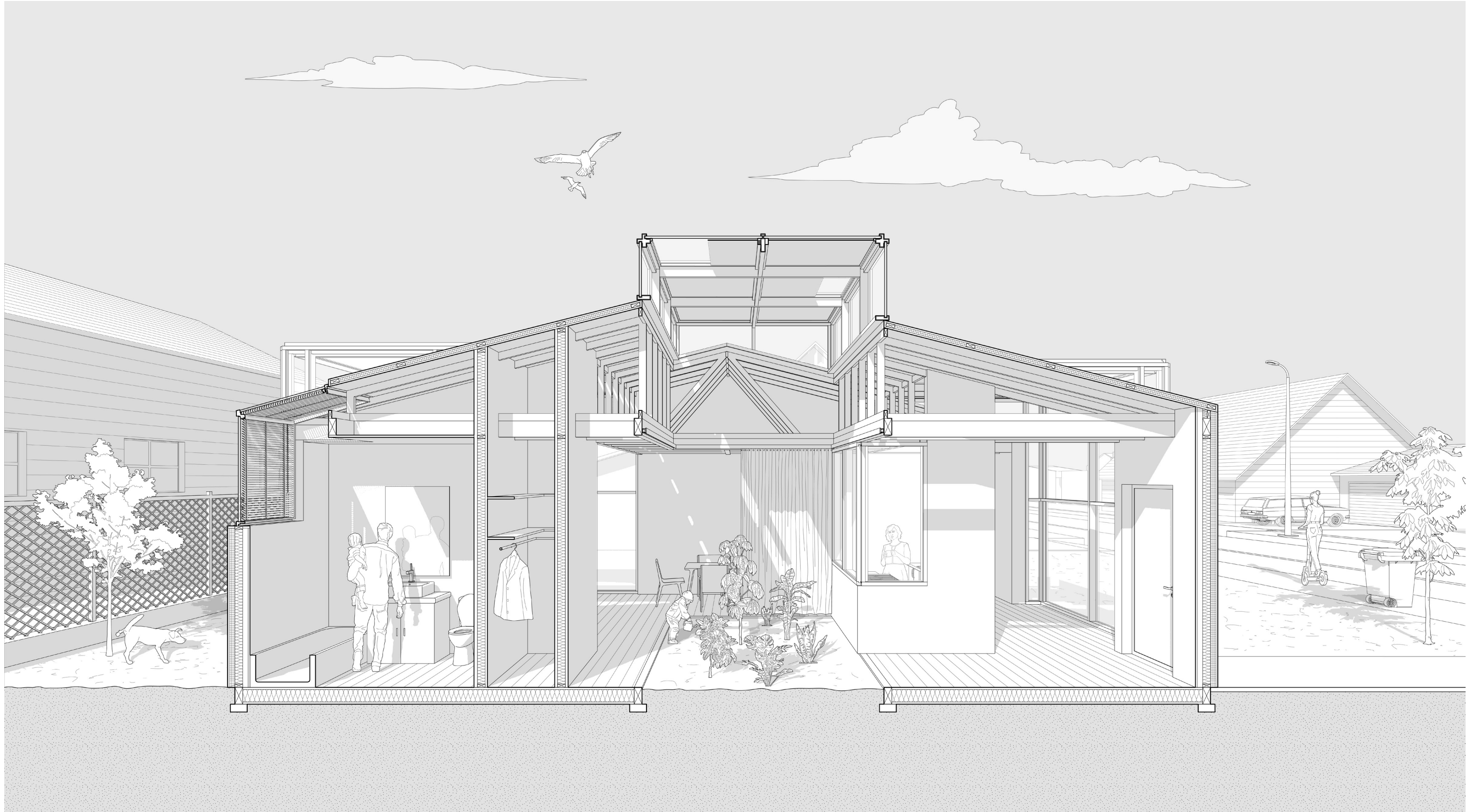
PLAN



- 1. INTERIOR FINISH
- 2. CAVITY INSULATION
- 3. 2 X 4 WOOD STUD
- 4. STEEL MULLION
- 5. DOUBLE GLAZING
- 6. VERTICAL BATTEN
- 7. AIR/WATER BARRIER
- 8. RIGID INSULATION
- 9. EXTERIOR FINISH



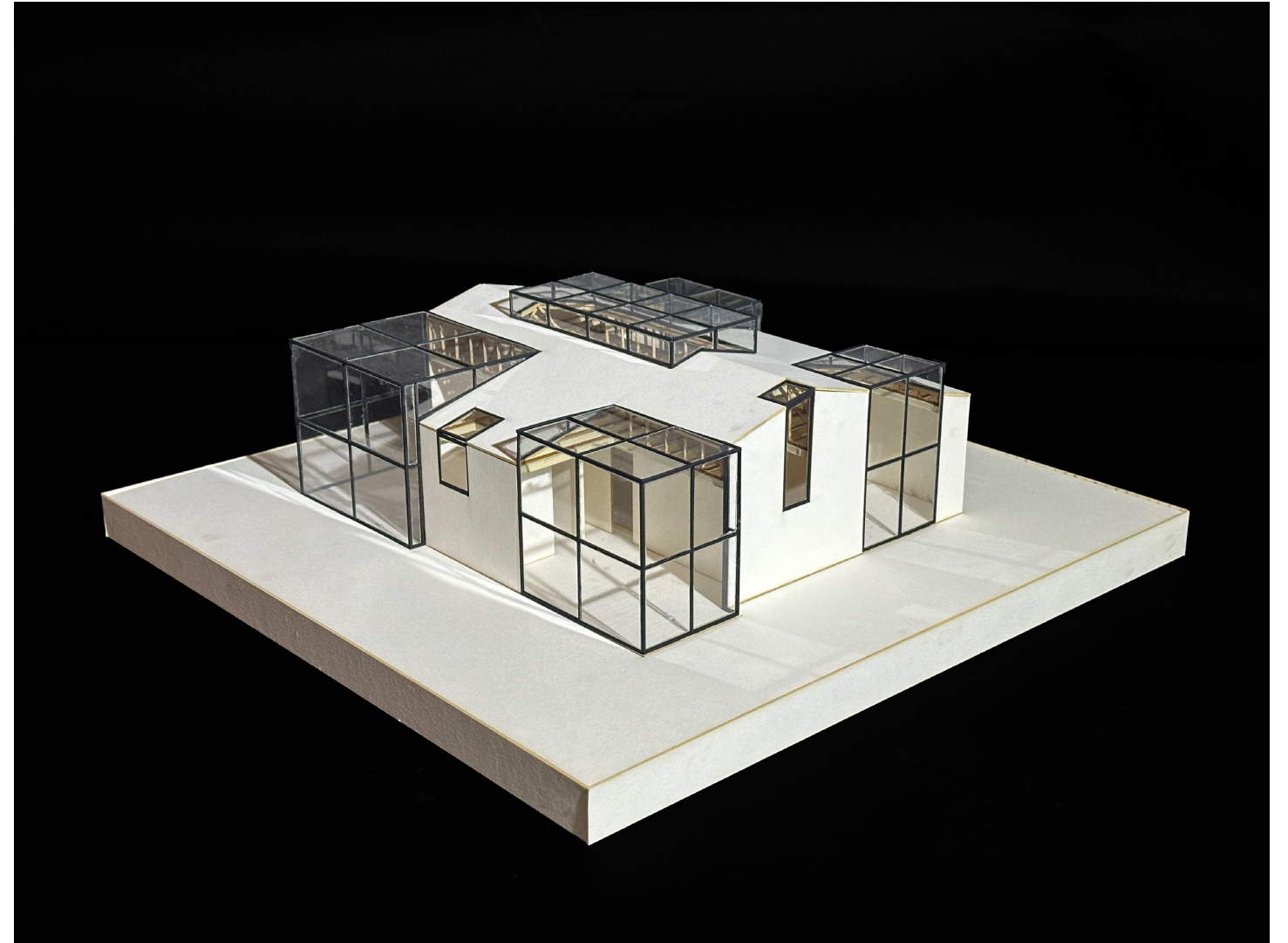
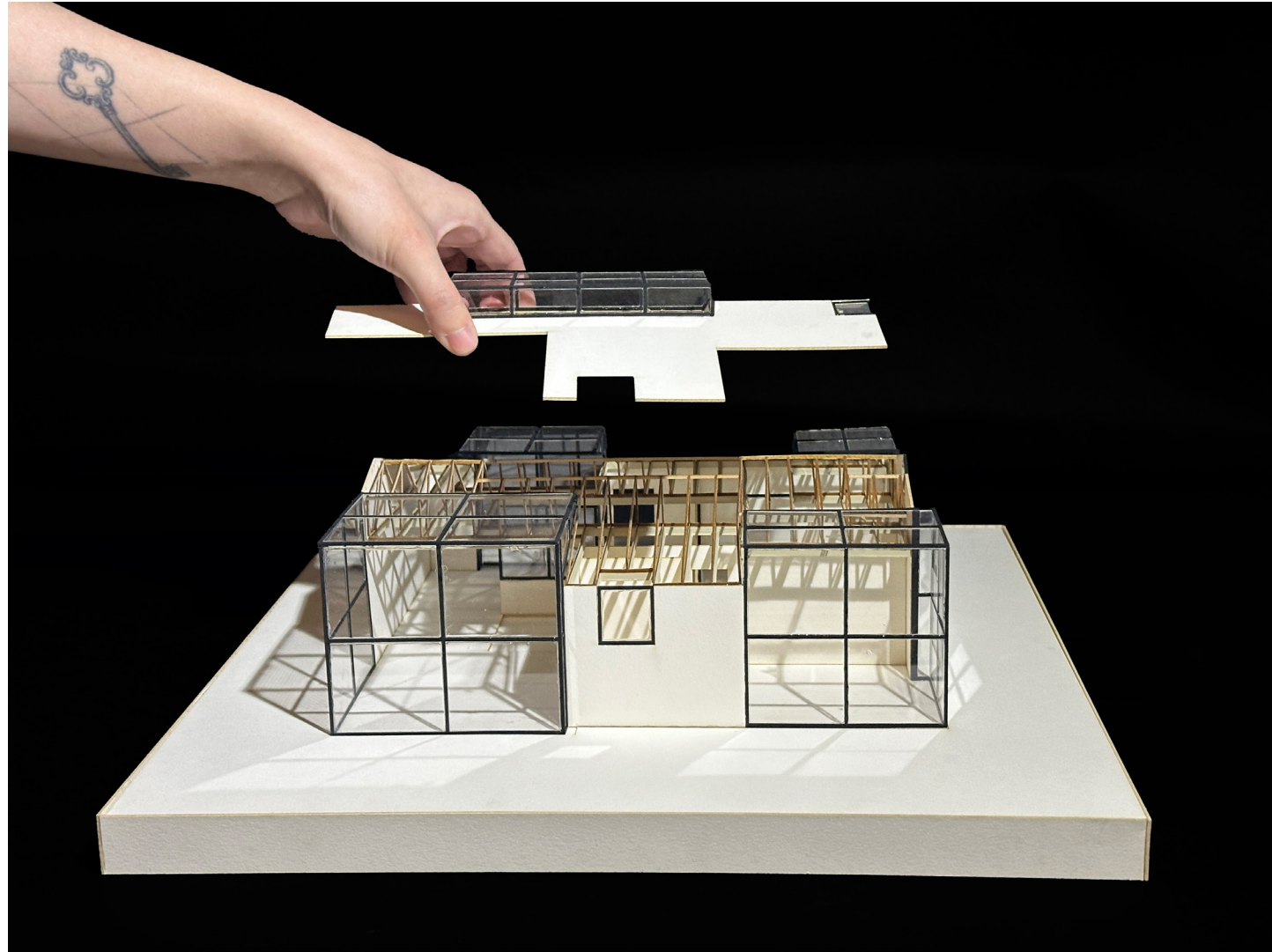
SECTION







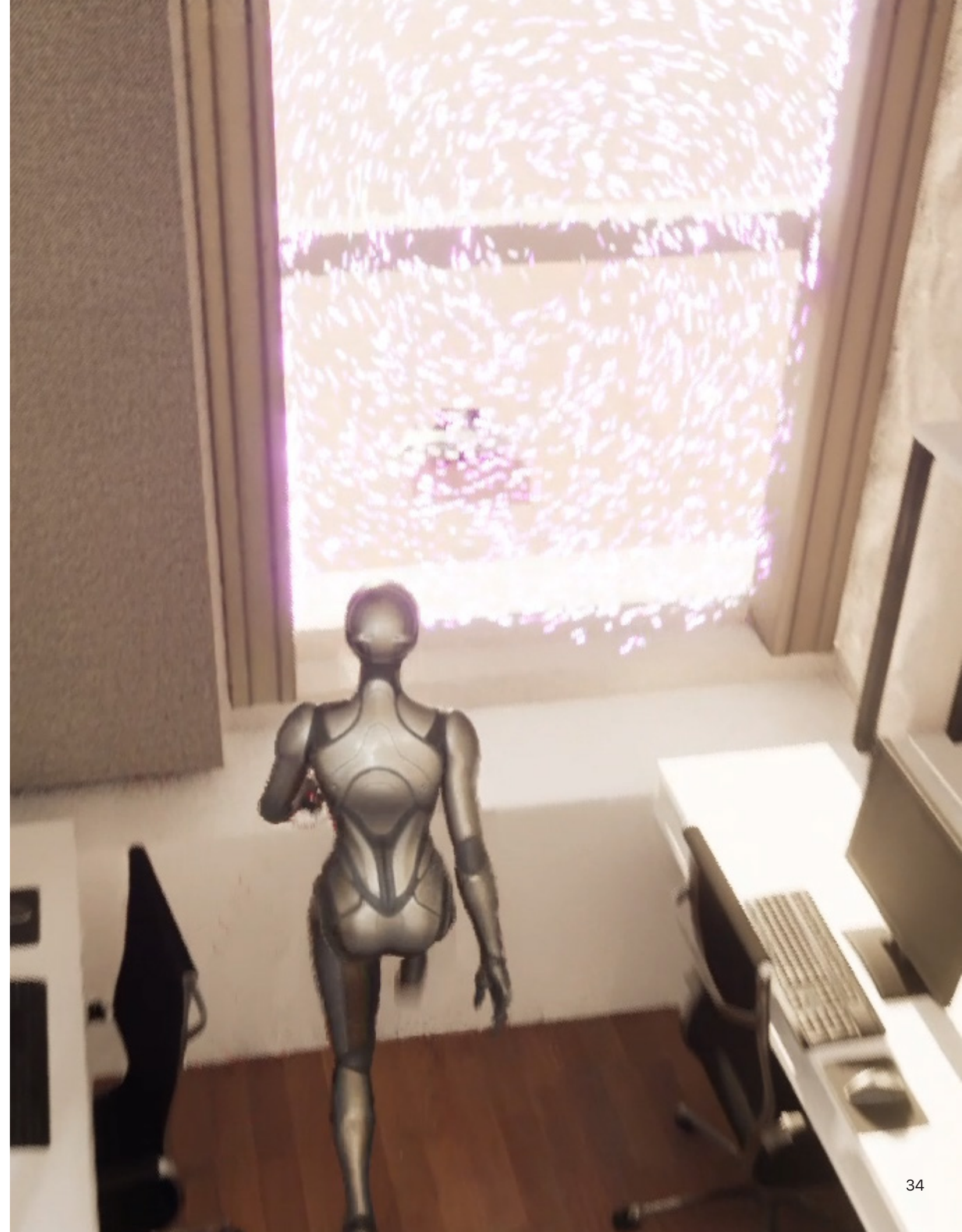




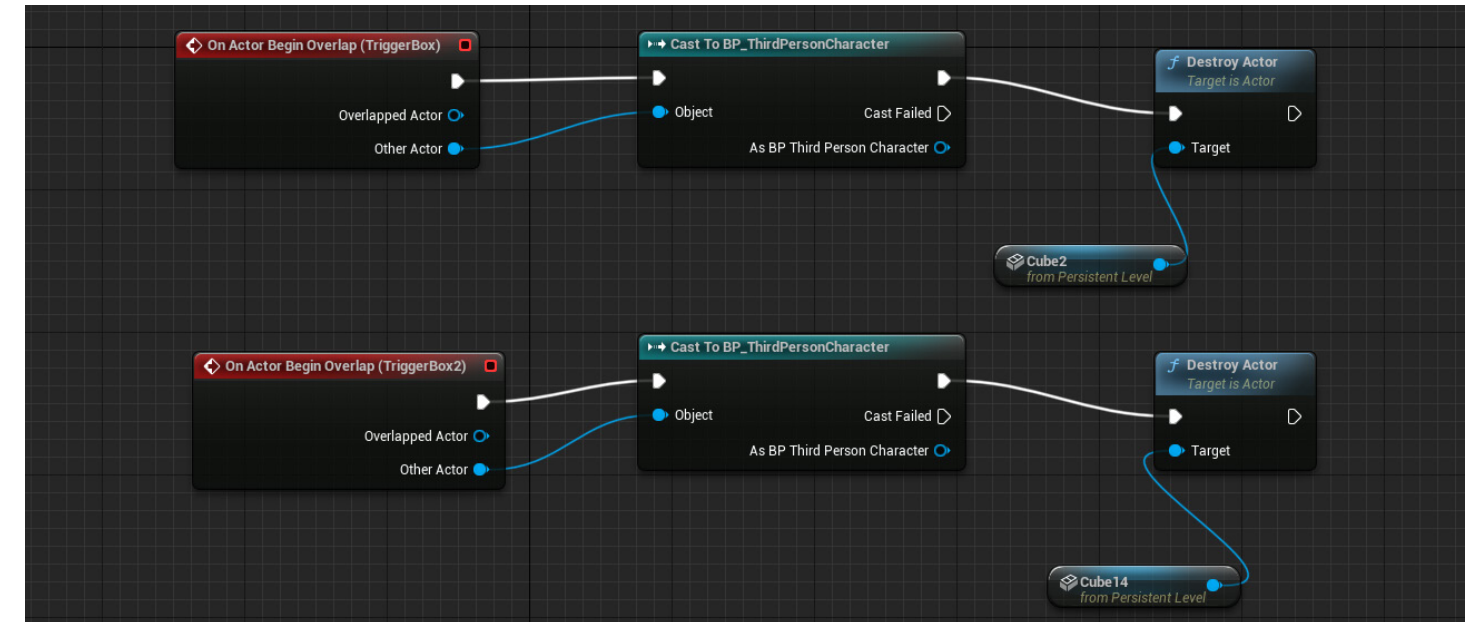
## 04 Studio Escape

ARCH 4980 Virtual Architecture  
Instructor: Nitzan Bartov  
Team Members: Zhexu Yang, Xiaoqi Shen

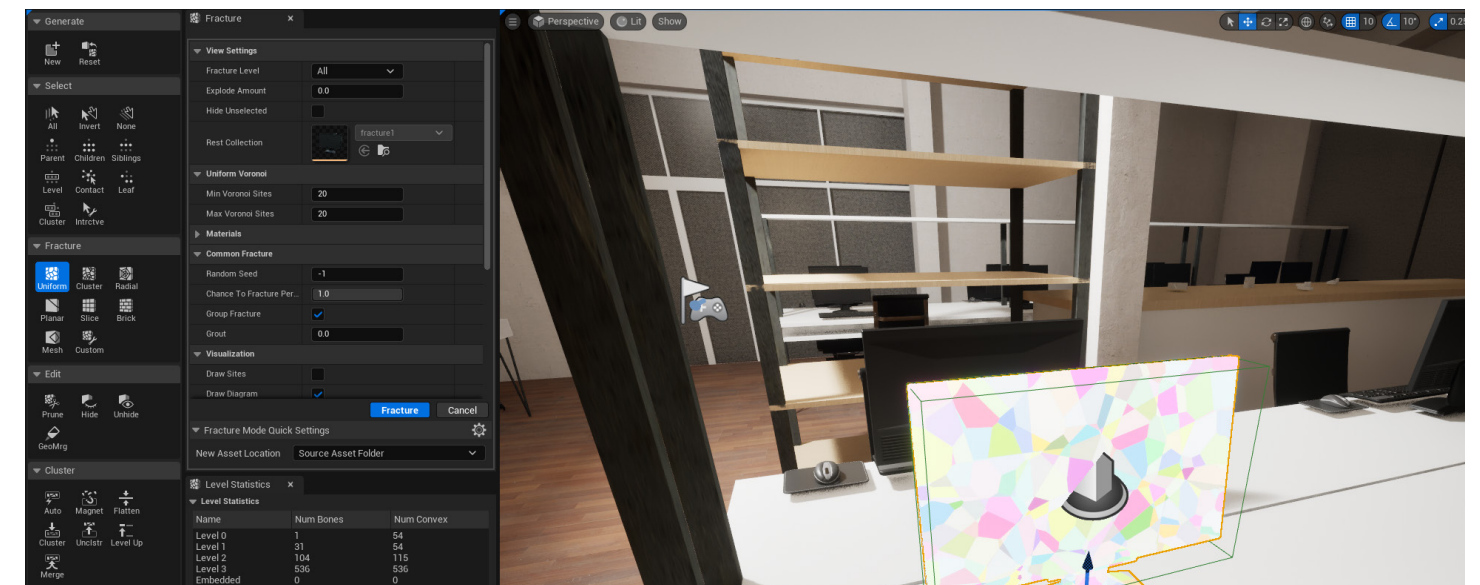
"Studio Escape" is an exploration and escape game that starts with the main character entering the normal studio space. The character will try to find a way out by smashing the correct object that triggers the portal. Once the portal opens, the character can go through the portal and explore the new studio space. Different portals lead to different spaces, and might lead to where you started. Player can go back and forth between spaces with different scales, punch and smash some chairs, computers, and models, and really explore the space to find a way out! Maybe there is **no way** you can **escape studio!**



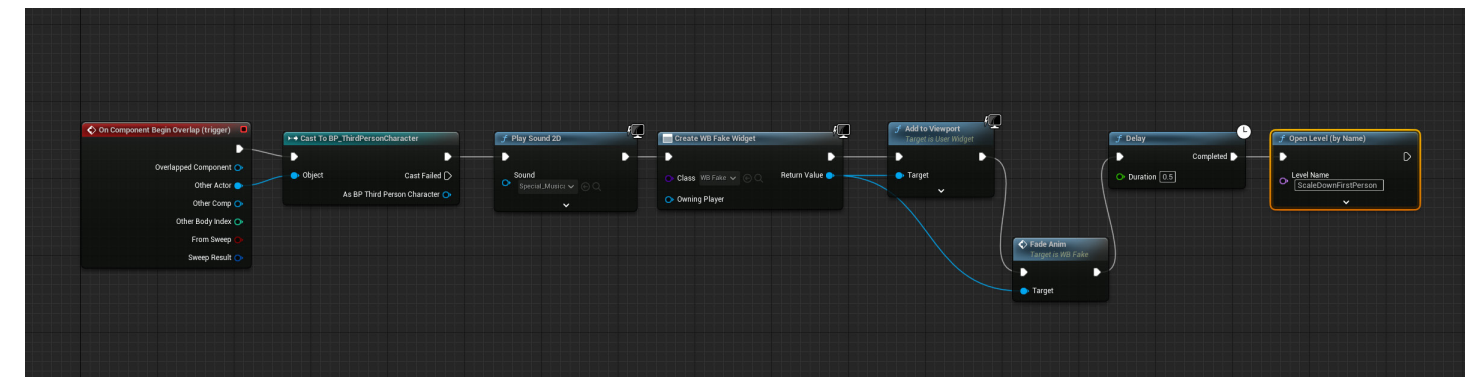




Trigger box destroys the curtain to reveal portal



Correct object fractures after punch

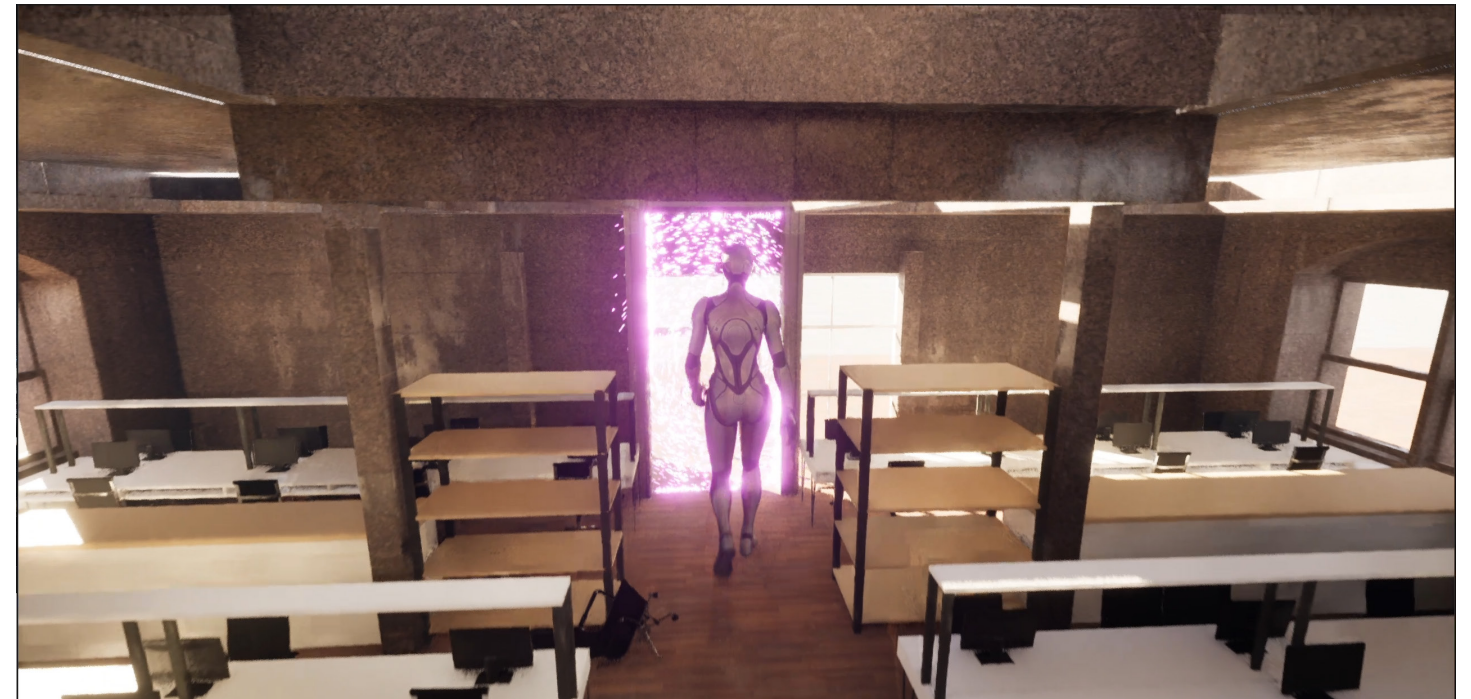


Trigger box of the portal opens a new level

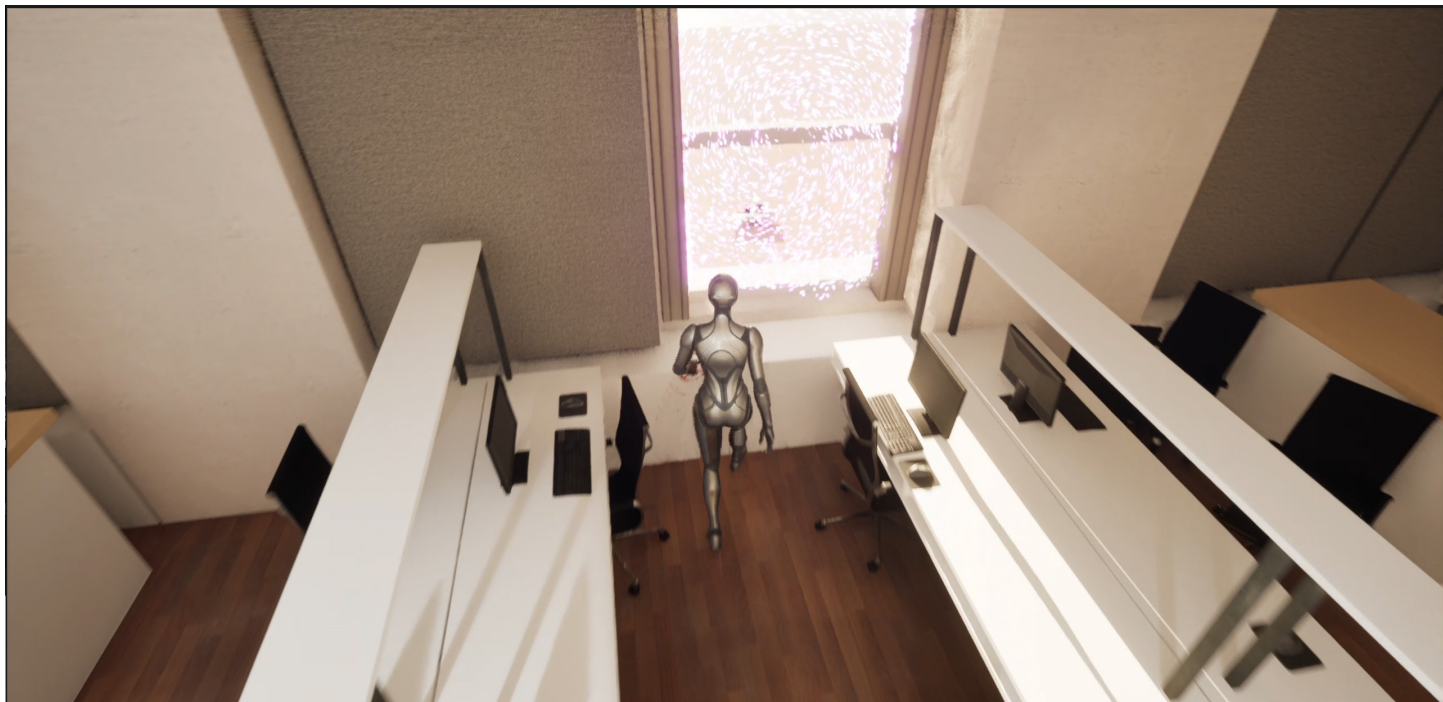




Punching and fracturing the correct object



Character in the scale-down studio space



Entering portal



Character in the scale-up studio space



## 05 Dynamic Home

ARCH 4894 Spatial UX  
Instructor: Violet Whitney  
Team Members: Zhexu Yang, Nuo Lyu, Haihui Zhu

The emergence of Dynamic Island helps to conceal the black borders caused by Face ID. While it doesn't fundamentally solve the technical issues on the screen, Apple has utilized this solution to blur the boundaries between hardware and software. What all these elements on the island have in common is that they display the status of user-initiated actions. This island serves as a window for users to understand device status and serves as an entry for applications currently running in the foreground. Dynamic Island may appear to be an animation at first glance, but its essence is information. In our opinion, the goal of UI interaction is to ensure that information is presented as extensively and accurately as possible in the places where it's most needed.

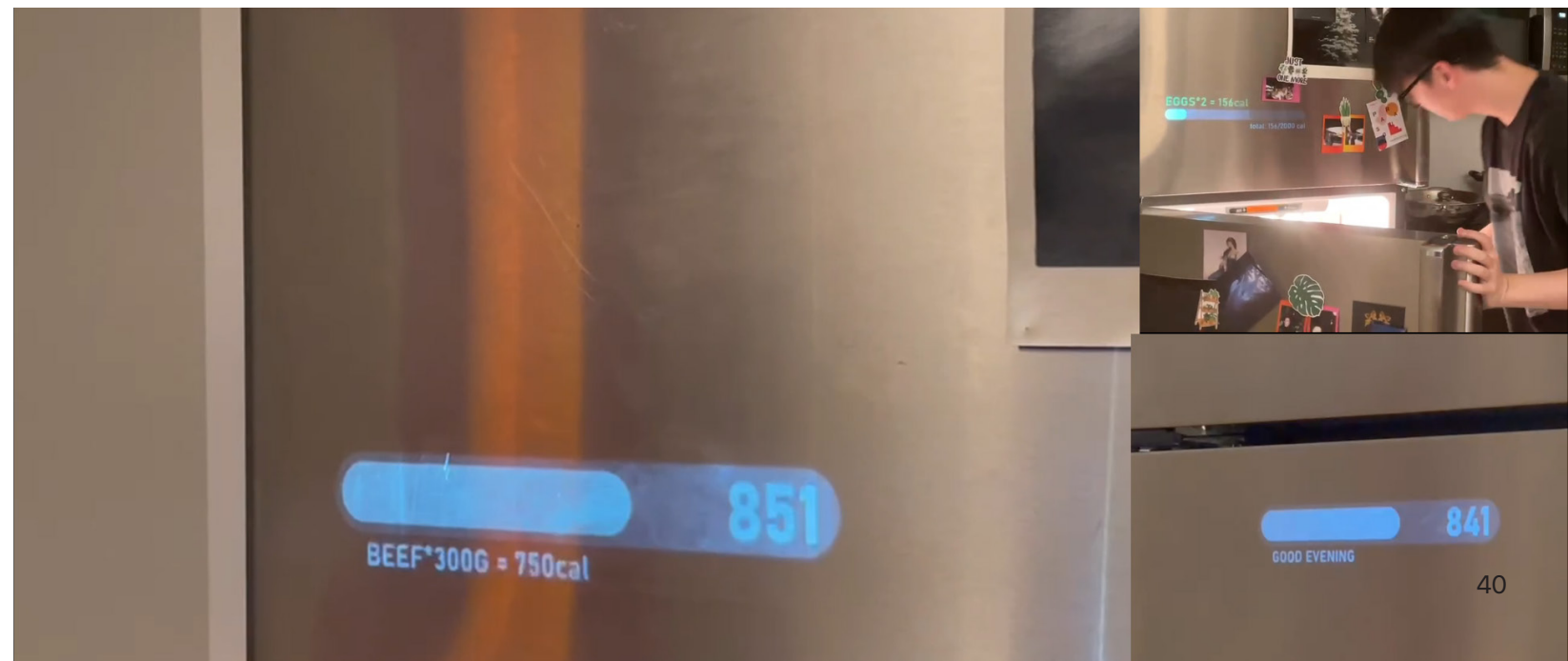
Dynamic island can be seen as a new prototype of user interface that can be used in future AR / VR UI systems. What if the island becomes boundary-less, what if its boundary can be extended 3 dimensionally around our daily life instead of just staying on the small screen? A larger boundary means a larger surface to interact with, and we think the strategies might bring more kinds of interaction for future lifestyle.

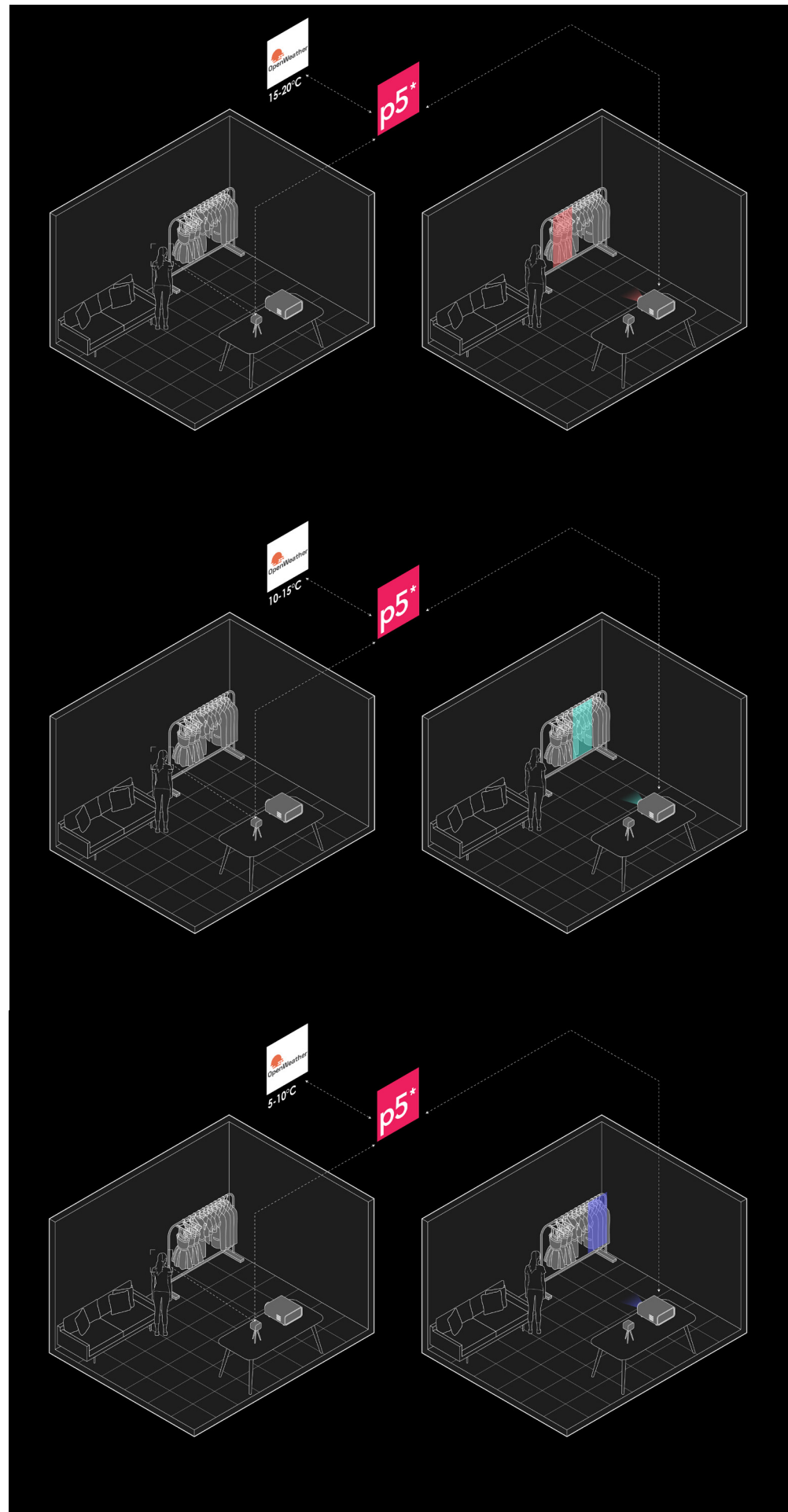
We began by exploring where interactions could occur in everyday life and realized that ordinary elements like doors, walls, and refrigerators could all serve as potential mediums for these interactions. More significantly, these mediums can be seamlessly integrated into common household settings, making them accessible to everyone. To embody our vision of a universal future lifestyle, it's crucial to reduce the barriers to contextualization. Ultimately, we developed three interactive features.

Dynamic closet is the assistant that directly highlights the clothing appropriate for the day's weather without an extra check on your phone. The motion sensor is activated when a person is in range and triggers p5.js. The p5 then gets data through open weather map API. When the temp is low, like 5-10 degrees Celsius, it will project a blue tone to the specific section of your clothes that are suitable for that particular weather. And for other weather conditions, it will adjust based on the temperature outside. This interface design integrates user experience with the daily routing and the surrounding environment for accommodation. You don't have to check the weather and decide what to wear, the program tells you what to wear based on the weather.

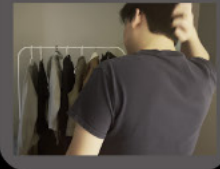
The dynamic alarm system can cure your daily morning laziness by getting you up. The p5 sketch is triggered when local time comes to the time you set up for getting up. Then the alarm will go off and a white dot will appear through projection. You have to follow and touch the dot three times until it stops, which successfully moves you out of your bed. Your hand will be captured by the motion sensor, which triggers the next move of the dot. We know it is hard getting up and it is very likely that you just hit snooze on your phone and go back to sleep. This interface design wakes up not only your mind but also your body to make sure that you're 100% up!

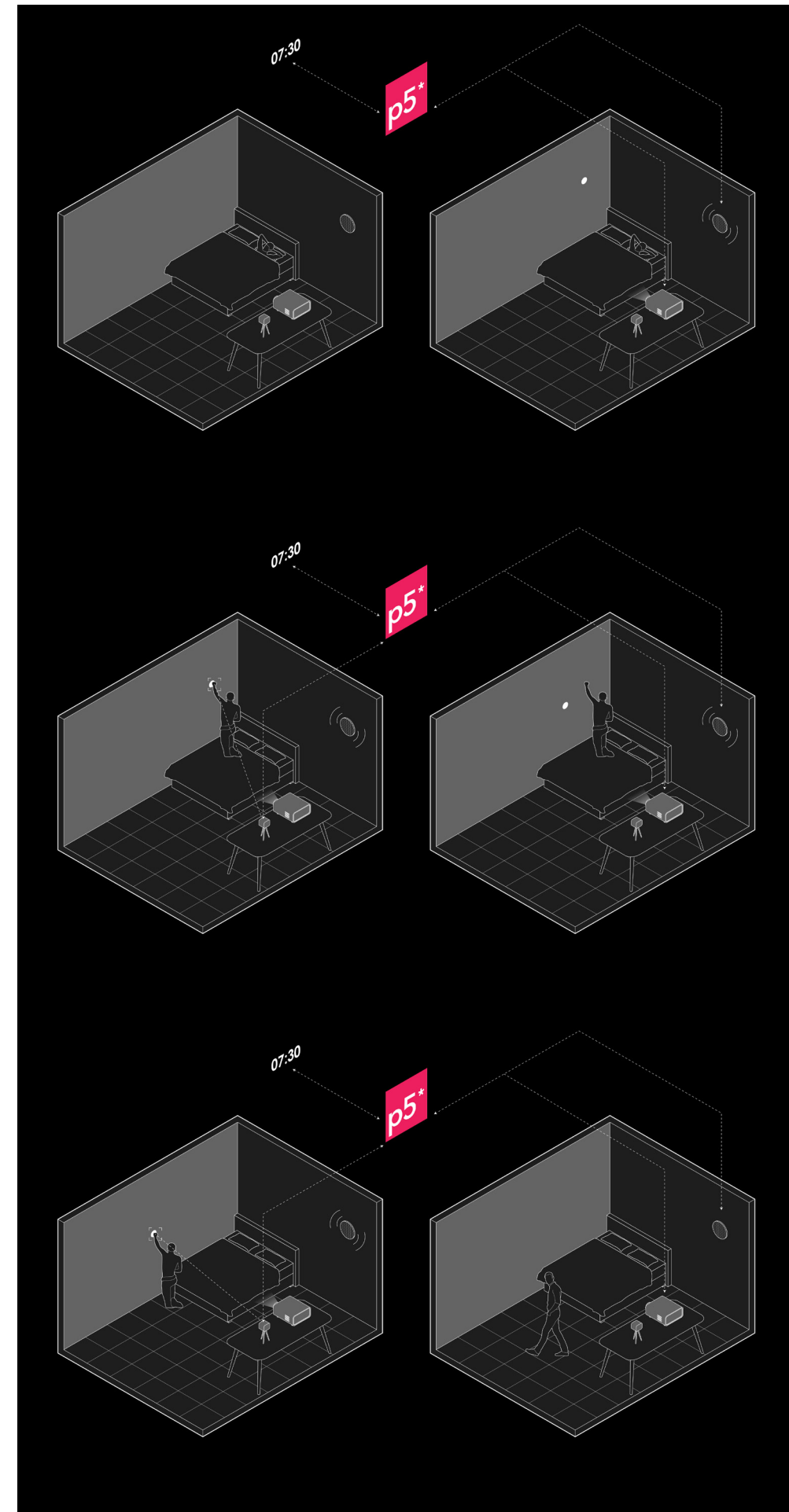
The dynamic health calculator on screen will be the natural tool for reminding you of the amount of daily food and calories intake without setting up a very specific plan. When you open up the fridge and take out a certain item, the sensor captures what type of food it is and talks to p5. P5 then gets the calories information from my net diary and calculates the daily calories intake based on your metabolism. The design makes it possible that you do not lose track of your calories and maintain your health without recording everything on your phone.



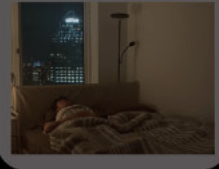

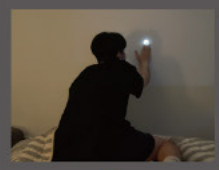


### DYNAMIC ACCOMMODATION

1. GOING TO THE CLOSET  

2. PICKING CLOTH BASE ON SUGGESTION  
  
 CAMERA ON THE CLOSET TO DETACT THE TYPE OF CLOTHES  
 GETHRING TEMPERA-TURE DATA ON OPEN-WEATHERMAP API KEY  
 MAPPING THE TEM- PERATURE WITH THE CLOTHES  
 PRIVIDING SUGGESTED CLOTHES TO WEAR BASE ON THE WEATH- ER
3. TAKE OUT AND PUT ON CLOTHES  

### DYNAMIC ACCOMMODATION

1. TIME TO GET UP  

2. ALARM GOING OFF  
  
 PS JS RUNS WHEN THE LOCAL TIME IS THE TIME TO WAKE UP  
 ALARM WILL GO OFF AND AN INTERFACE WITH A DOT APPEARS  
 PROJECTING THE MOVING DOT TO THE BEDROOM WALL  
 HOVERING HAND OVER THE DOT FOUR TIMES TO FOLLOW THE MOVEMENT TIL IT STOPS, AND THE MOTION IS DETECTED WITHIN PS JS
3. FOLLOWING THE DOT THAT LEADS YOU  
  
 PS JS RUNS WHEN THE LOCAL TIME IS THE TIME TO WAKE UP  
 ALARM WILL GO OFF AND AN INTERFACE WITH A DOT APPEARS  
 PROJECTING THE MOVING DOT TO THE BEDROOM WALL  
 HOVERING HAND OVER THE DOT FOUR TIMES TO FOLLOW THE MOVEMENT TIL IT STOPS, AND THE MOTION IS DETECTED WITHIN PS JS
4. GETTING UP  
