

Portfolio

ADAM YUZHEN ZHANG

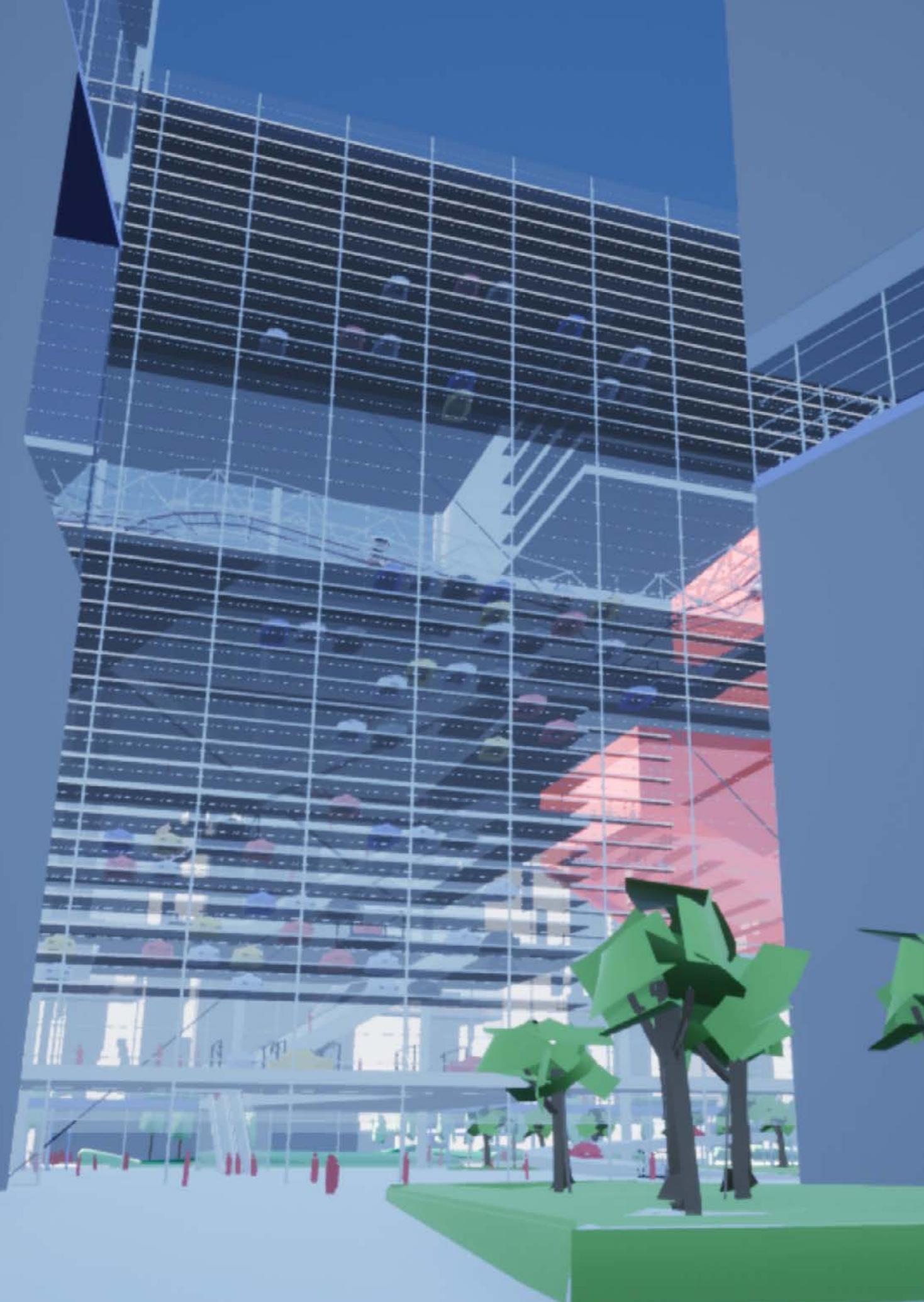
B.Arch '21
Cornell University

"Architecture is always dream and function, expression of a utopia and instrument of a convenience." For me, architecture is a sequence of spaces and an orchestration of movements that weaves together dream and function, idealism, and utility. This is also a central theme for my projects. Aside from the structure and material, there will always be something of humanity itself: object, symbol, semiotics... I also see architecture as a metaphorical stage where people "perform" or enact their bodily performativity.

I'm also hoping to bring together cutting-edge technologies such as VR and AR with the humanities aspect of architecture. With my background in CS minor, I have taken two consecutive studios with the theme of VR. In VR, the haptic interaction with spheres is a means of transporting oneself into a new space. According to Hito Steyerl, "bubble vision" is a framework that facilitates this shift, proposing to adapt us to a world where artificial intelligence systems are becoming increasingly prevalent. My final thesis will also be centered around virtual reality and augmented reality.

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THE MEMORIAL LOOP

— Lyrical Pathways

Spatial choreography with Virtual Reality

Virtual Places Research Studio
Spring 2020

Instructor: Henry Richardson, Christopher Morse

Site: Ground Zero, New York

Collaborator: Zoe De Simone

Contribution: Conceptual design, design in virtual reality, development of the interactive VR experience in Unreal Engine, architectural representation

The project redefines movements through urban spaces, and experiments Virtual Reality as a tool of design, visualization and presentation. During Covid-19, the design process tests various tools for virtual collaboration during quarantine.

The project formulates pathways at different levels that link atriums on the surrounding buildings to expand urban scale circulation to a three-dimensional system. The three proposed towers are the points of entry that links the paths down to the ground plane, the World Trade Center Train Terminal, and the Battery Park City Ferry Terminal. A “People Mover” 3D tram is proposed to help pedestrians move through the pathways overlooking the Memorial site.

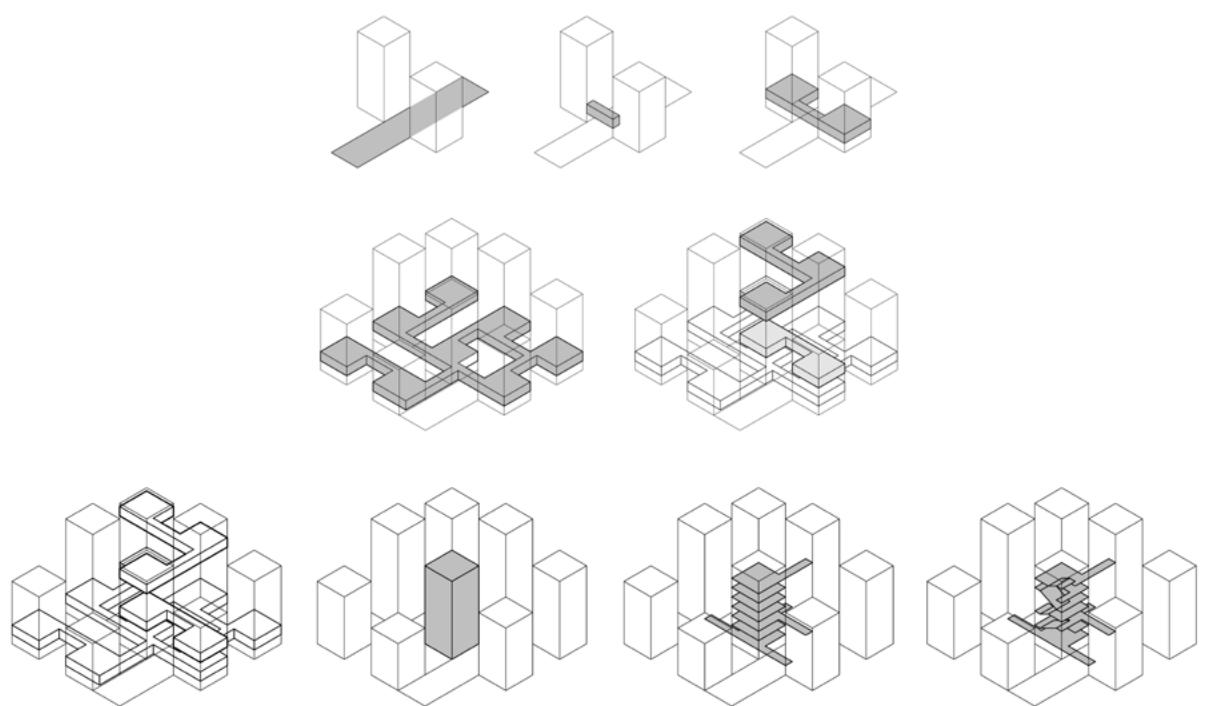
The design workflow investigates Virtual Reality as the main design tool by utilizing VR modeling in Gravity



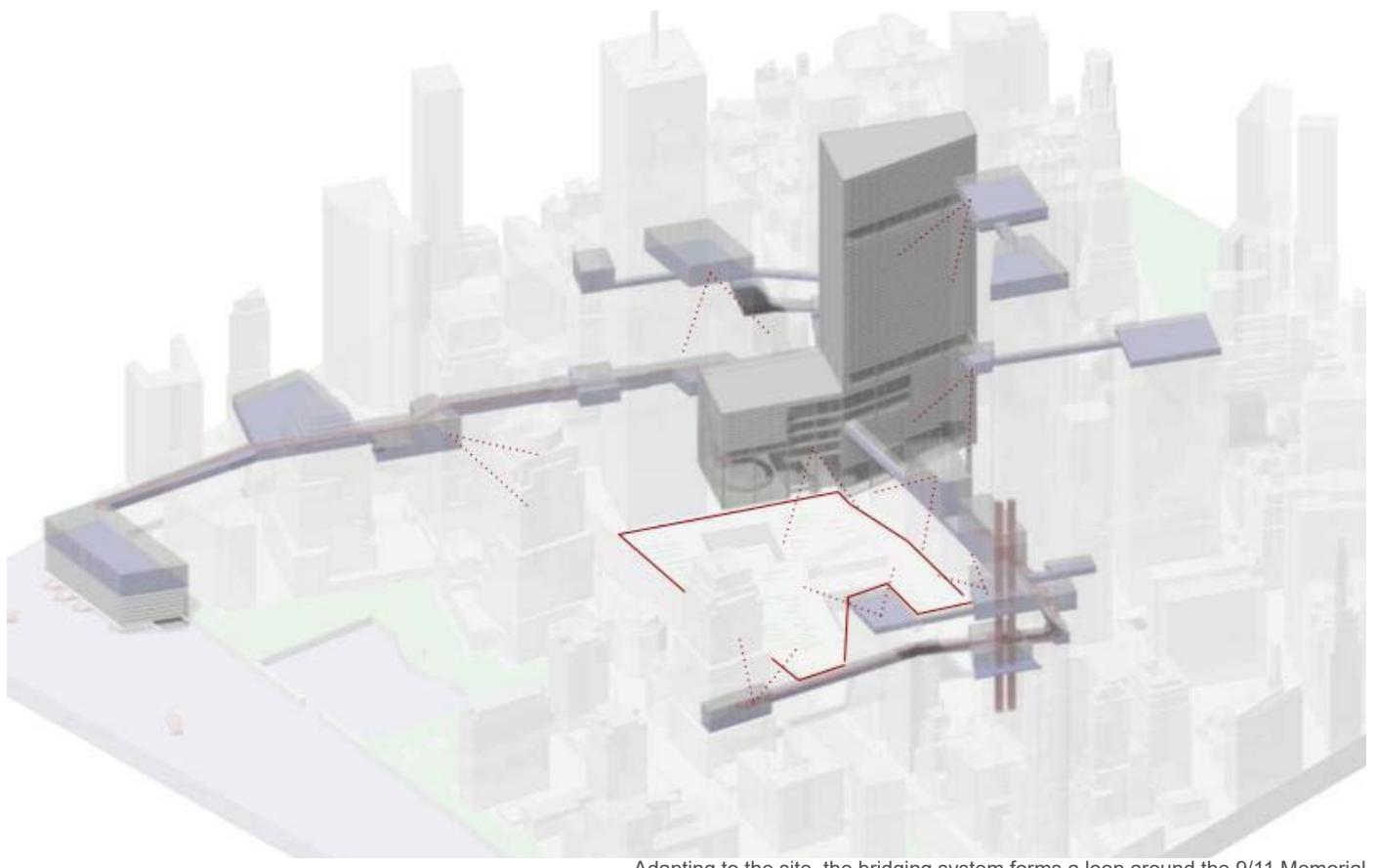
Sketch, Tilt Brush, and Arkio. VR is also the analytic tool that allows real-time immersive experience through the elaborated vignettes of the project, and it is the presentation tool that allows multiuser visualization for sharing experiences and virtual interactions for changing space and time.

The design process also takes advantage of Rhino Worksession and GitHub for information sharing, and the multiuser mode of Arkio and Unreal Engine for virtual collaboration while social distancing.

Designing an urban center with multiple ground planes

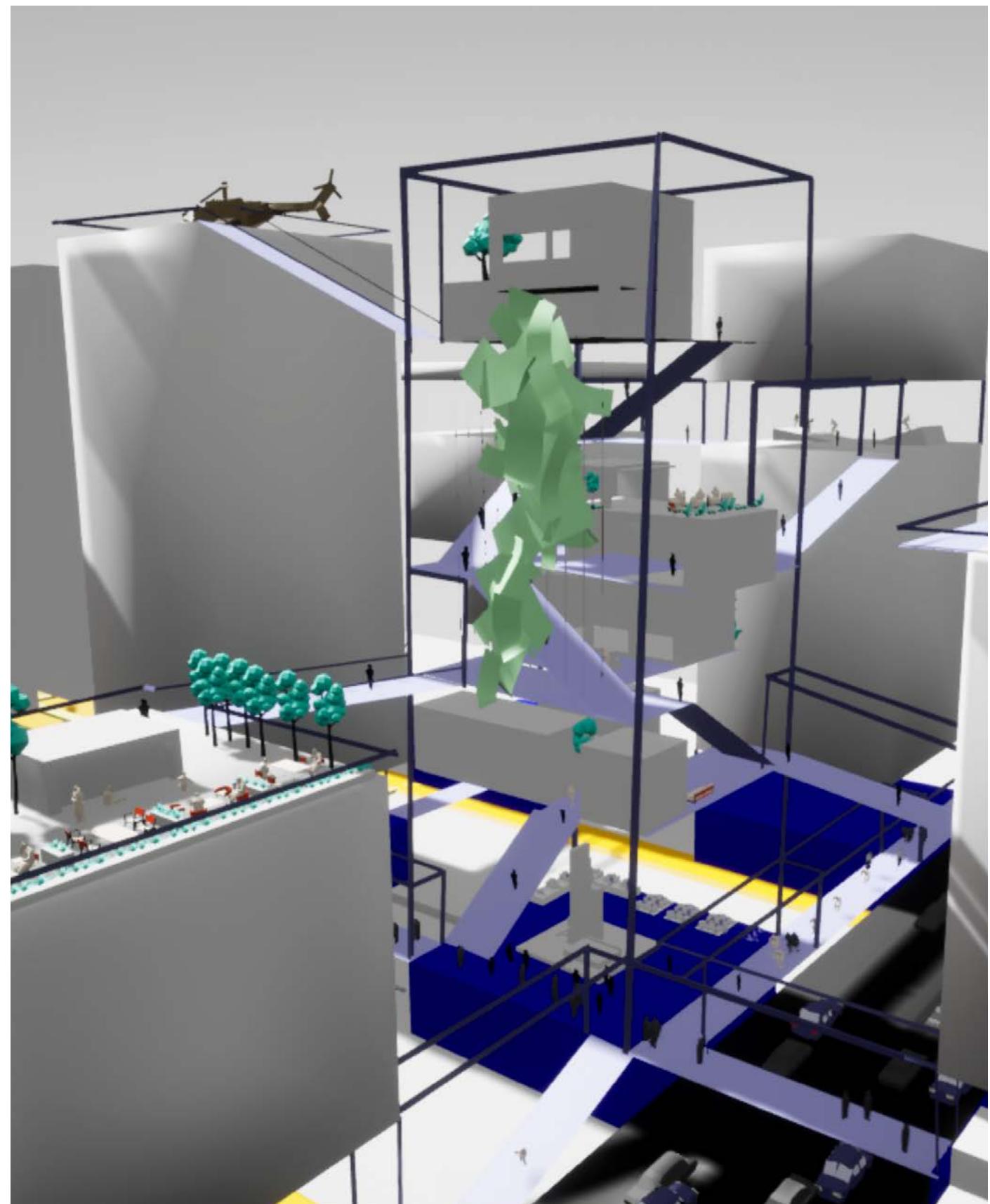


The bridging system and vertical circulation tower of Hong Kong Elevated Walkway generates multiple ground planes for the city



Adapting to the site, the bridging system forms a loop around the 9/11 Memorial

Analyzing Precedent within Virtual Reality

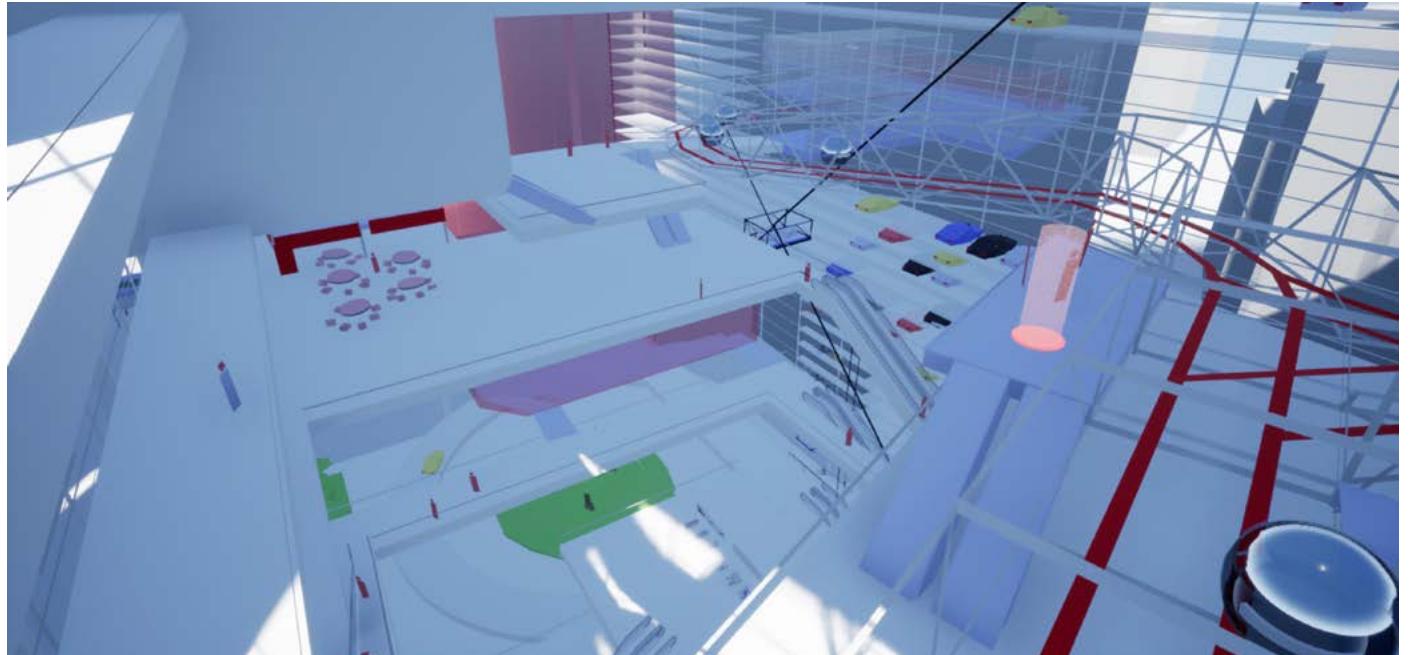


Sketching out the diagram of Hong Kong Elevated Walkway in Tilt Brush, populating it with programs, people, cars, and vegetations in Arkio, and experiencing it in VR in the Unreal Engine.

Experiencing the design in the multiuser VR environment created with Unreal Engine



Virtual Final Review Installation at the Gallery in the Main Lobby



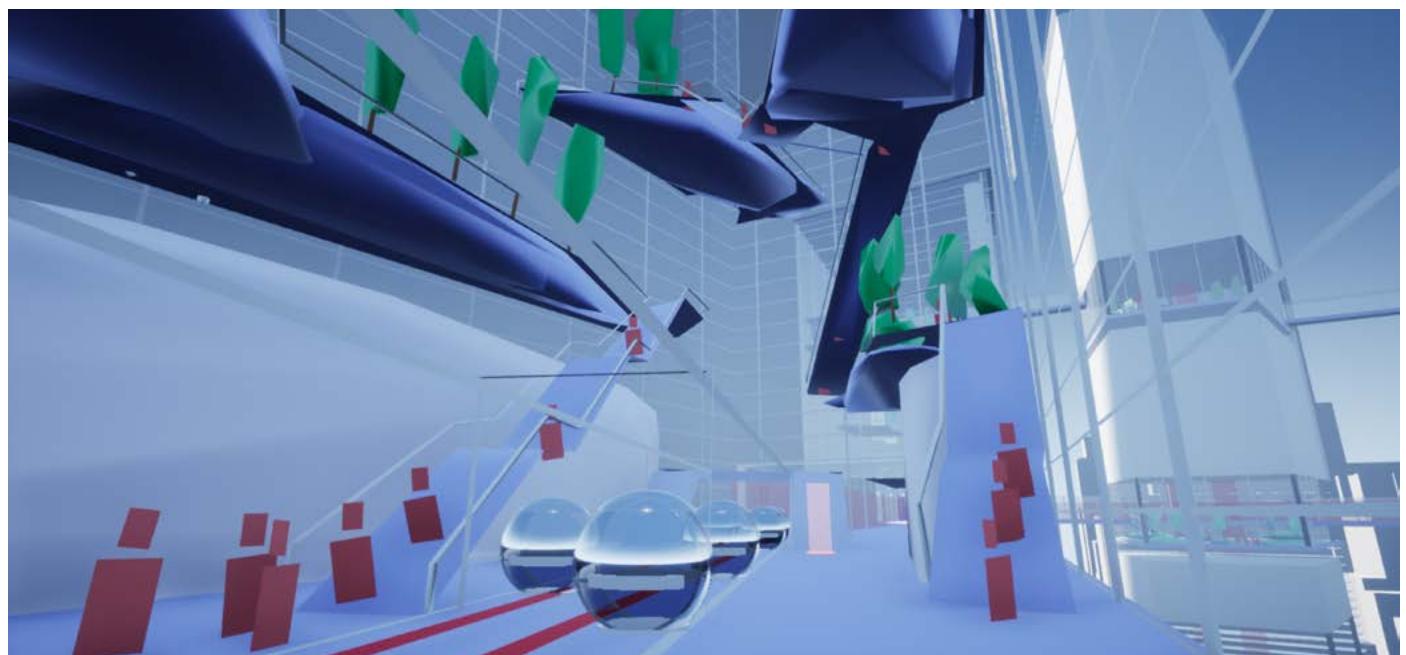
Main "People Mover" Station Overlooking the Main Lobby



Virtual Milstein Hall Pinup Space for Collaborative Final Review



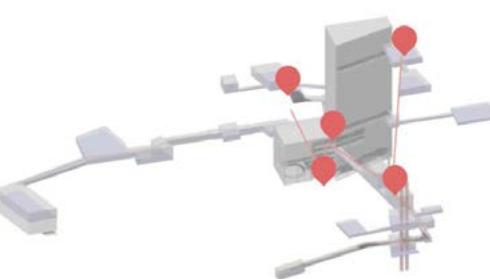
Car Parking Facade and Vertical Car Elevators



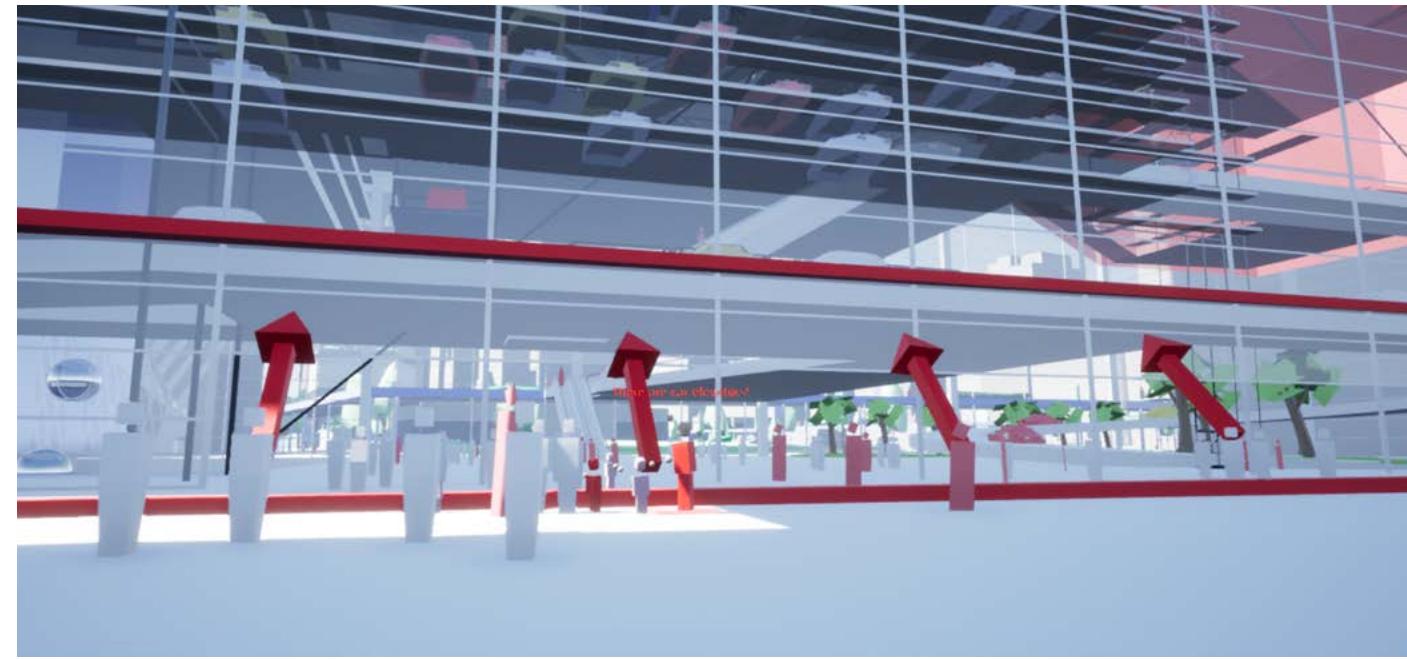
Atrium Space Inserted on the Context Building

Choreographing experiences for pedestrians arriving from the city center

The narrative of pedestrians' arrival at this urban complex is choreographed in Gravity Sketch and imported into the Unreal Engine. It represents the "affect" of spaces, which leads to design decisions. The tour guide helps introduce design elements to visitors in VR.



Guided VR Pedestrian Experience - Arrival



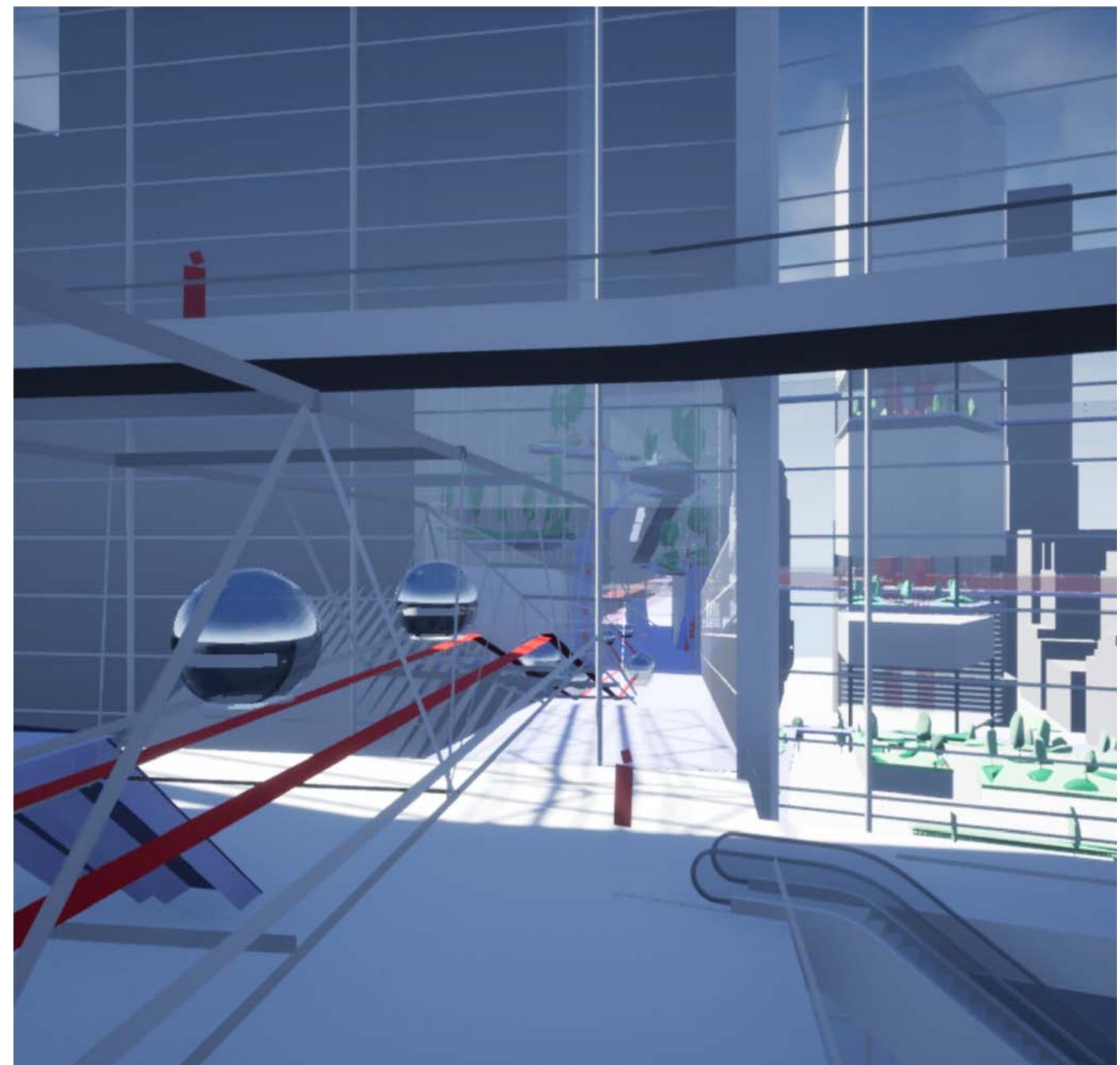
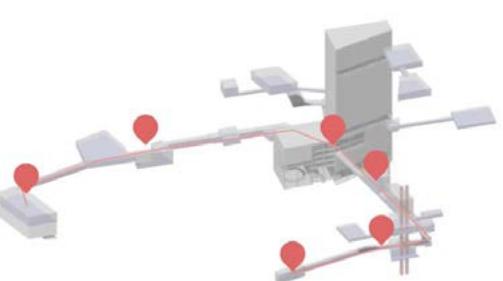
Elevating Street to Prevent Intersection between Pedestrians and Cars



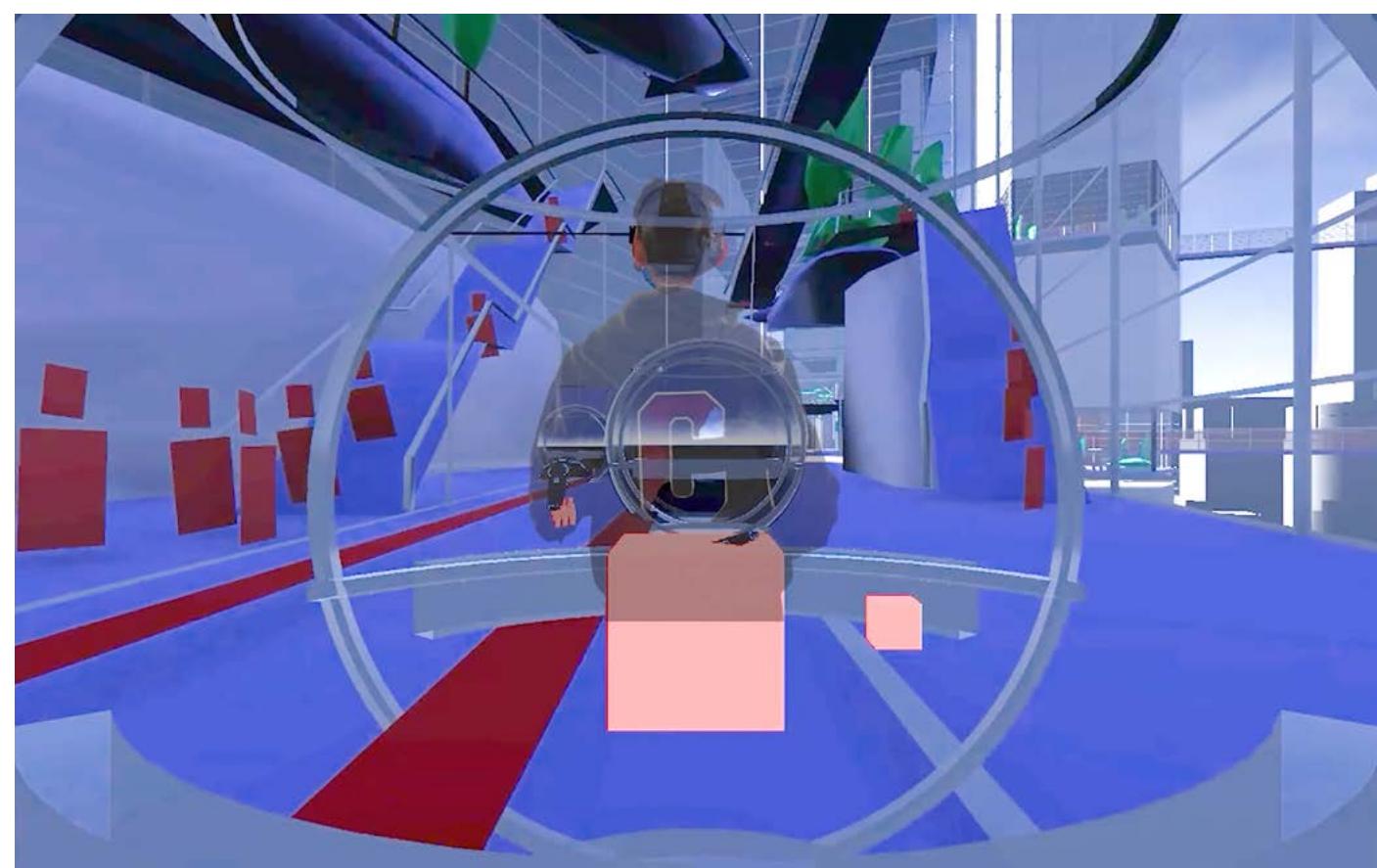
Main Lobby

Experiencing “People Mover” paths in VR

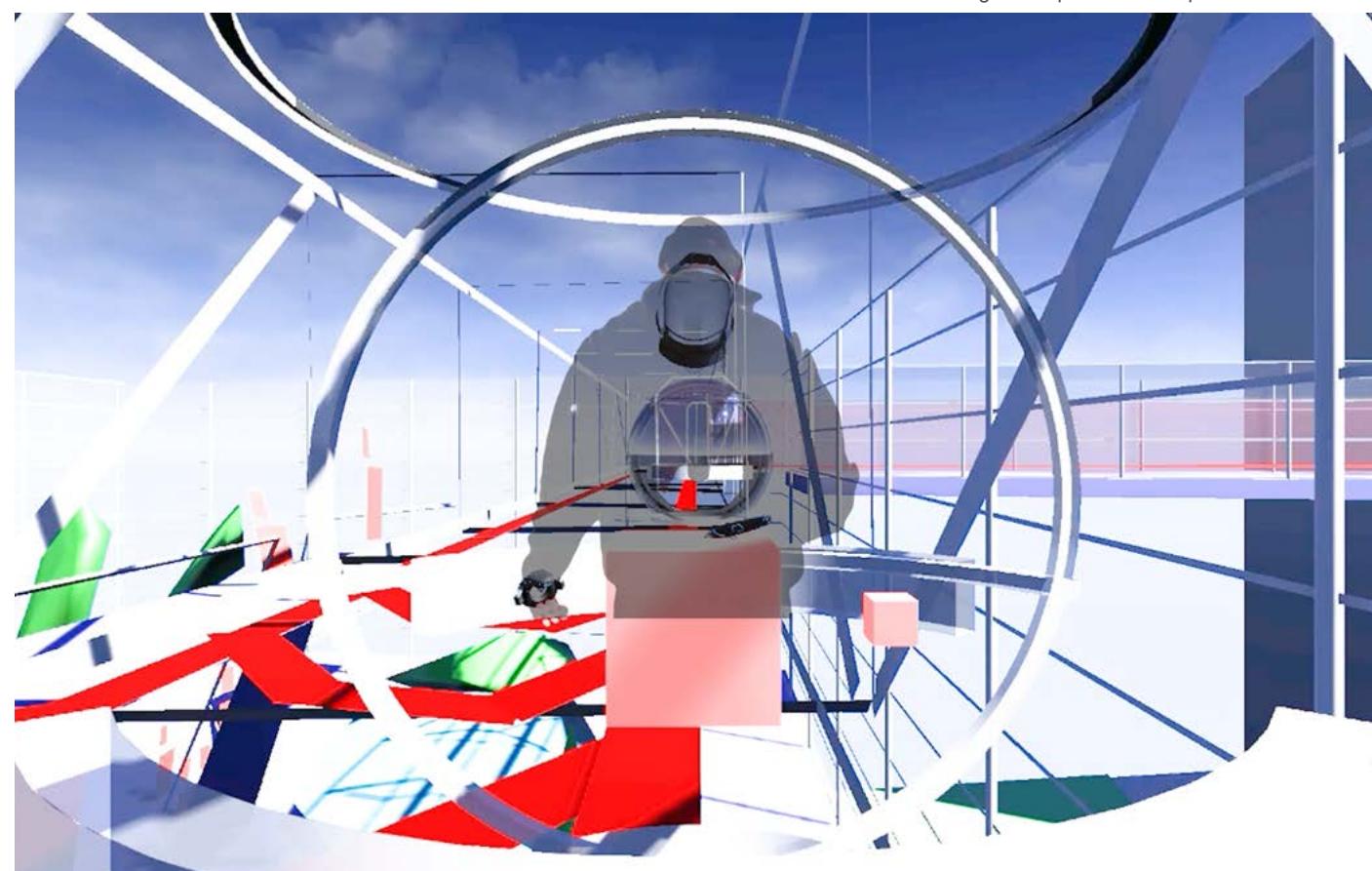
The “People Mover” system threads through the winter garden above the harbor, the restaurants, the main lobby, and other public spaces inserted on the context buildings. This experience allows visitors to drive a “People Mover” capsule on their own through the spaces and enjoy the nodes along the track.



“People Mover” Tracks Linking Atrium Spaces

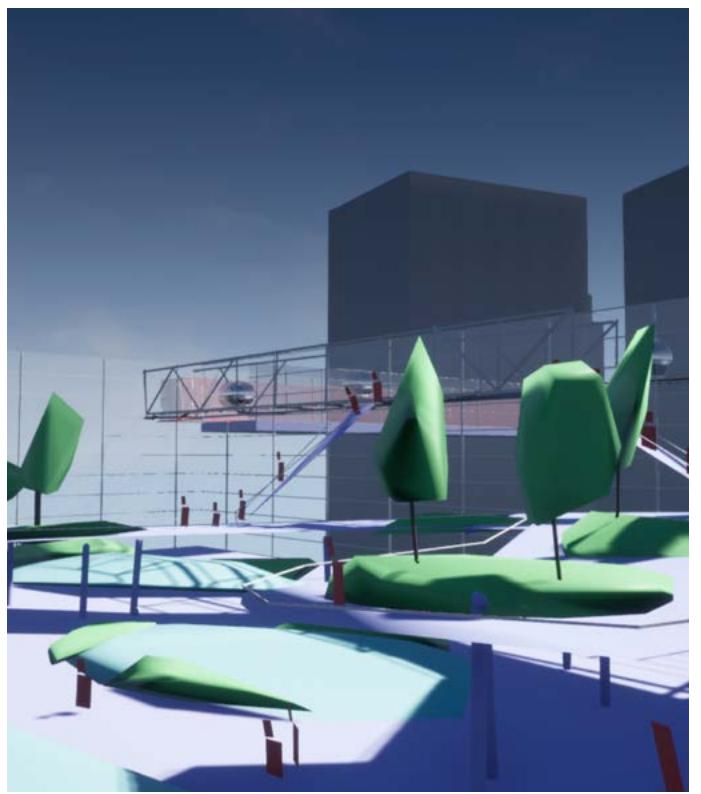


Driving a “People Mover” Capsule in VR - Atrium

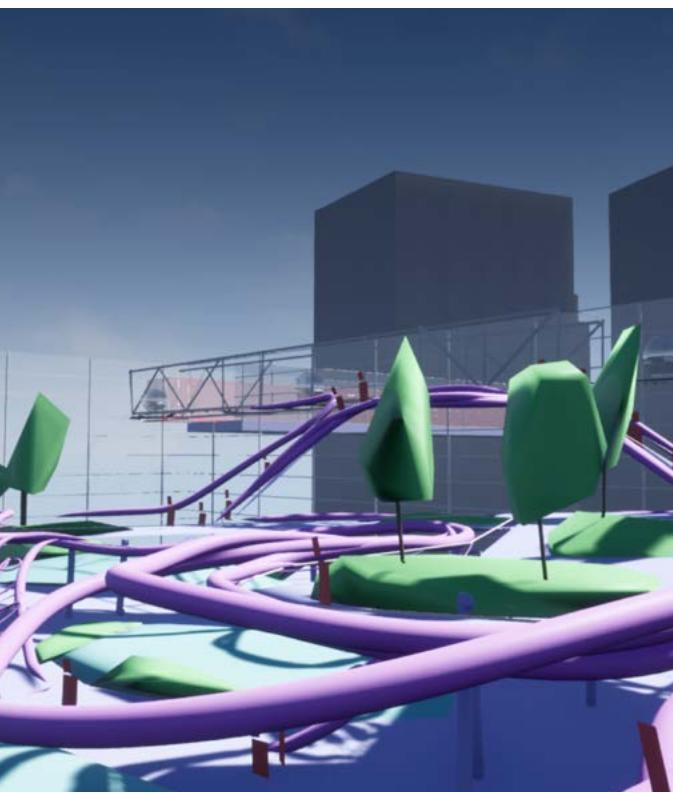


Driving a “People Mover” Capsule in VR - Winter Garden

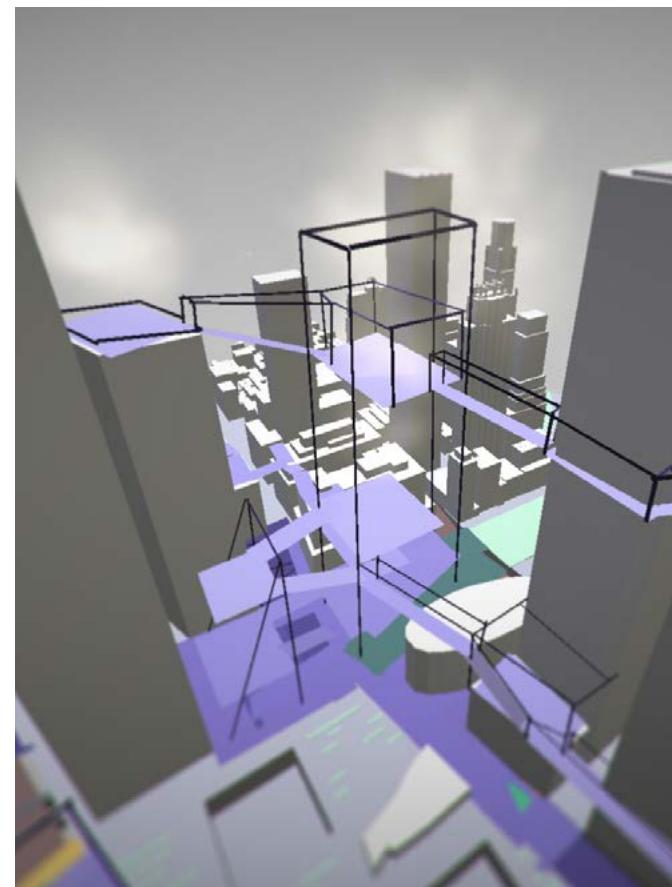
Design workflow with intuitive 3D sketching in Virtual Reality



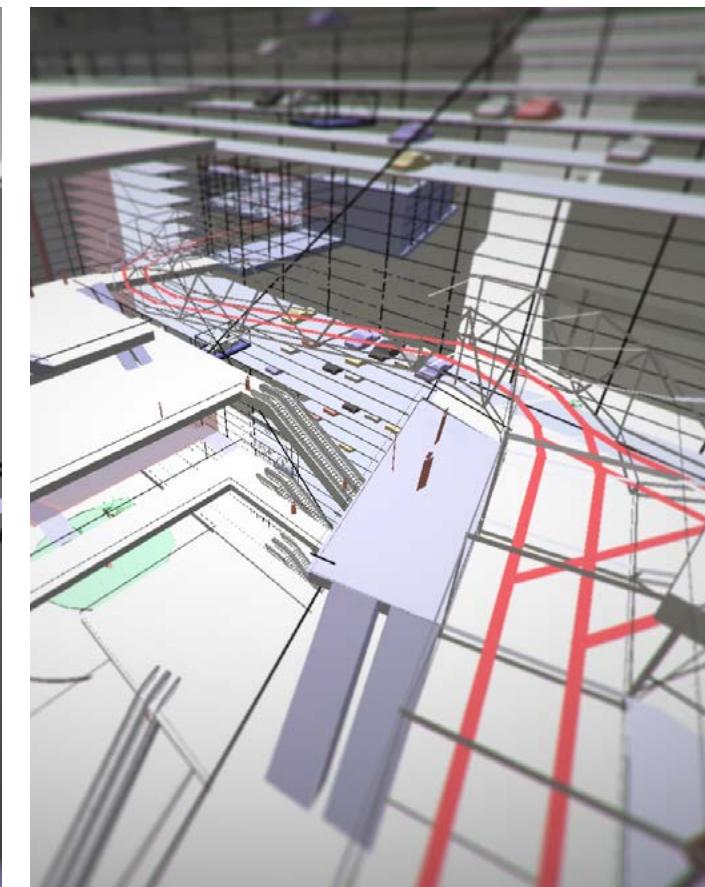
1. VR Spatial Design
Gravity Sketch & Tilt Brush & Arkio



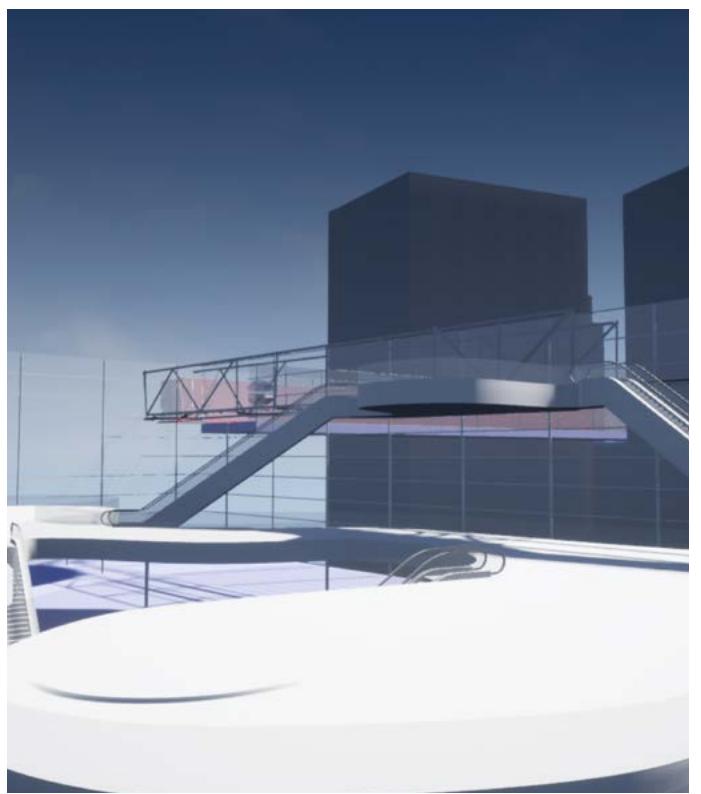
2. Collaborative VR Annotation
Unreal Engine & Gravity Sketch



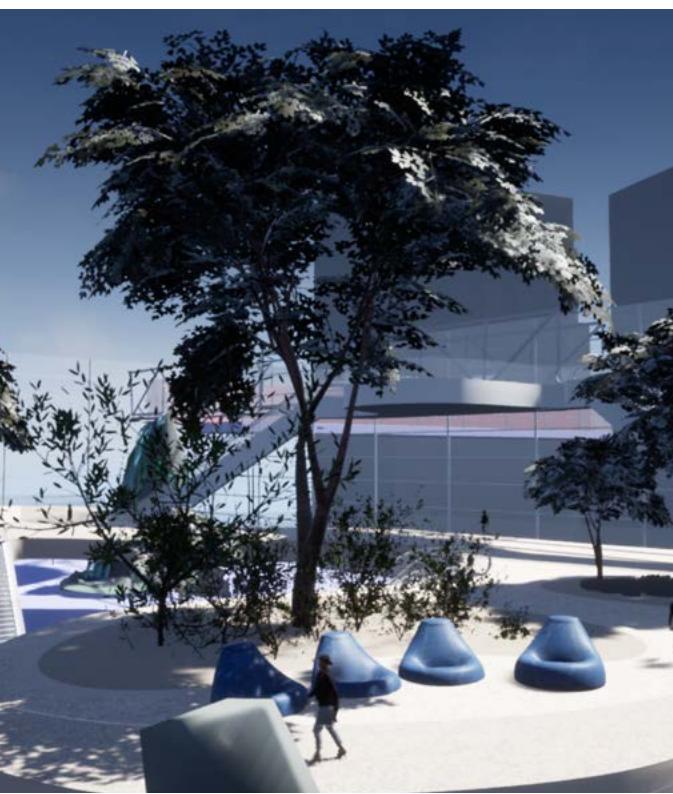
Massing and Bridging Design in Tilt Brush



"People Mover" Station Design in Tilt Brush



3. Translate Sketches to Geometries
Rhinoceros & Grasshopper



4. VR Mood Design
Gravity Sketch & Tilt Brush



Choreographing Narrative in Gravity Sketch

Tools developed to improve user experience in VR

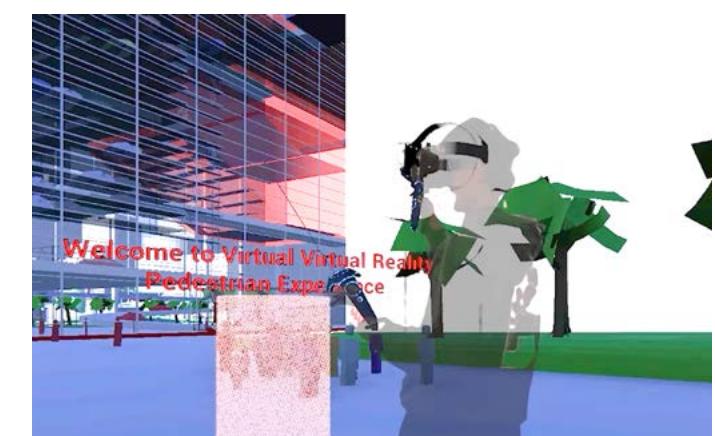
The following tools are implemented in Unreal Engine for smooth user experience in the virtual space. Upon arrival, users first go through the tutorials on navigation through spaces, interaction with buttons and models, and operation of the VR menu. The menu allows users to control the sun position, to change design phase, and to teleport to different vignettes. The two virtual headsets transport users to the narratives of the pedestrians and the "People Movers".



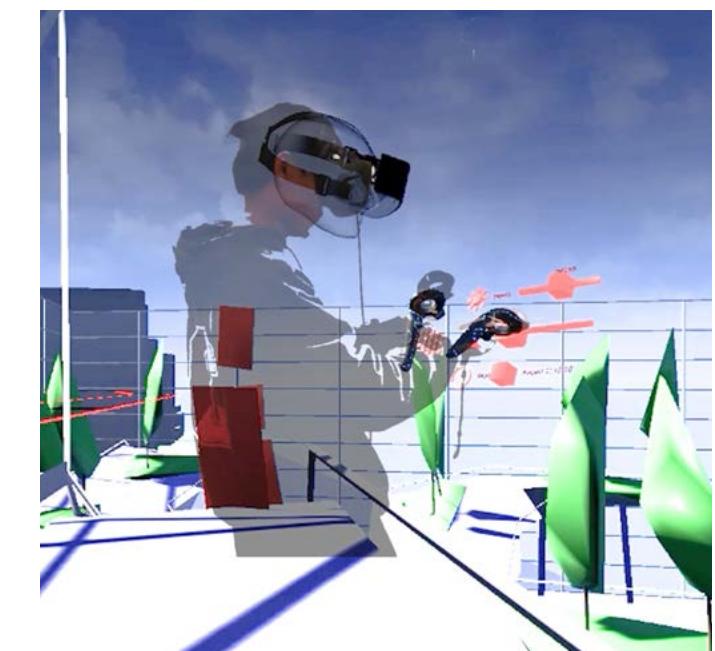
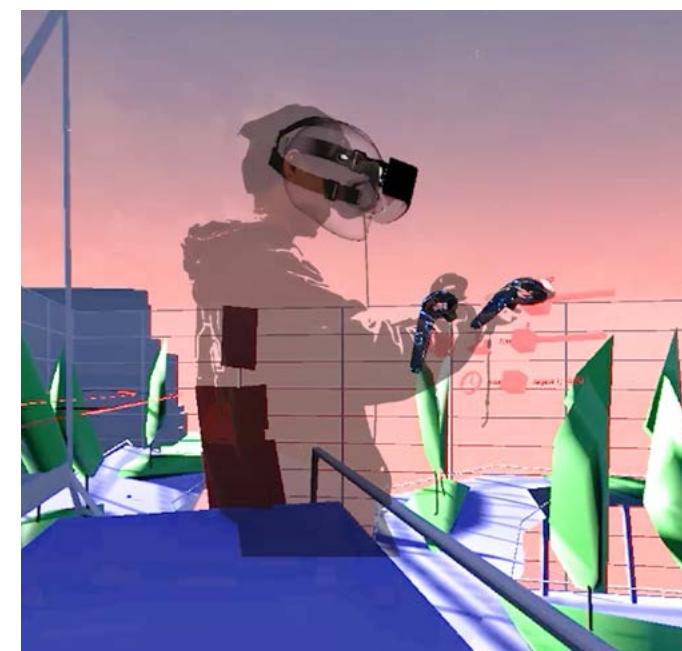
Start Scene - Teaching Users Fly, Teleport, and Interact with Buttons



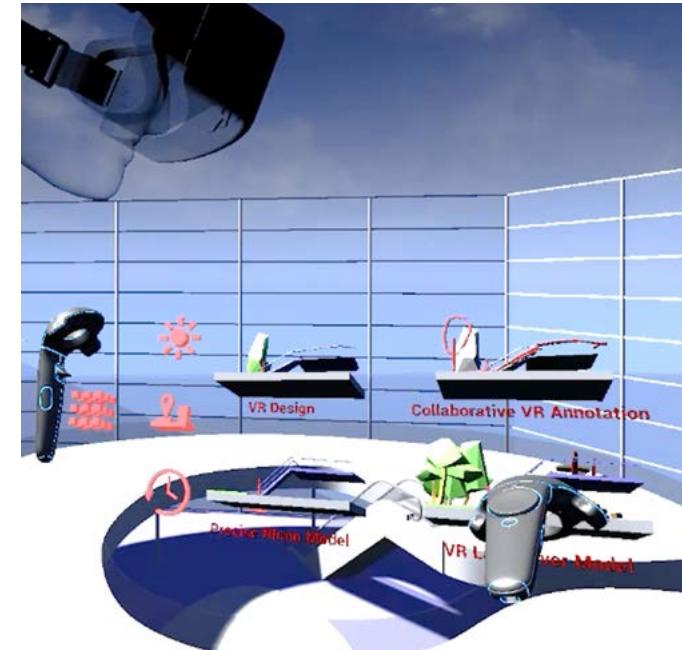
Grabbing Diagram Models in the Gallery for Closer Inspection



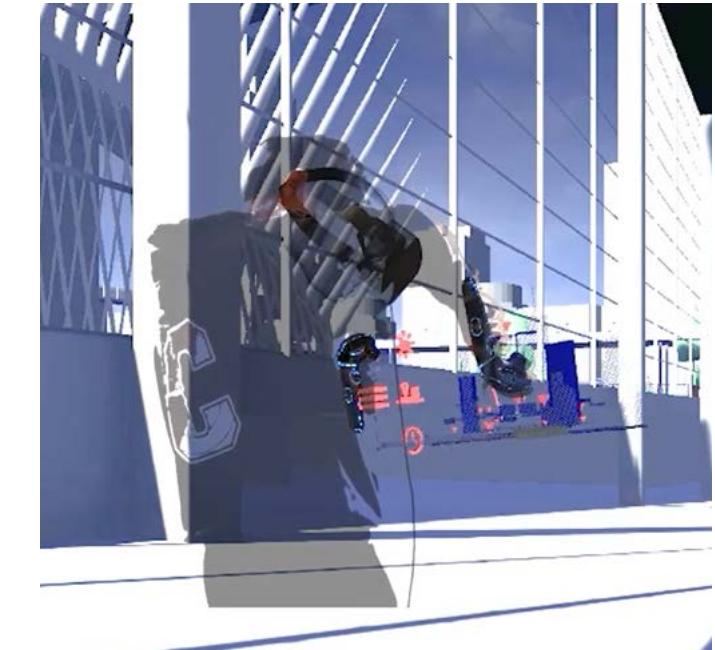
Put on Virtual Headset in VR to Start the Pedestrian Experience



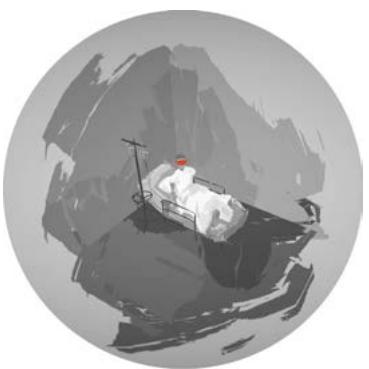
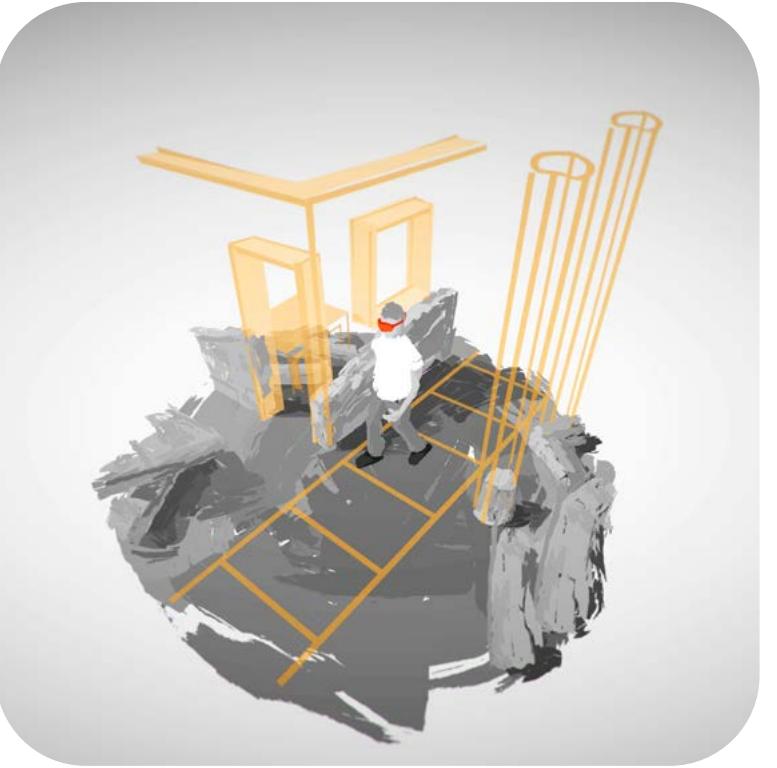
VR Menu - Controlling Sun Position with Sliders



VR Menu - Time Travelling back to four Design Phases



VR Menu - MiniMap for Teleportation



Futuristic Anthropocene — Reality immersed in the “Bubble Vision”

Thesis Project
Spring 2021

Virtual Reality, according to Hito Steyerl, is a bubble vision, in that everything revolves around the user, like a spherical universe, yet at the same time, the body is usually missing from the scene. Thus, VR is where the nonexistent bumps with the ubiquitous. The 360 VR sphere is also a representation of an Anthropocene without the presence of humans, an experimental biosphere without the actual nature being present.

With the constantly renovating technologies, the virtual bubble will ultimately become an extension of the reality of our daily lives and interact with the reality reciprocally. My thesis is thus focused on such virtual sphere, a space that is both crucial and “absent”. It attempts to define the meaning of architecture in virtual spaces through a series of VR/AR experiments that explore the transformation of architectural elements from the real to the virtual, as well as the intersection between the virtual and the real spaces in a futuristic setting.

My vision is to use this “Bubble Vision” to solve real life issues such as improving the quality of life for immobile patients, helping the rehabilitation of lost cultures or historical architecture, and creating alternative spaces that challenge homogeneity and gentrification.



Collage of Graffiti Art on Blank Facade

PARA(SITE) FAÇADE

— Creative Site/Sight

Recreating a communal urban realm for the young

Design V Studio
Fall 2018

Instructor: Lina Malfona
Site: Bronx, New York
Individual Work

The project revitalizes blank facades as backdrops for communal activities and links them with multilayer circulation paths to form a never-ending living room for the young.

The collective memory of Bronx is documented in photographs of dwellers rapping, DJing, breakdancing, and graffiti art by photographer Joe Conzo. The daily rituals of the elders and the kids can be found in Jules Aaron's photographs, where people enjoyed communal spaces for social activities, with building facades as the backdrop for this urban drama.

This project identifies the blank facades facing open spaces, extrudes them to house programs, and forms new boundaries of the communal spaces. The urban



nodes are then linked by paths to introduce a layer of movement through them. The flow of public spaces houses storefront for individuals' self-expression and creativity.

Low-cost housing then occupies three of the facades, where units with movable furniture and reconfigurable spaces are inserted for young people. They can thus enjoy the system of public urban spaces as their living rooms and share the whole city among each other.



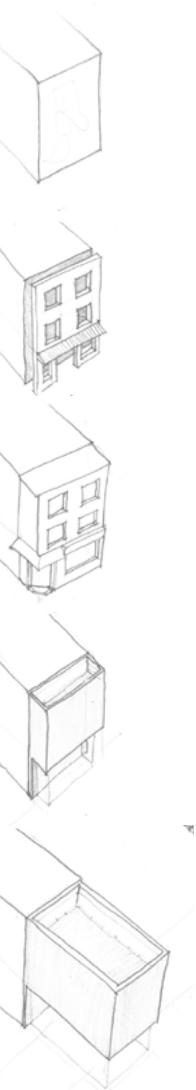
The Hip Hop Movement Documented by Joe Conzo



The Collective Memory Documented by Jules Aaron



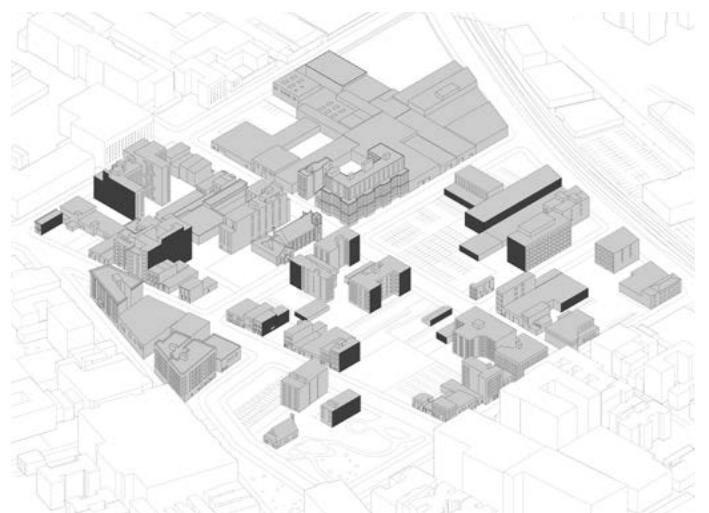
Empty Facades and Facade Strategy



Transforming empty facades into low-cost residences, galleries, commercial centers, and day-care facilities.



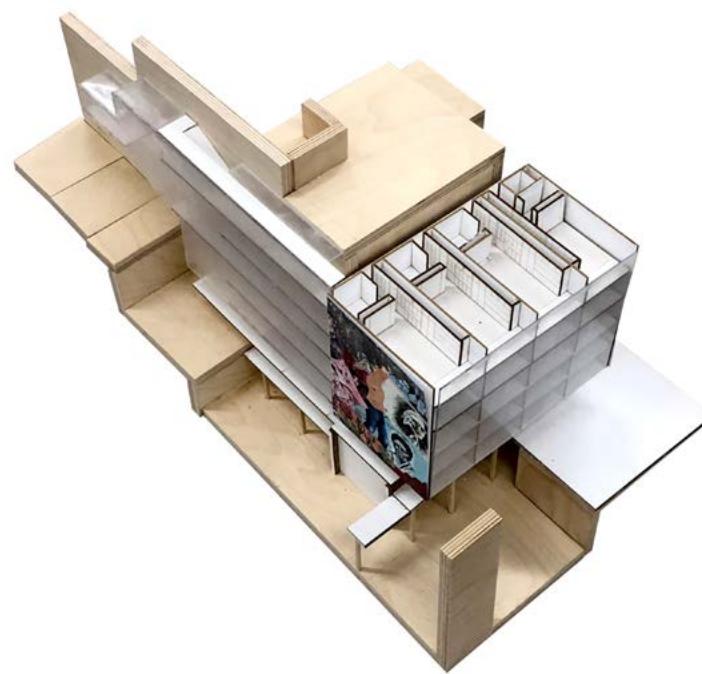
Facade Extrusion



Mapping out Blank Facades



Mapping out Potential Public and Green Spaces and Generating Connections

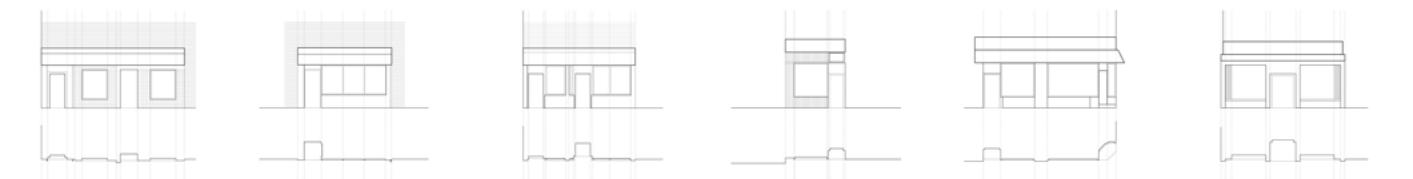


1/4" = 1' Model

Elevating for individualized creation of storefronts at ground level



Video rendering of the ground level

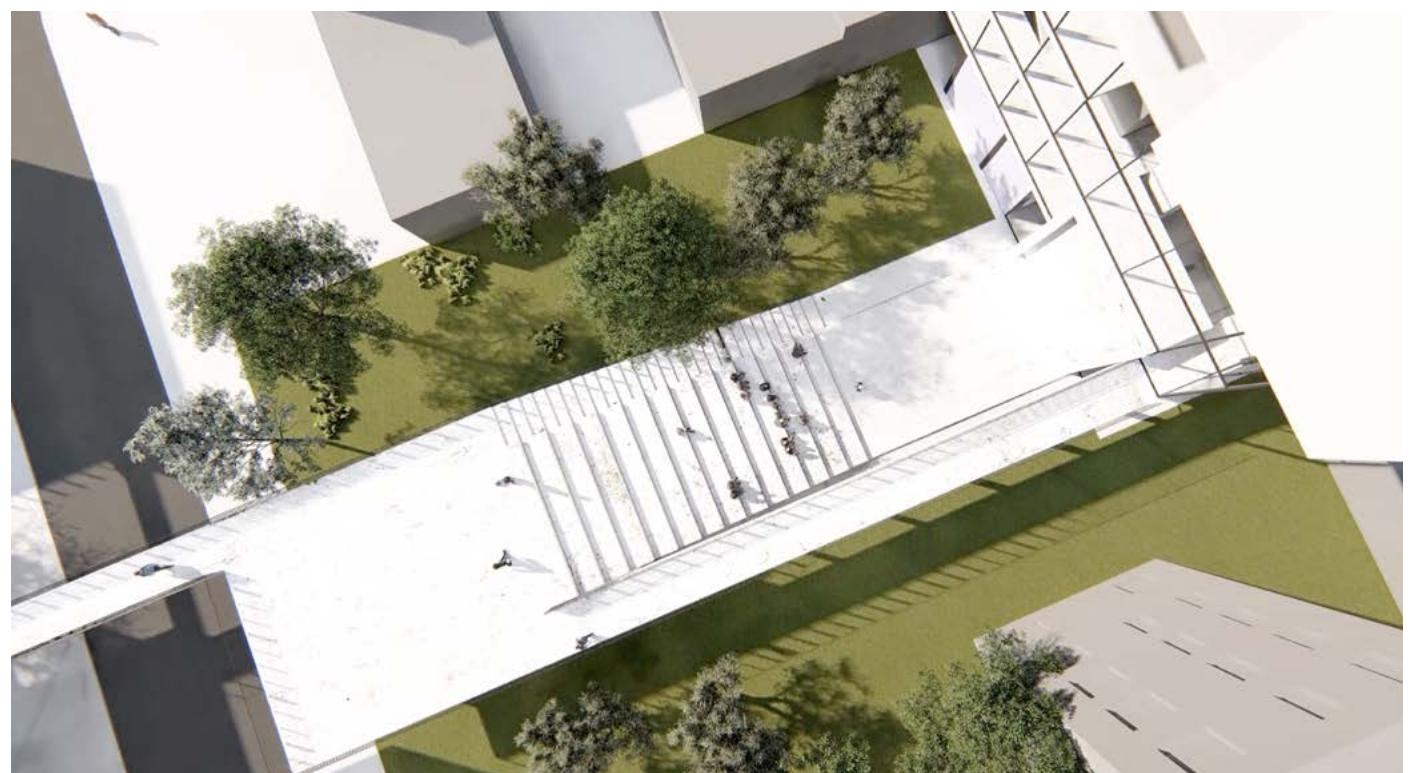


Study of the Storefronts



First-floor Nolli Plan

Linking the nodes to form a layer of communal activities close to the ground



Video rendering of the connection



Axon of the Residential Buildings

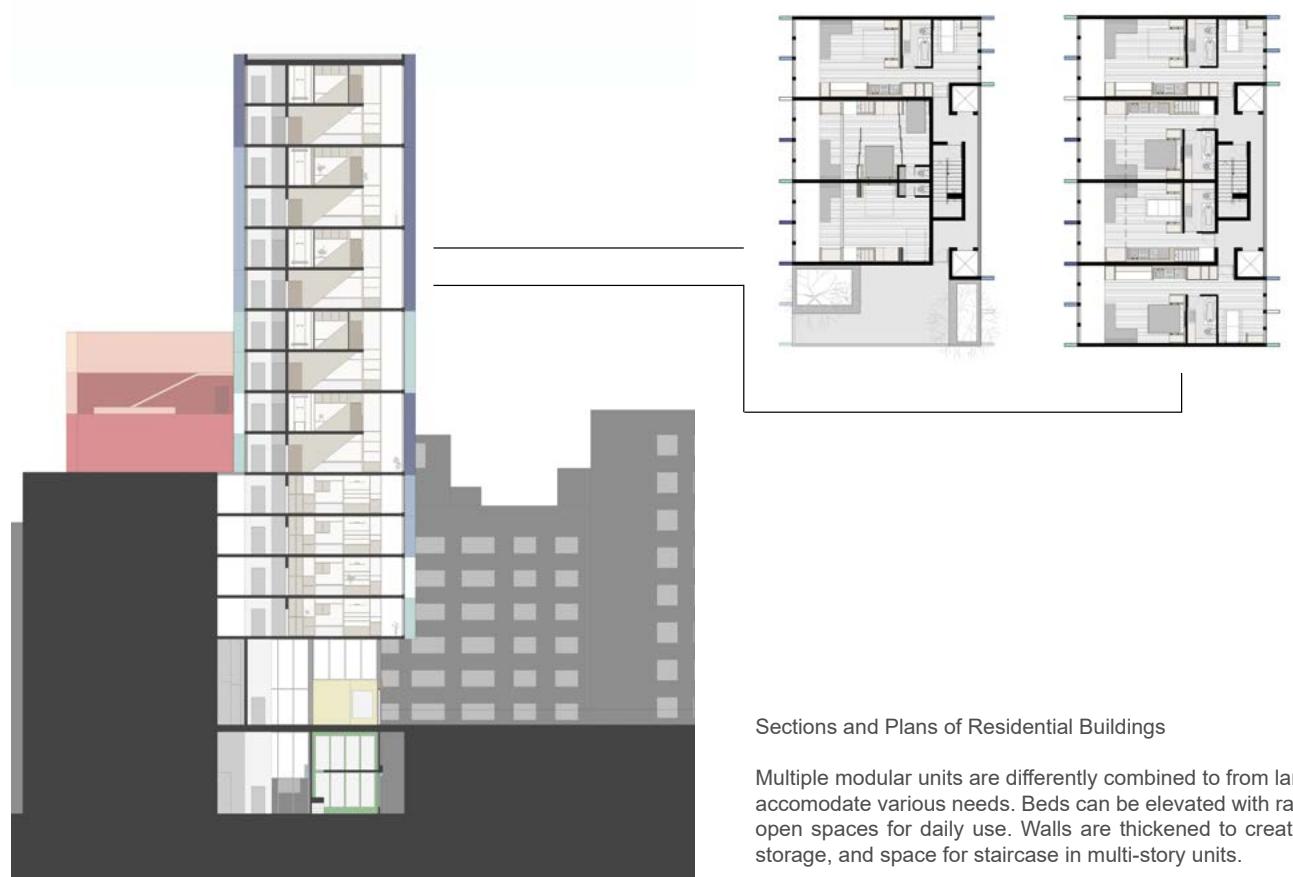


Linkage system



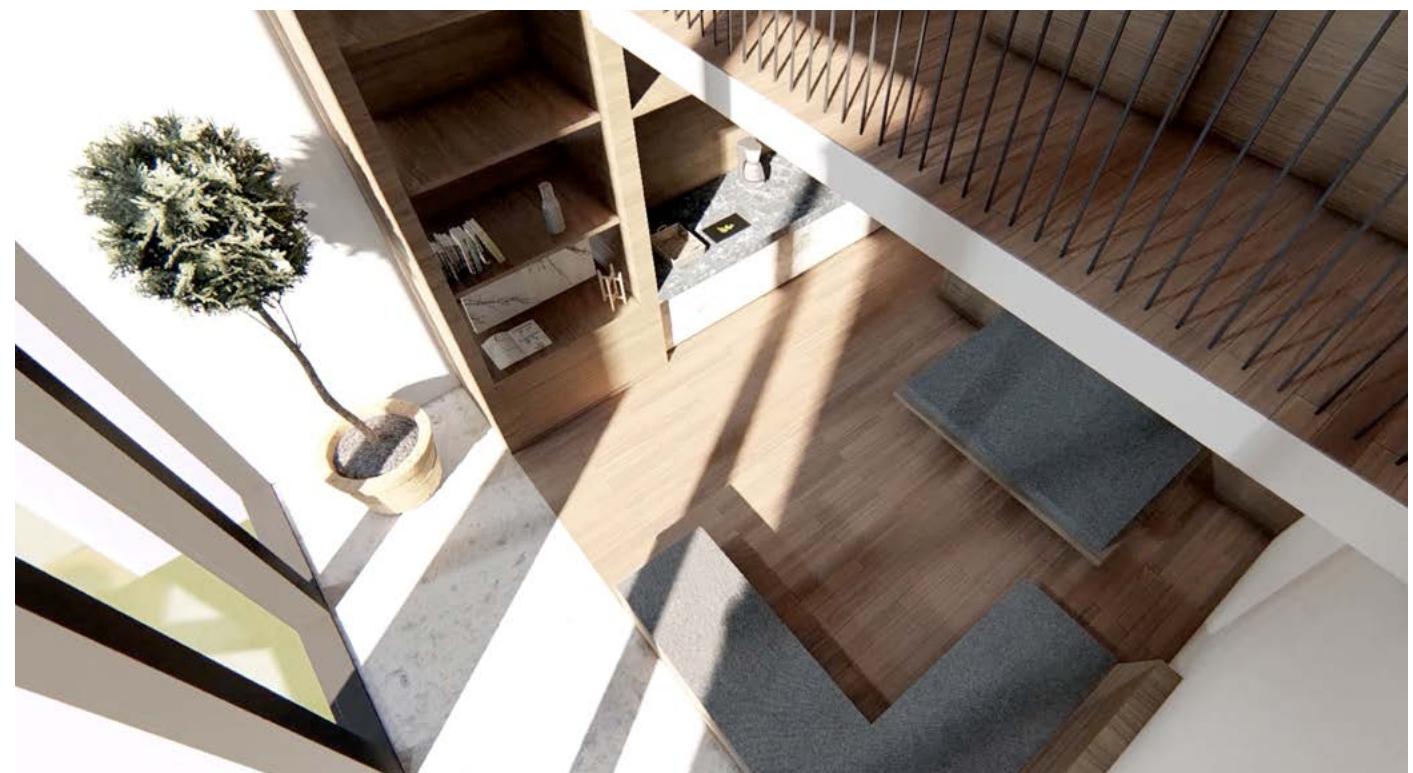
Perspective Section

Minimizing housing units but expanding their living rooms to the neighborhood.



Sections and Plans of Residential Buildings

Multiple modular units are differently combined to form larger suits to accommodate various needs. Beds can be elevated with rails to create open spaces for daily use. Walls are thickened to create space for storage, and space for staircase in multi-story units.



Video Renderings
A walkthrough video is produced with Lumion to help experience the urban complex



1/8" = 1' Model

THE SOUNDSCAPE

— the Golden Hall, Ithaca

Inserting an urban node for music

Design IV Studio
Spring 2018

Instructor: João Almeida
Site: Ithaca, New York
Individual Work

The project is a landmark that derives from its context and reforms people's movements in the neighborhood.

With its Corten steel finish, the Music Hall blends itself into the golden tone of the city of Ithaca and engages with the neighborhood. The fragmented volumes, mimicking the scale of the scattered houses in the surrounding area, derives from the datum lines of the urban fabric. The radial layout creates a series of rotating facades toward the curved Seneca Street, brings selected views of the hill across the street into the interior, and defines the convergent movement of visitors towards their destination, the volume for music.

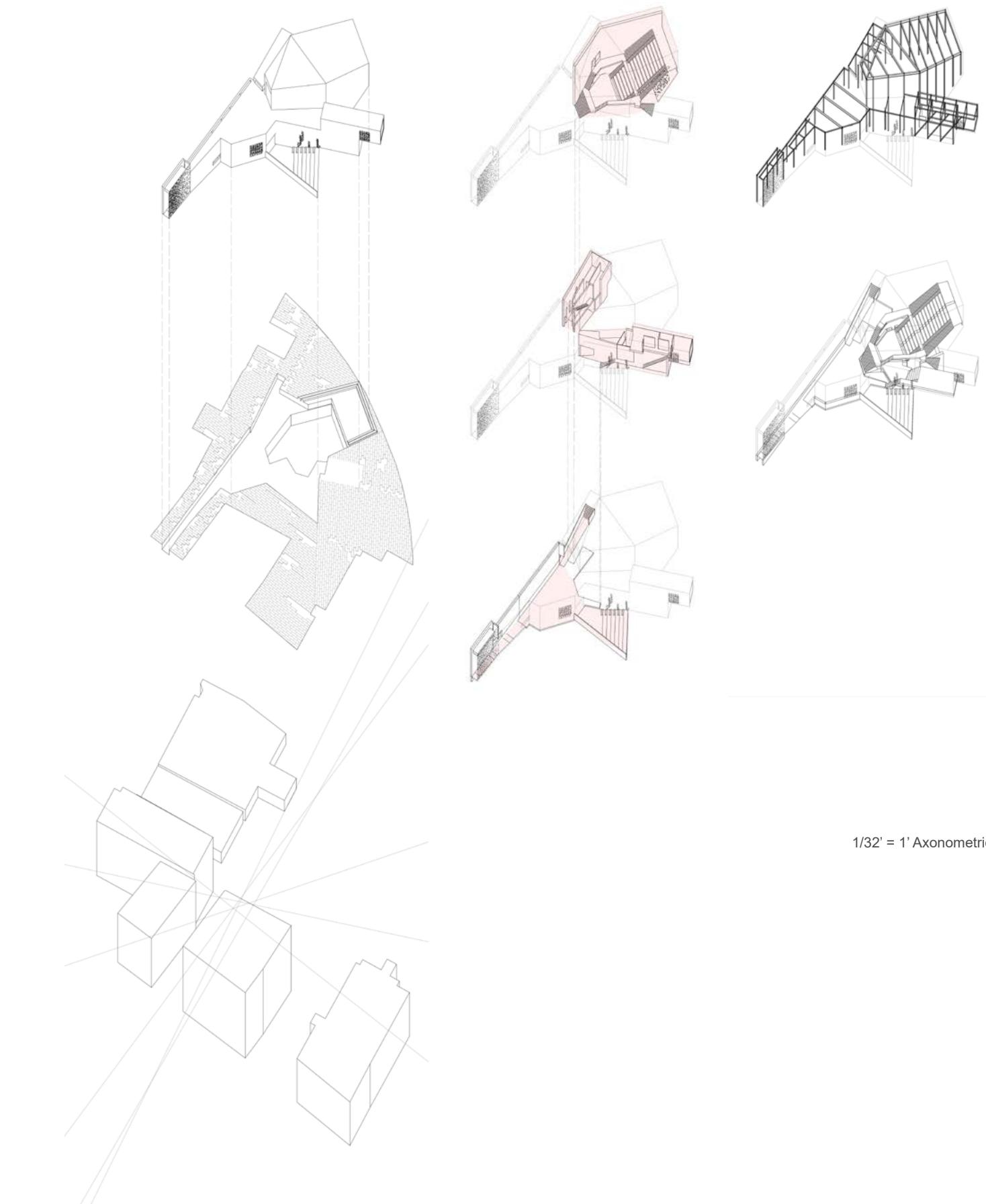
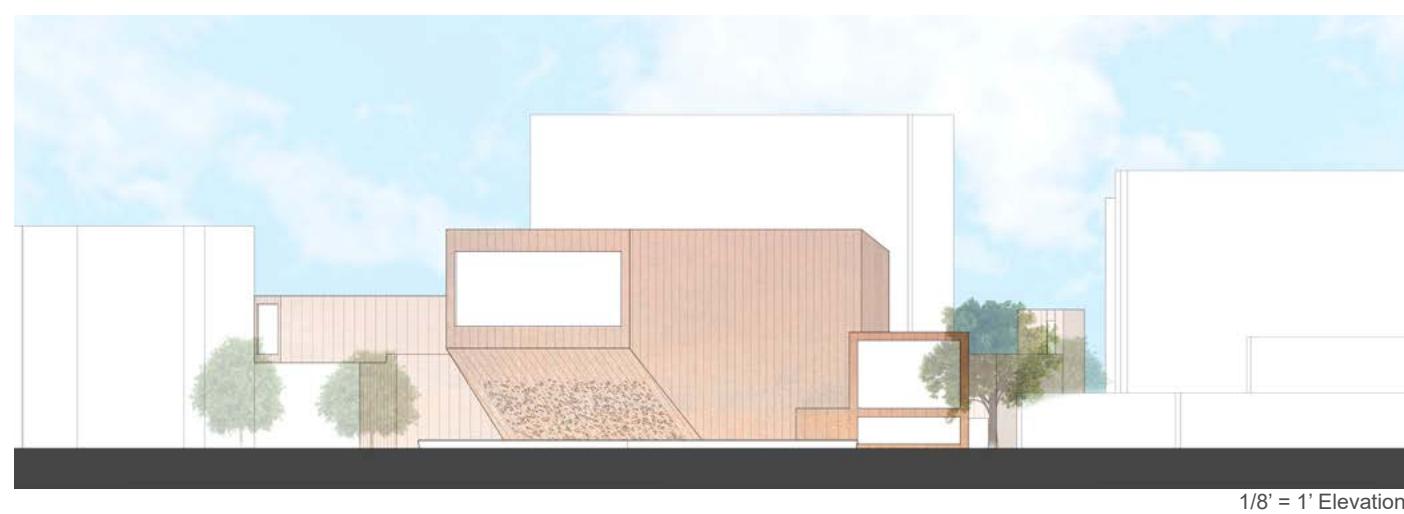
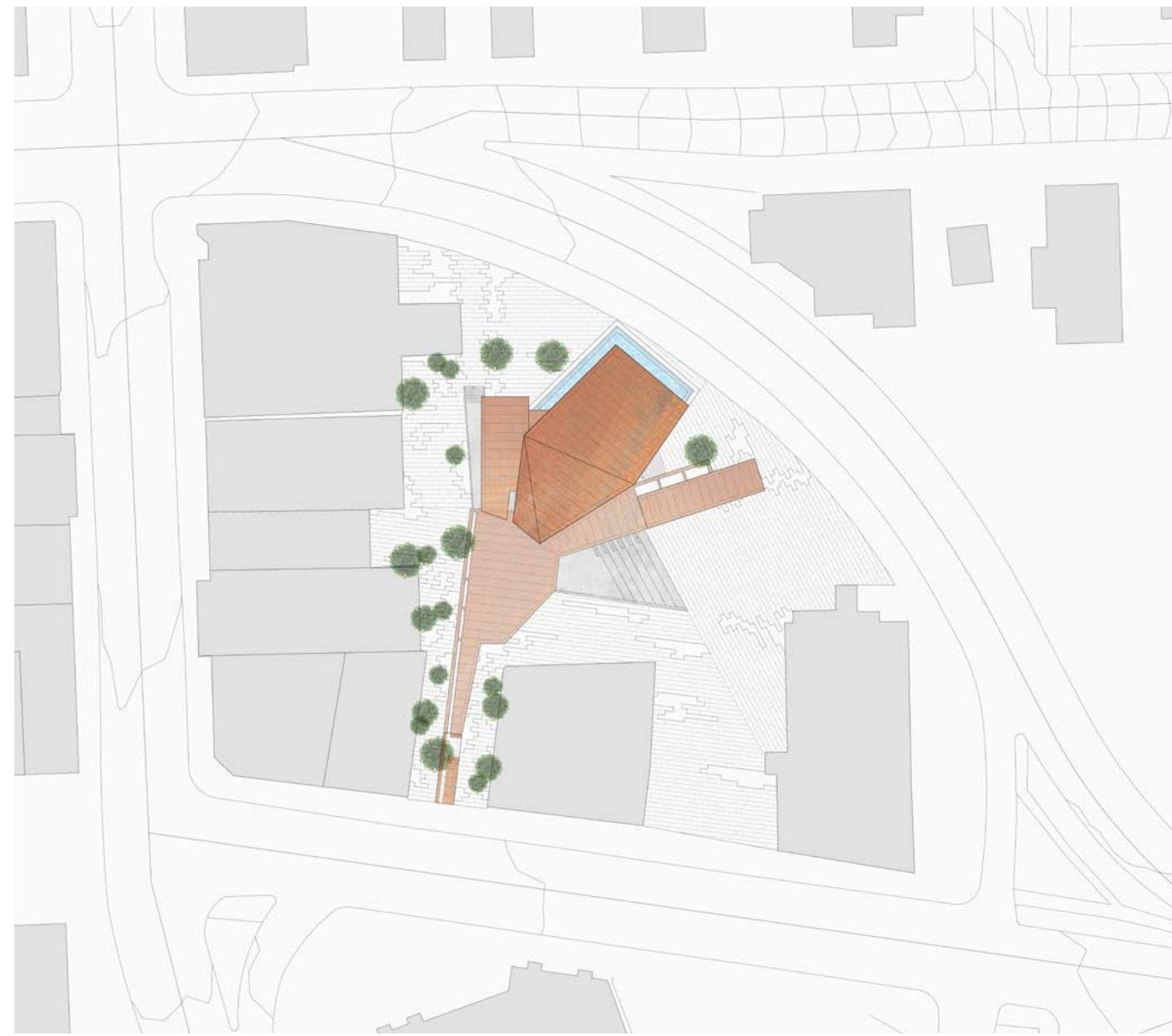
The main entrance penetrates through the site to reach

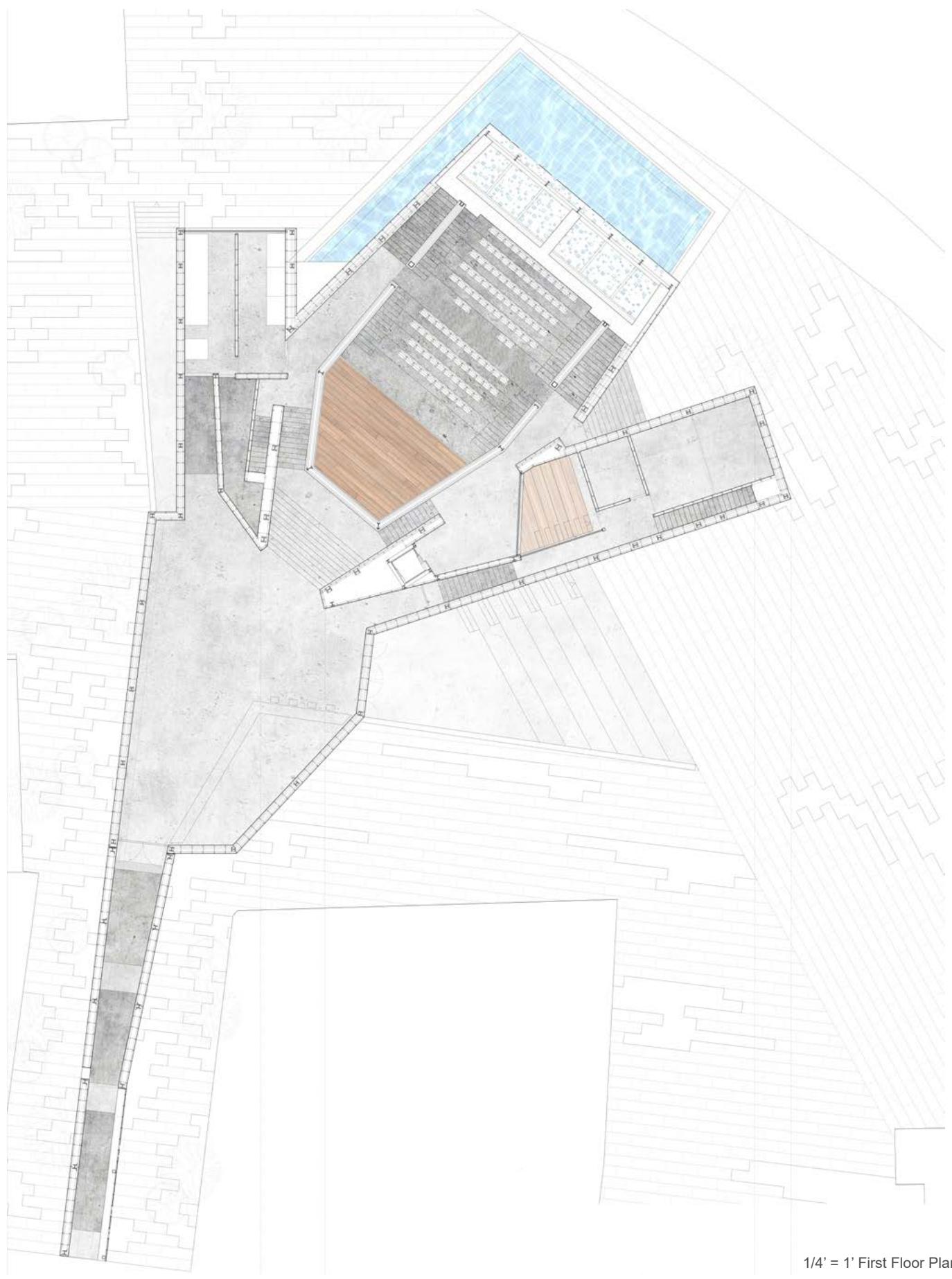


the pedestrian street of Ithaca Commons, while the other two openings diverges to gather people from all other directions to the central sunken lobby. The main three volumes house the program of office, auditorium, and artists' practice space, respectively. The radial pattern continues outdoor and forms garden spaces.

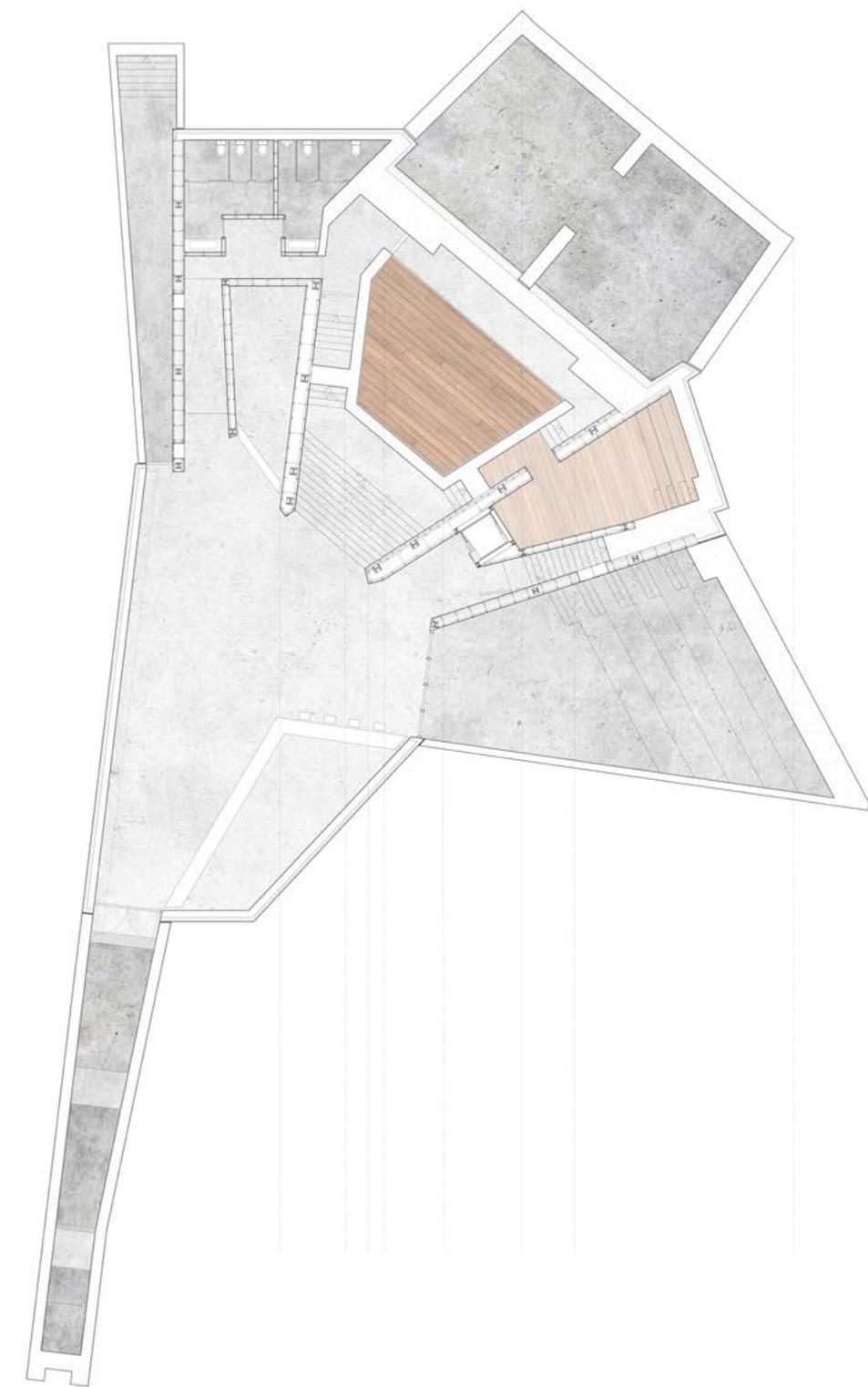
The core, the volume for music, is enclosed by a second layer of translucent U-glass. The glass box is filled up with sound and light, and is where the show begins.

Defining a center that converges visitors from all directions.

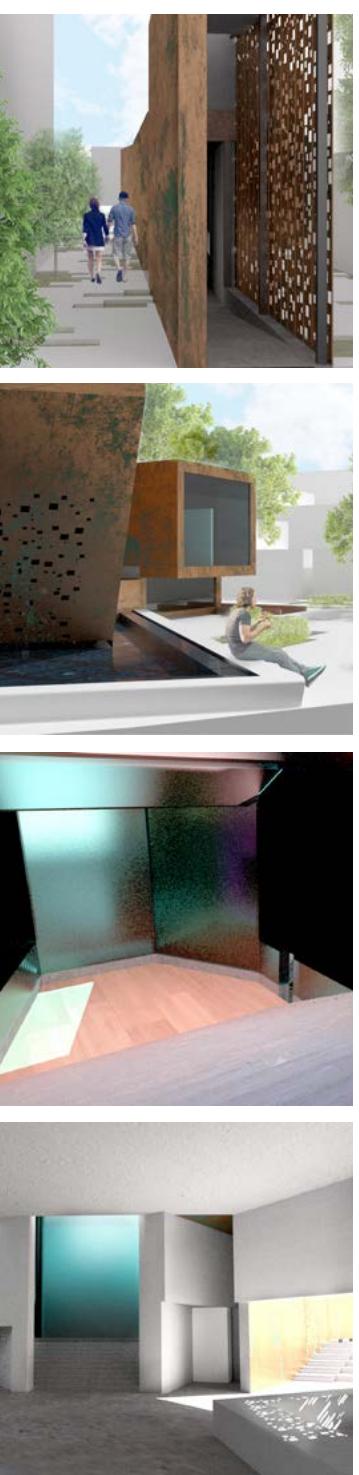




1/4' = 1' First Floor Plan

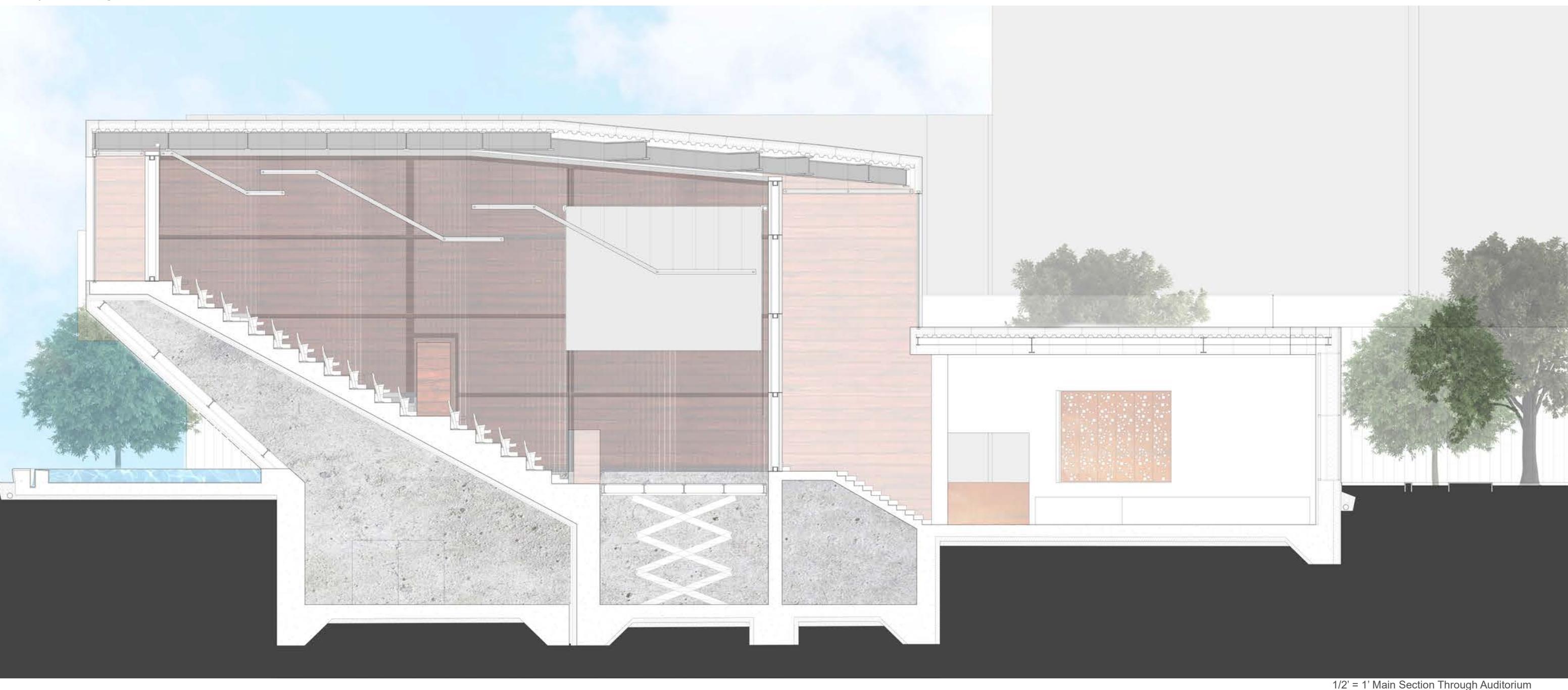


1/4' = 1' Lower Lobby Plan



Renderings

Specializing structures and materials to form an enclosure for sound



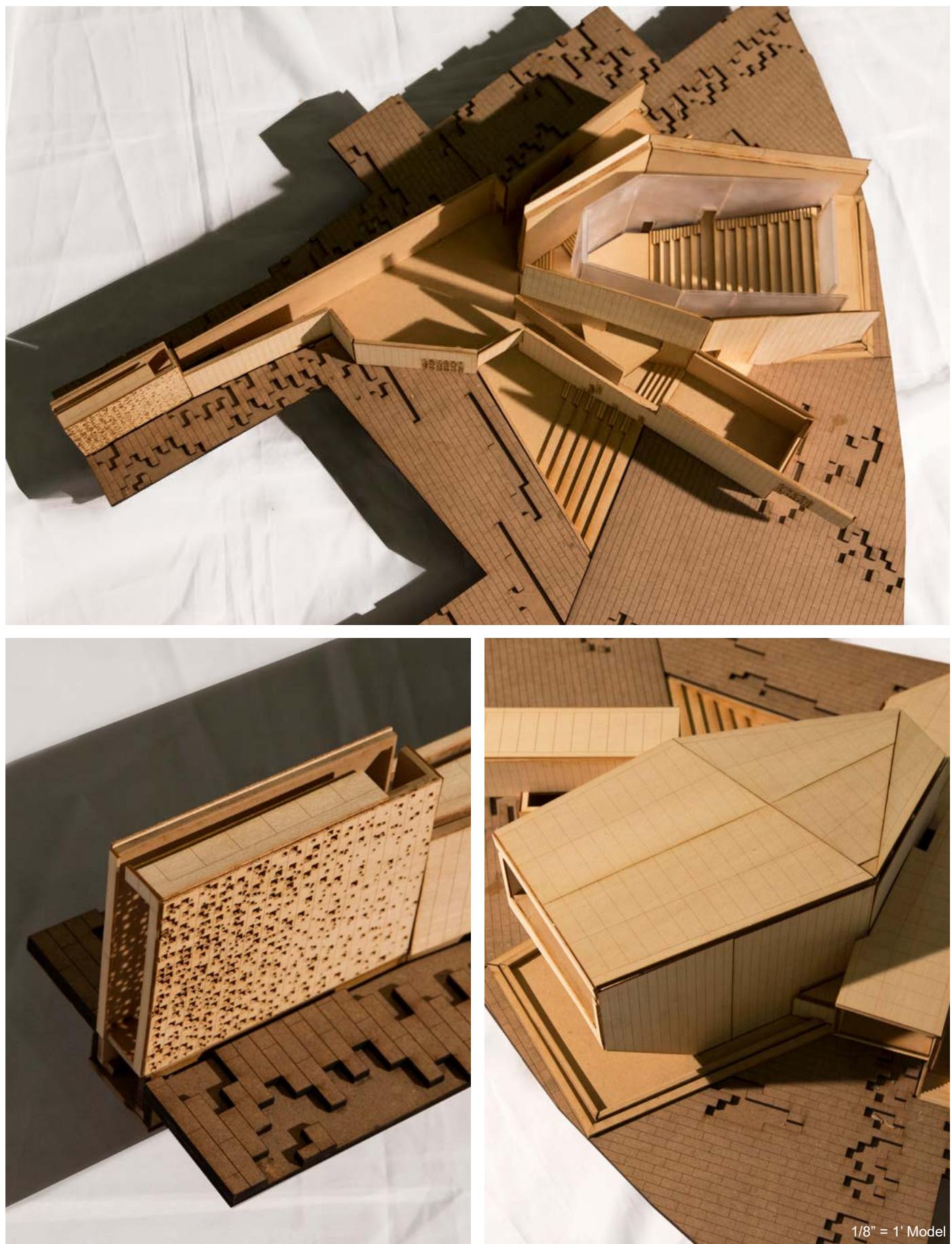
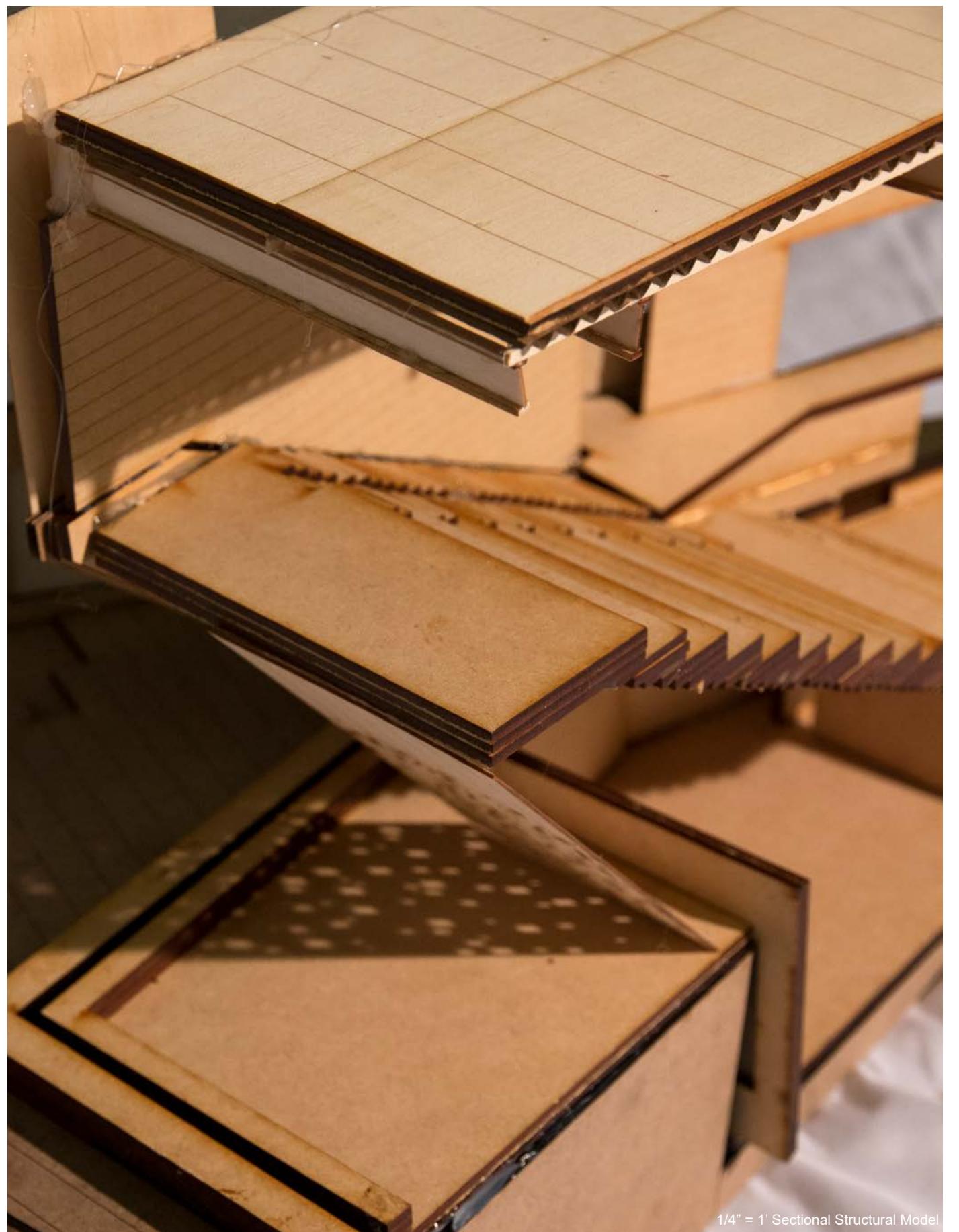
1/2" = 1' Main Section Through Auditorium



1/4" = 1' Section



1/4" = 1' Section



CARVED DWELLING

— Sculptural Idiosyncrasies

Intersecting design with rawness

Design III Studio
Fall 2017

Instructor: Dasha Khapalova, John Miller

Site: Ithaca, New York

Individual Work

The dwelling investigates the intersection between the carefully articulated intervention and the rawness of nature, and focus on the dialog between the materiality of the hard and the soft.

This is a dwelling designed for a wood sculptor whose works focus on the relationship between the articulated style of realistic figure carvings and the rawness of wood with its vein and barks untouched.

Corresponding to the sculptor's carving projects, the dwelling design starts with carvings following the cliff of shale rocks of the Willard Way site. Concrete volumes are then inserted into the excavations, forming a layer supporting the shale structurally, with penetrated openings both for sunlight and for revealing the rock



texture behind. Wood inhabits the space both as an additional layer of finishing material in the living spaces, and as the raw material for carving projects scattered in the studio spaces.

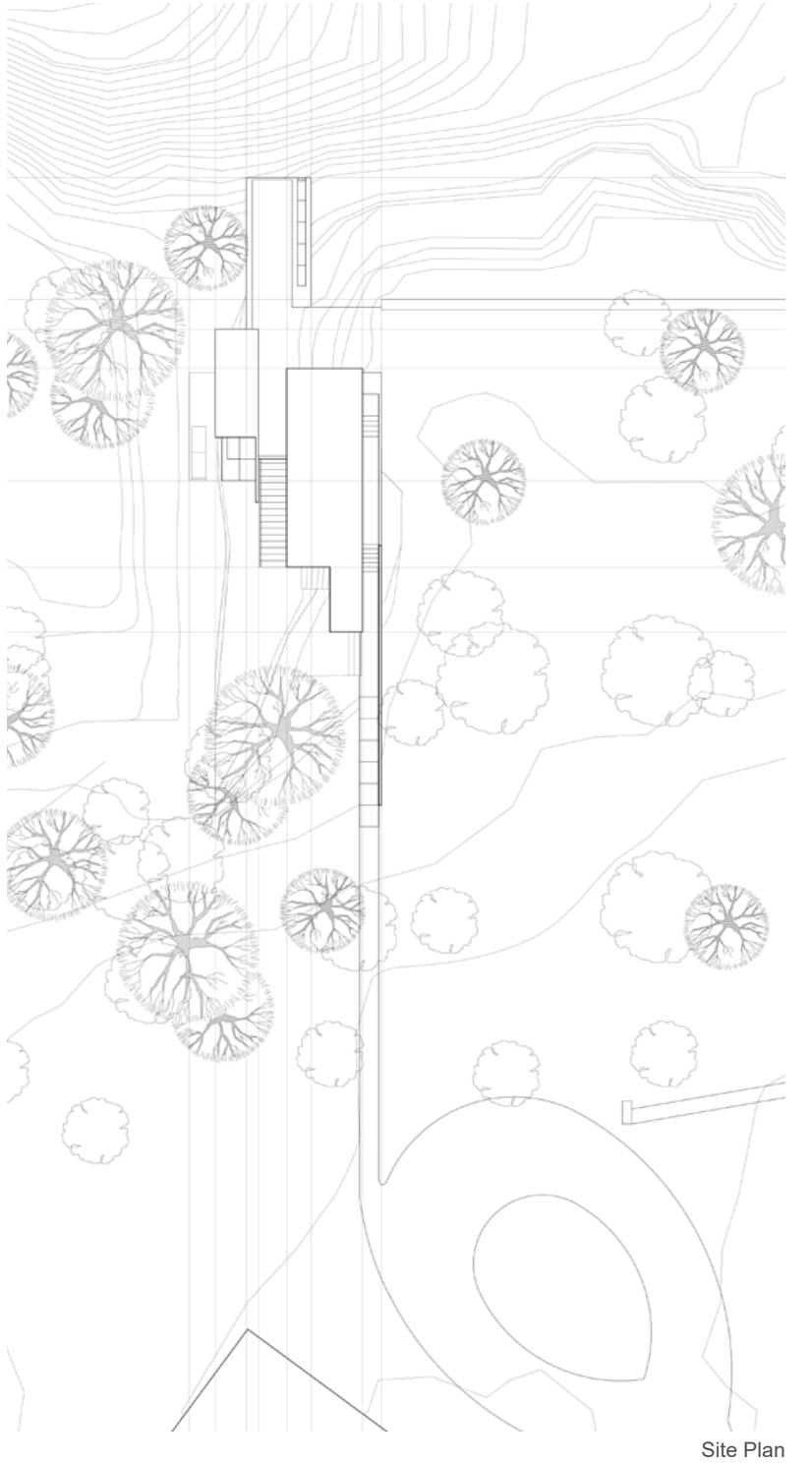
The alternating levels defines the daily ritual of the sculptor by separating public activities on the first floor from the private ones below and intersecting in the middle with the studio space and a path for sculpture tools and materials.



1/16" = 1' Site Model

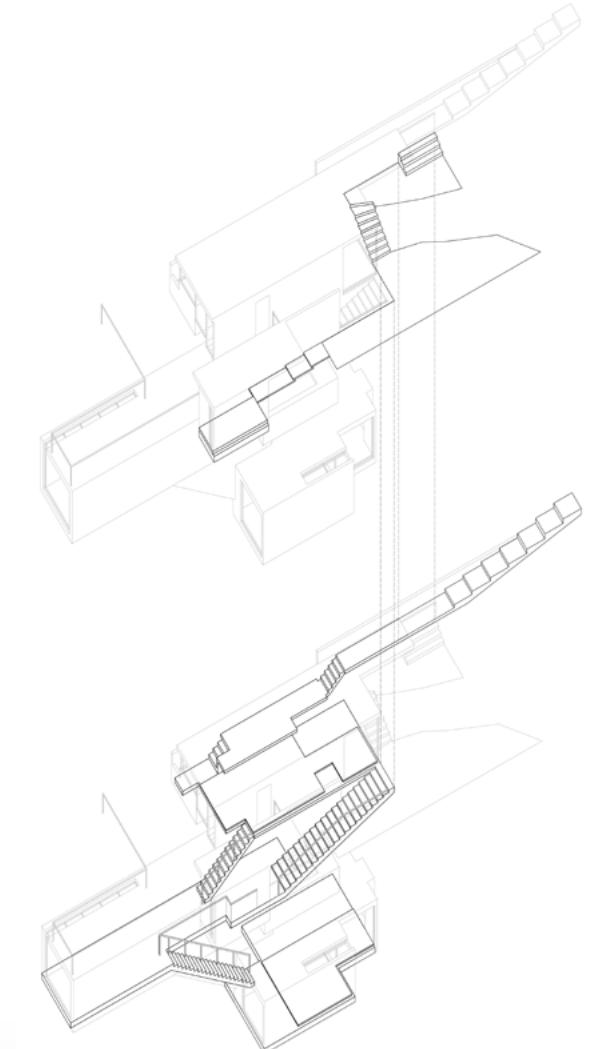
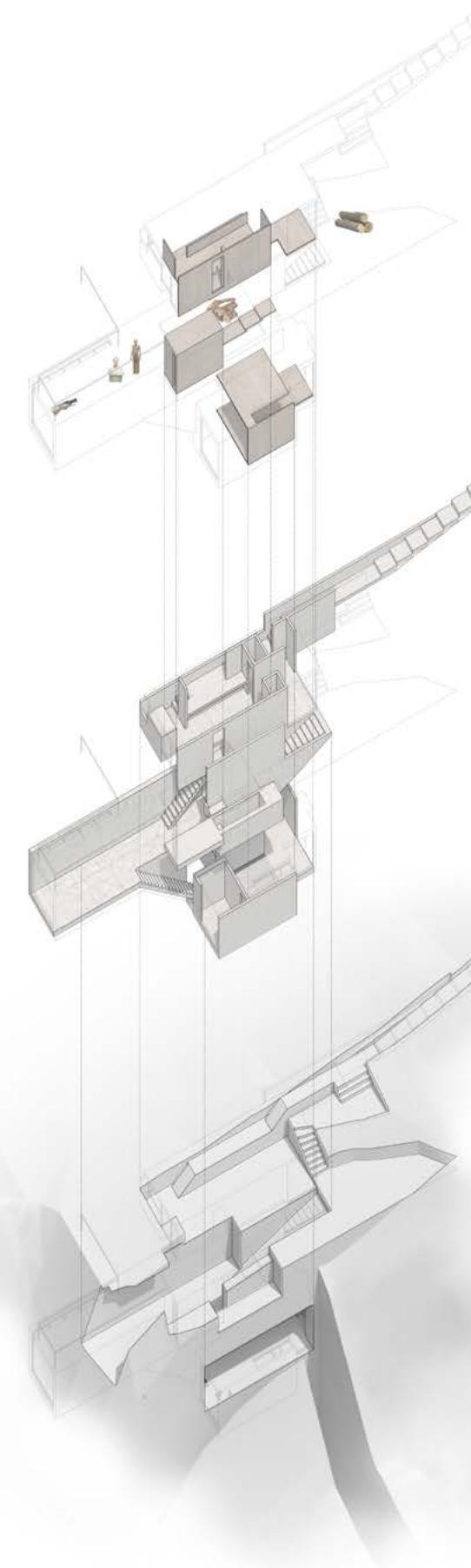


References of sculptures and sculptural tools

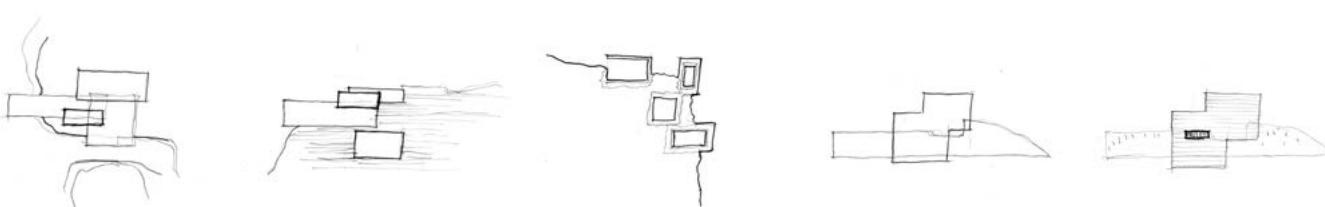


Site Plan

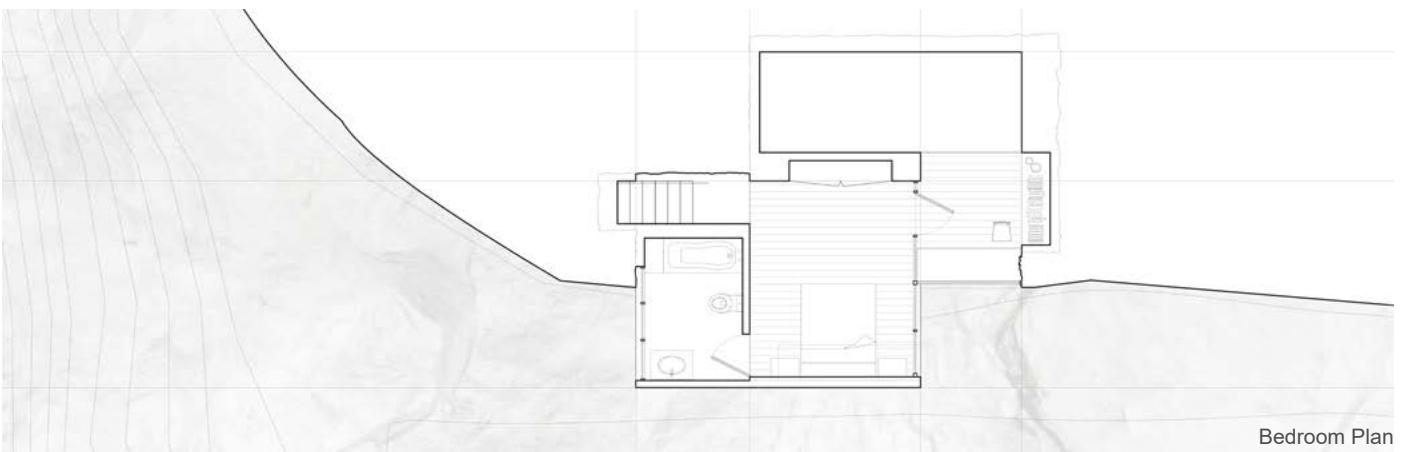
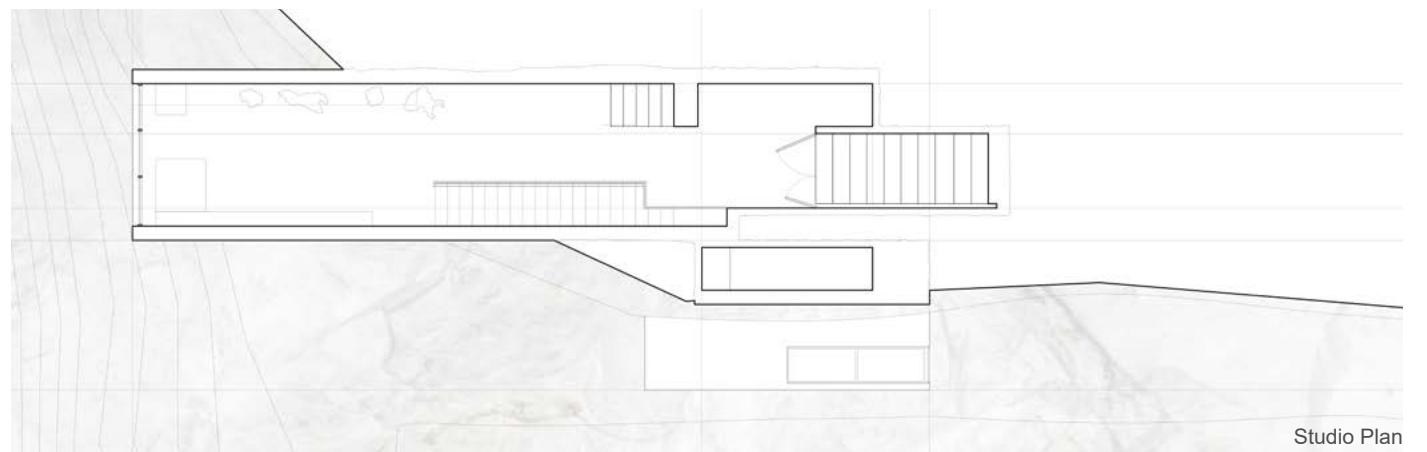
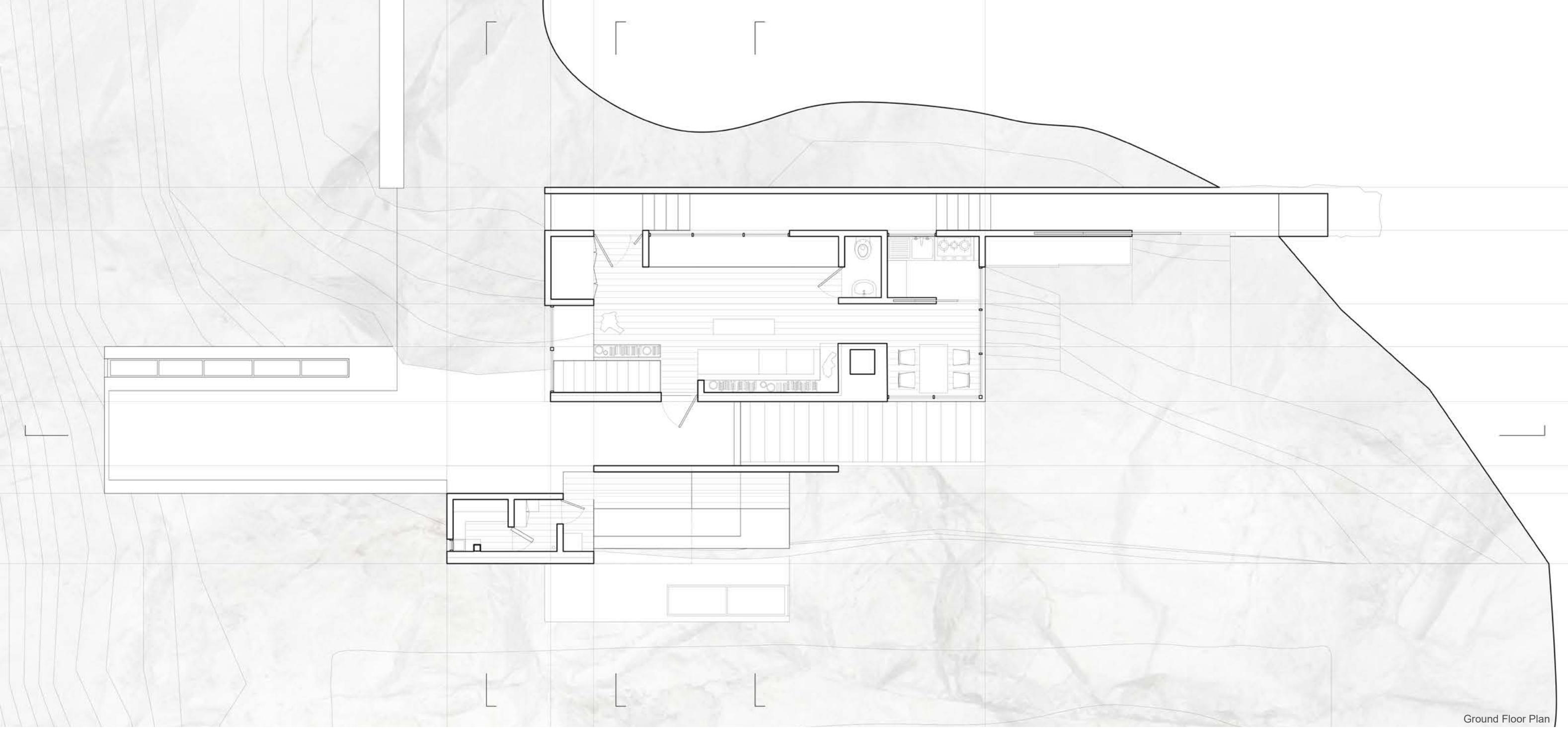
Defining the daily movements through layering of materials



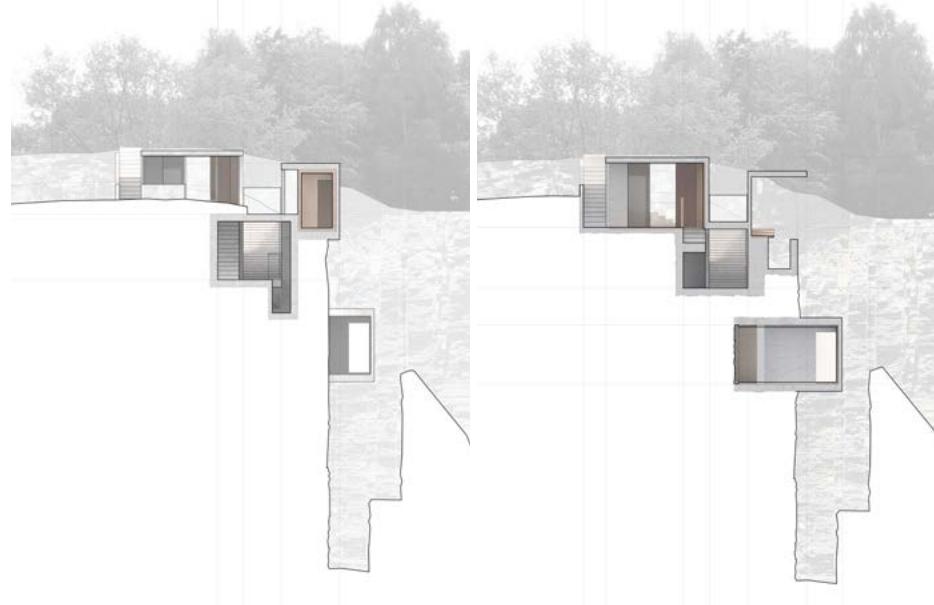
Axonometric Diagrams of Materials and Circulation



Diagrams of the project



The stability of wood and the activity of wood



Serial Sections



1/4" = 1' Sectional Study Model



1/16" = 1' Study Model



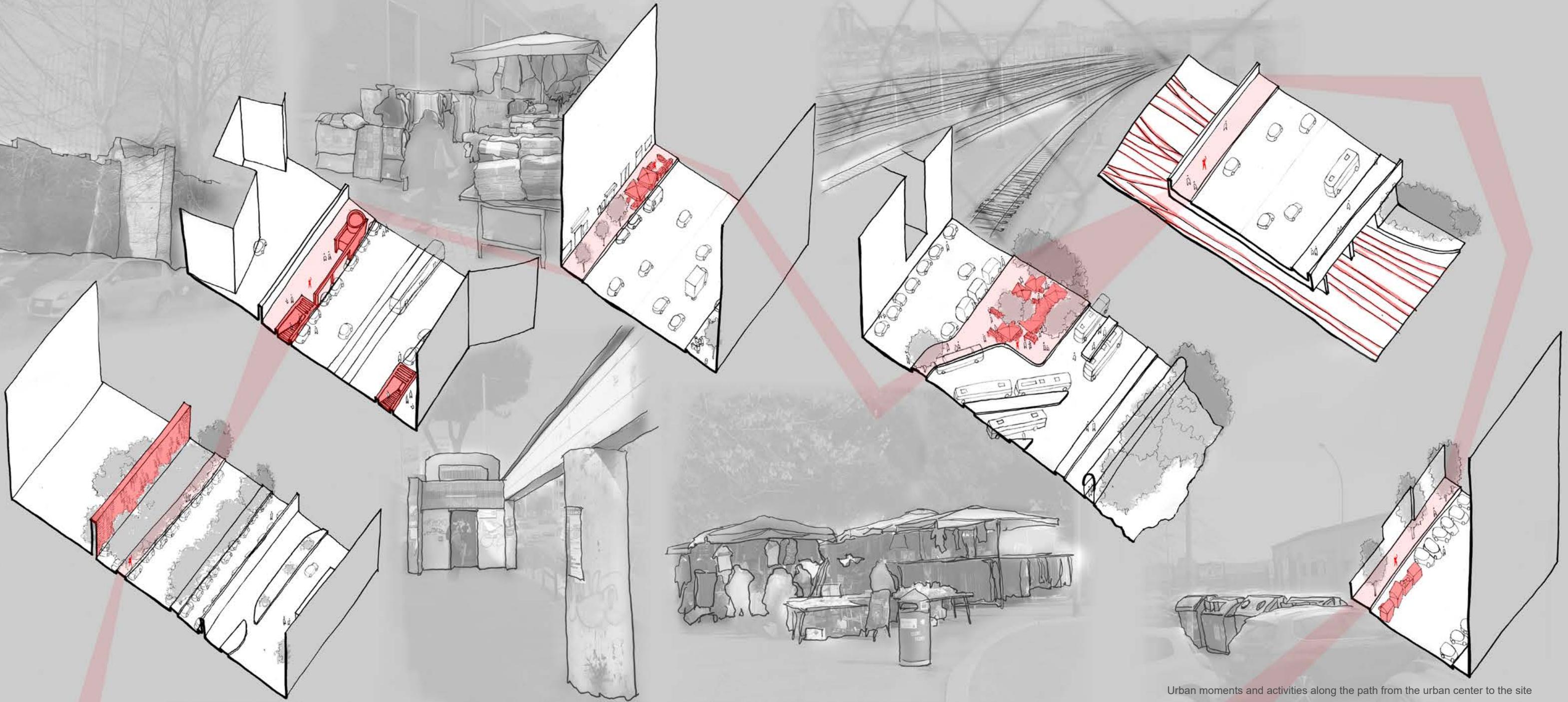
Longitudinal Section Through the Studio



Renderings



1/4" = 1' Sectional Model



TIBURTINA BUS STATION

— Symphony of a Metropolis

Movement orchestration with gateways

Design IV Studio, Cornell in Rome | Spring 2019

Instructor: John Zissovici, Alberto Iacovoni

Site: Rome, Italy

Individual Work

The project orchestrates movements through gateways for passengers, tourists, private cars, and buses.

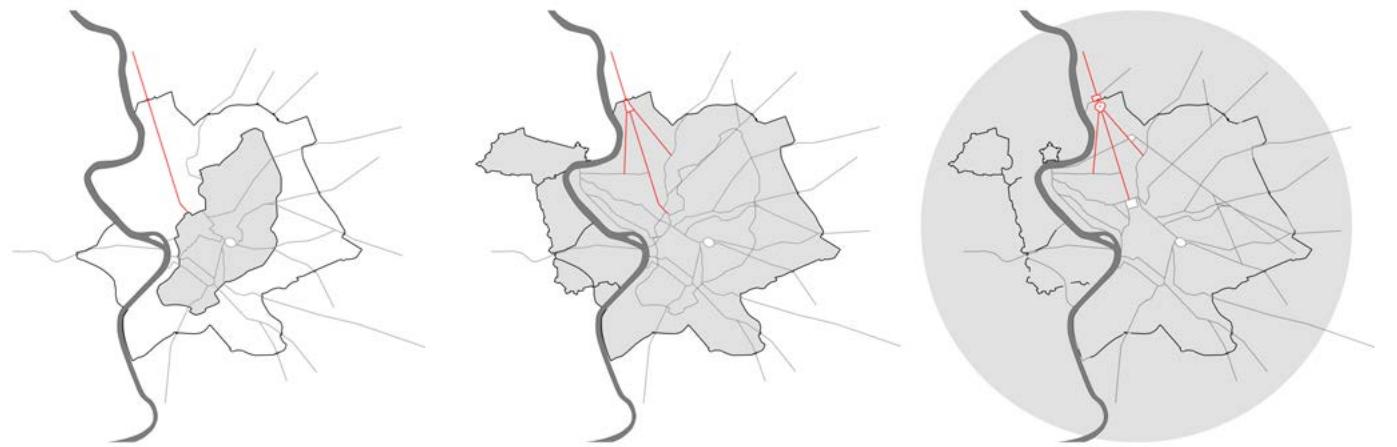


The north gate of the city of Rome, Porta del Popolo, was transformed from a former defensive border into a connective transition. Such transition is not only marked by the enlarged scale of opening in the 16th century, but is also emphasized by the additional layer of decorative sculpture by Michelangelo. Such sandwiched system of one solid mass between two lighter layers can be multiplied, pushed, shifted, scaled, and flipped to create a unique experience when moving through.

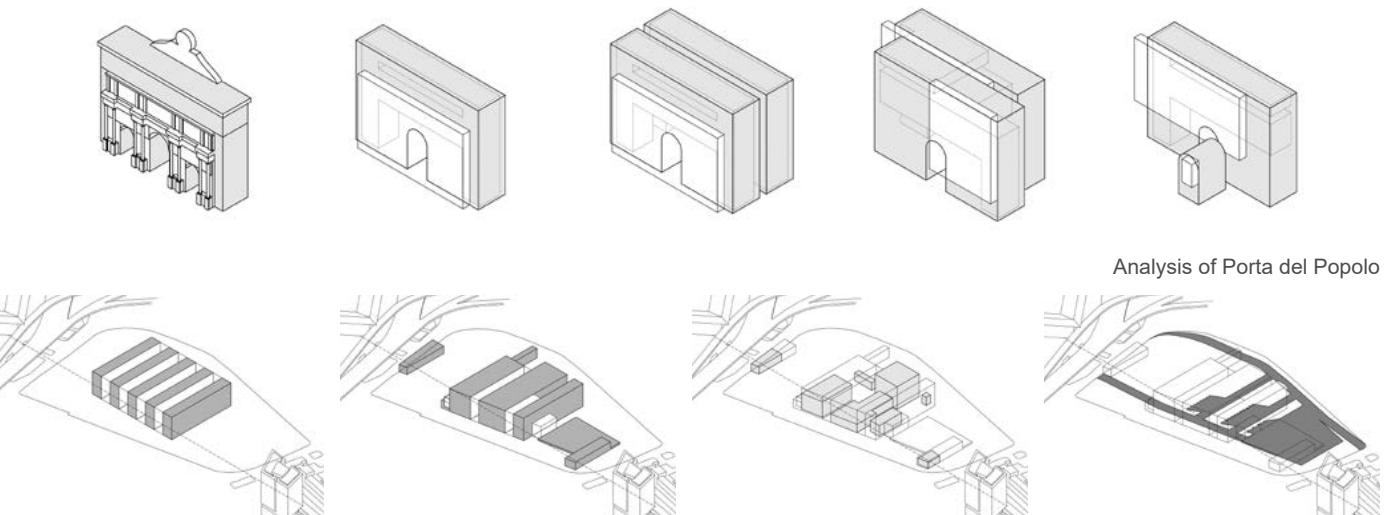
The concept of "Gate" was used in this project to orchestrates movements. From the urban corridor in front of Labics' complex, through the site, to the Tiburtina Train Station, an axis of movement can be identified,

along which, series of gates are placed and adapted to the urban context. The three main gates house a bus station, a hotel, and a community center, while the voids of gateways house local markets and piazzas. Two other monumental gates define the start and end of the series of public openings along the axis.

The buses descend into the sunken garden, turn perpendicular to the main axis, and move along the gaps between the gates, where light comes through and illuminates the station level. People arrive by walking through the gates. Then they stop and move parallel to the gates to take the buses.



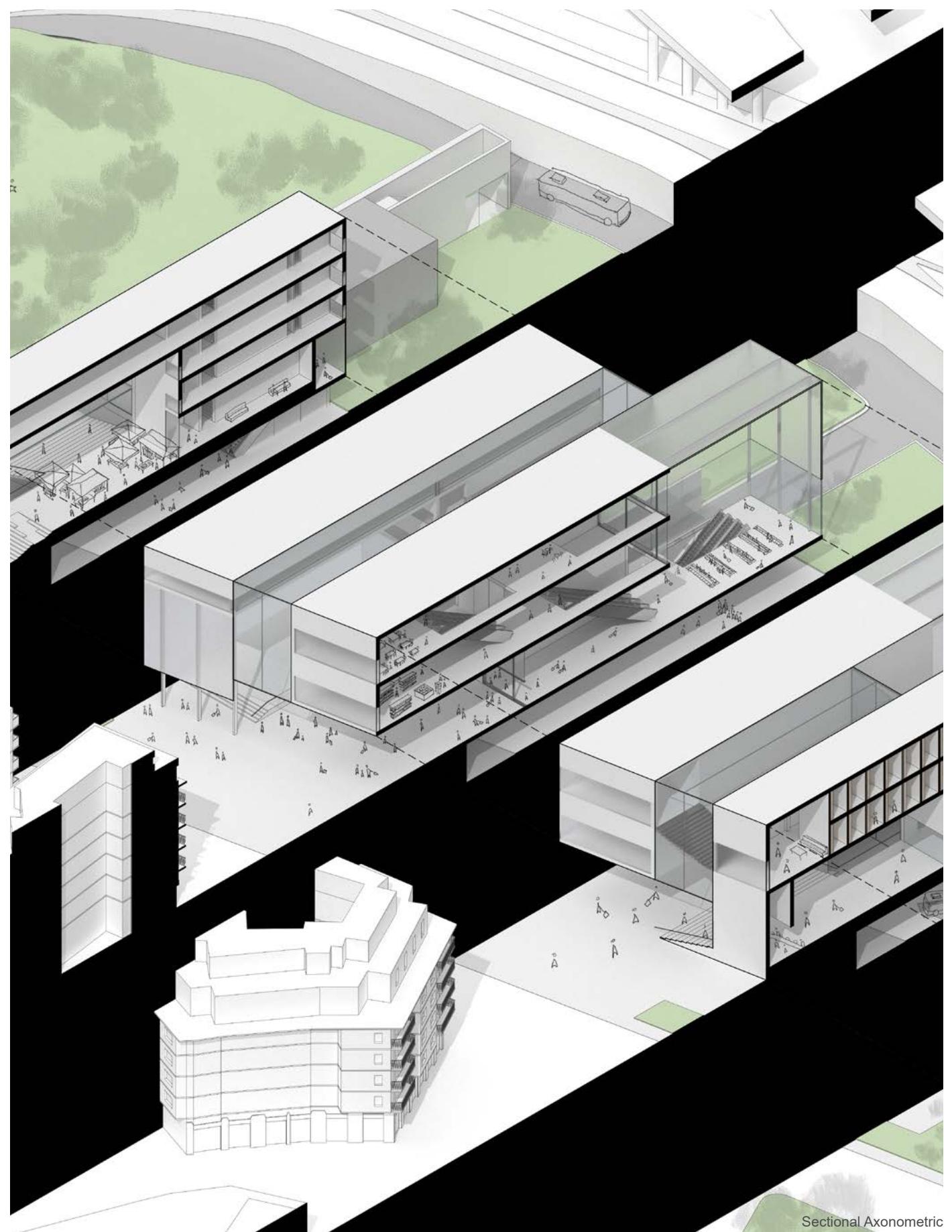
Transformed Role of Porta del Popolo as Rome Expands



Analysis of Porta del Popolo



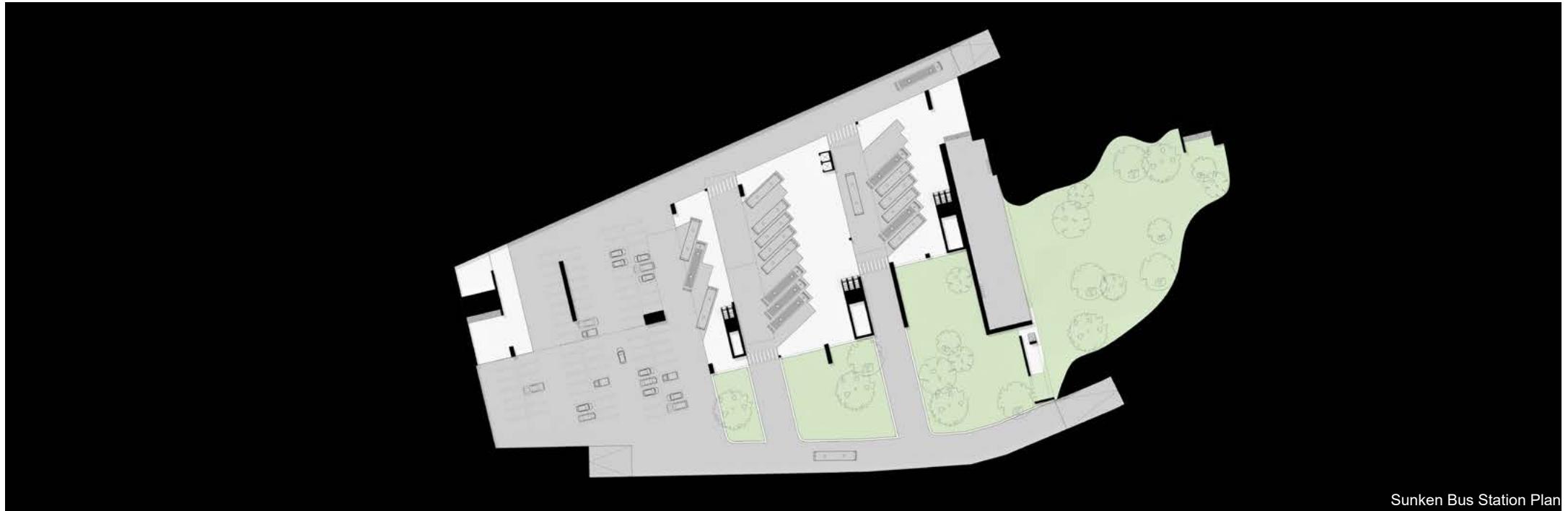
Site Plan



Sectional Axonometric



Ground Floor Plan



Sunken Bus Station Plan



Video Rendering of Gates with Lumion

FLUSHING COMMONS

Virtual Places Research Studio

Spring 2020

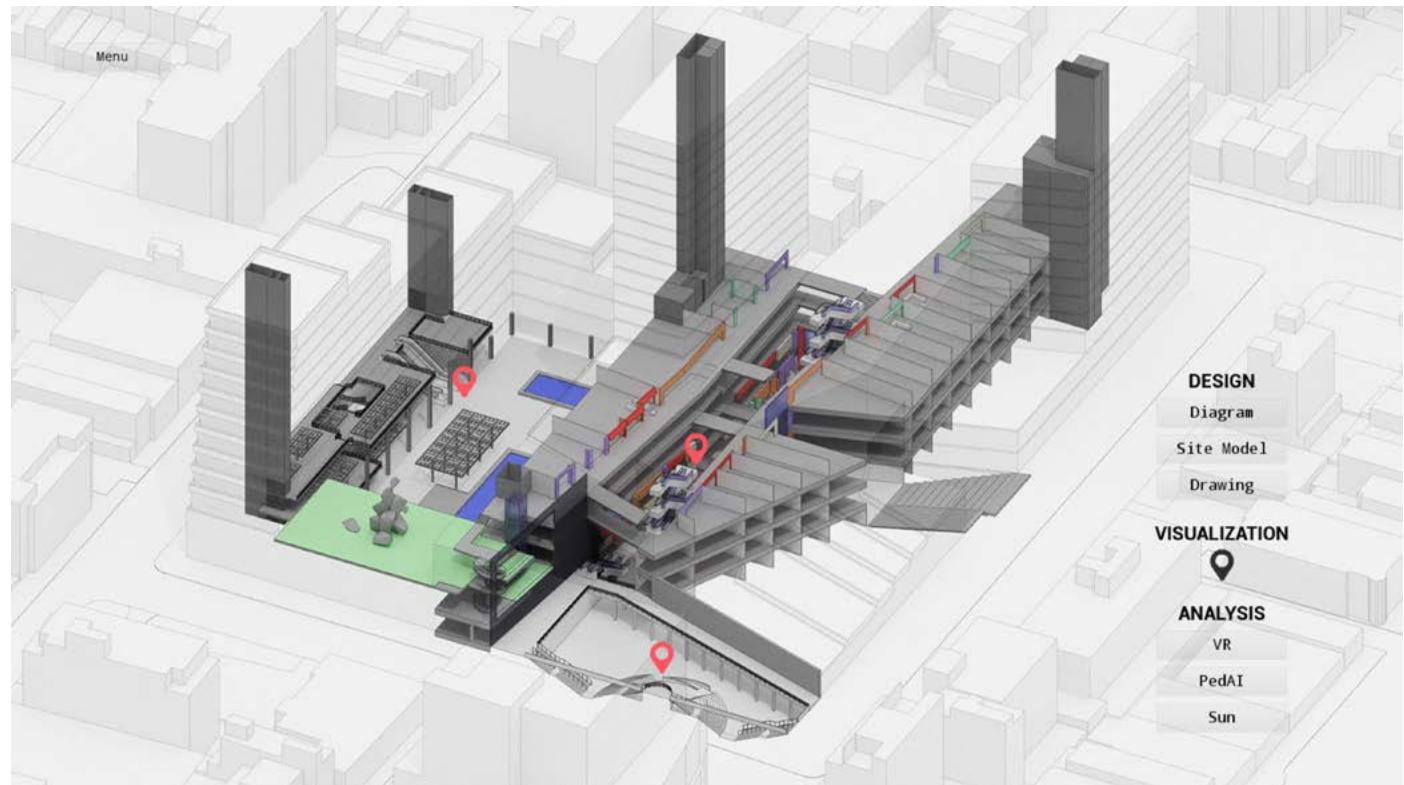
Instructor: Henry Richardson, Christopher Morse

Site: Flushing, New York

Collaborator: Ting Wei Fan, Noah Gear

Contribution: Conceptual design, development of the interactive application, architectural representation

The project proposes an urban center at the center of the China Town. It utilizes VR for placemaking, and experiments with the Unreal Engine to create an interactive application for idea presentation.



Screenshot of the menu of the Unreal Engine application



Day and night comparison of the 24/7 street in VR



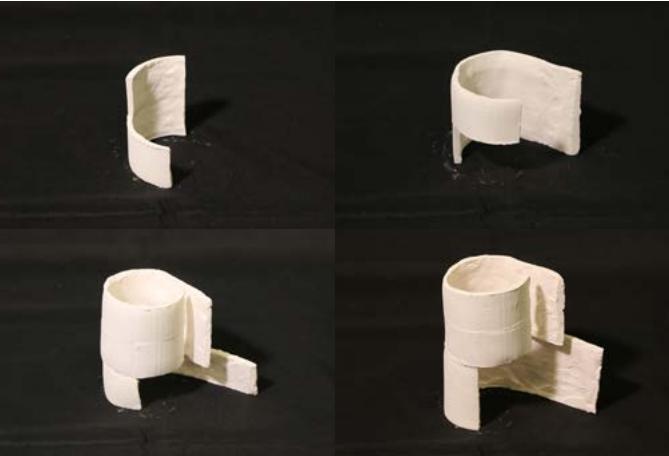
Mixed Reality

Other Works OCCUPYING CHAMBER

Coevolutionary Archetypes Option Studio
Fall 2019
Instructor: Naomi Frangos
Individual Work



Glasses



Ceramics



Glass Mold



Ceramic Mold



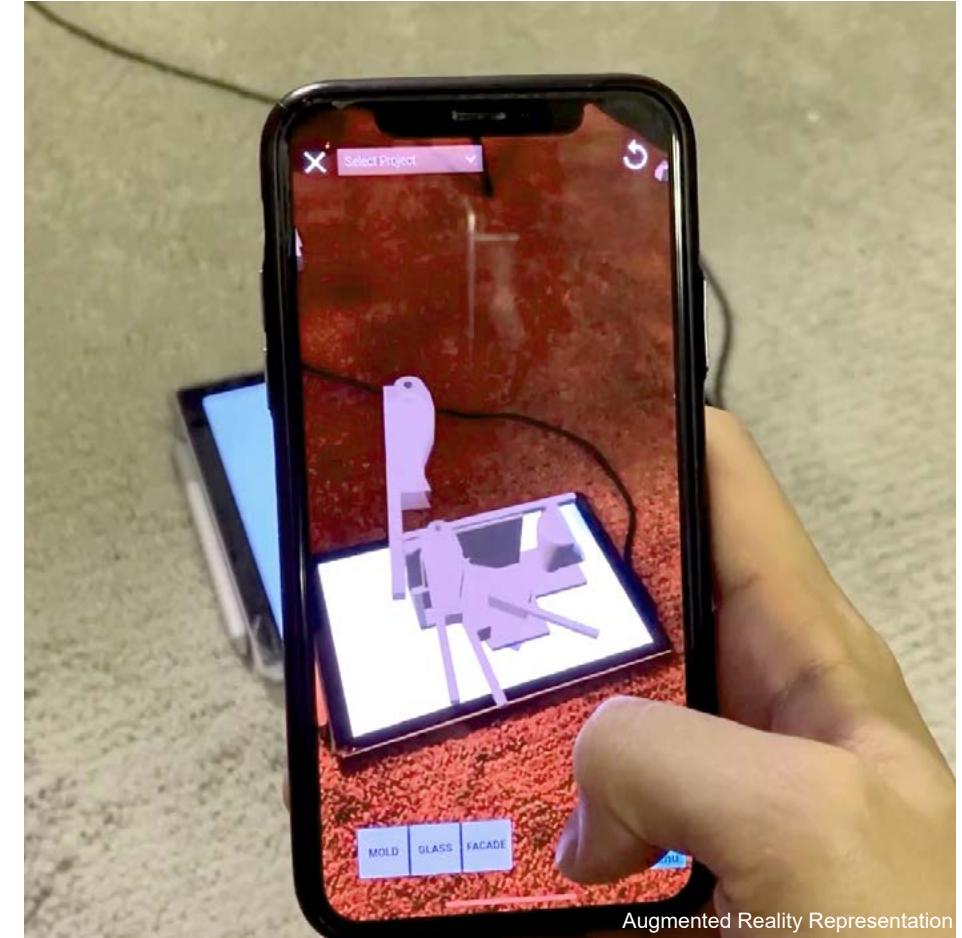
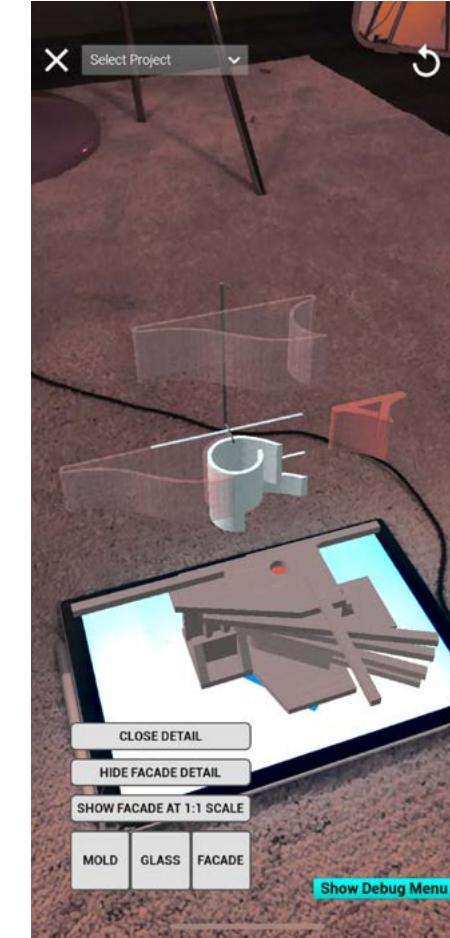
Glass Blowing at Corning Museum of Glass



Ceramic Casting

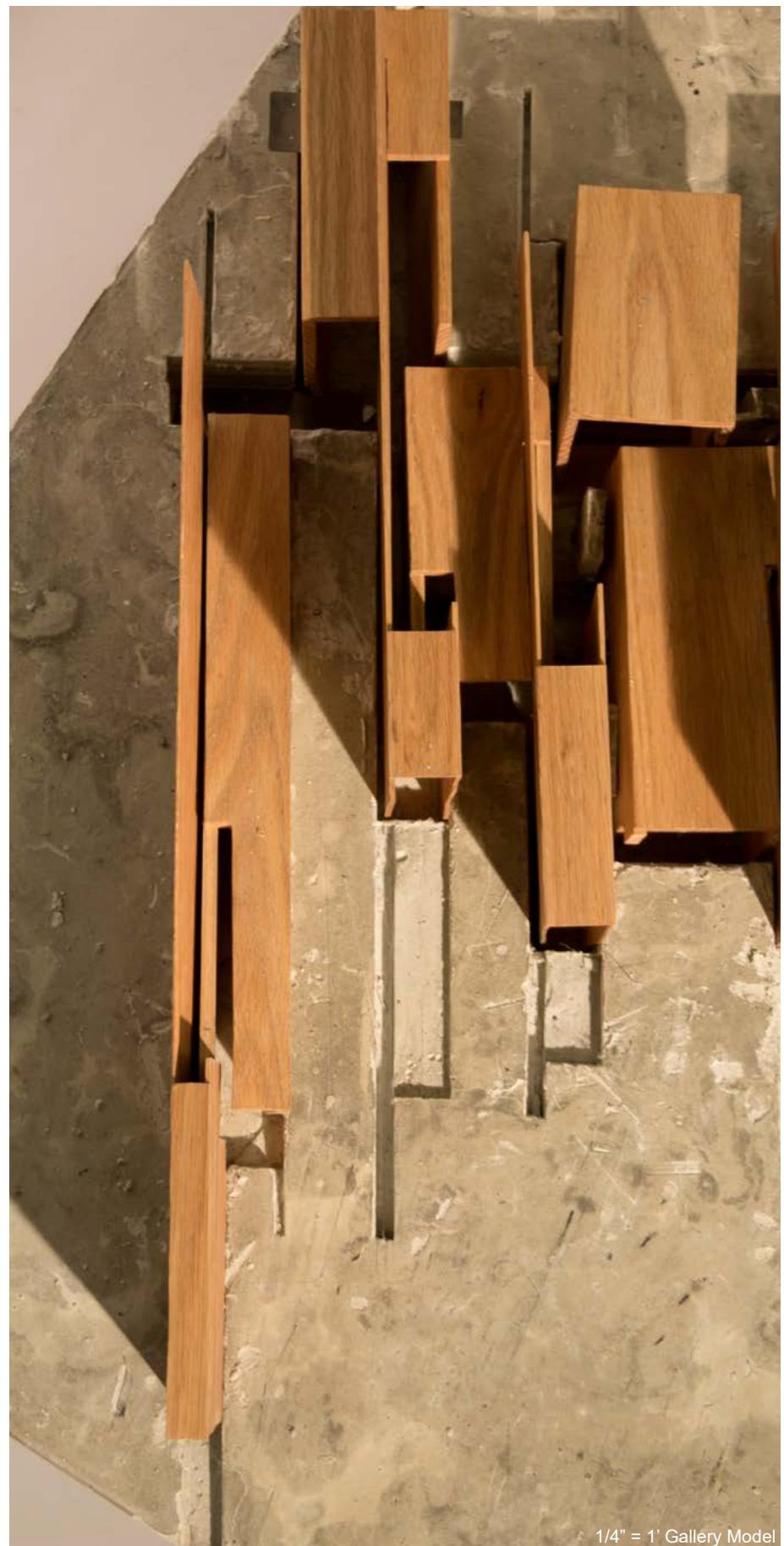


Façade Installation at Mui Ho Fine Arts Library

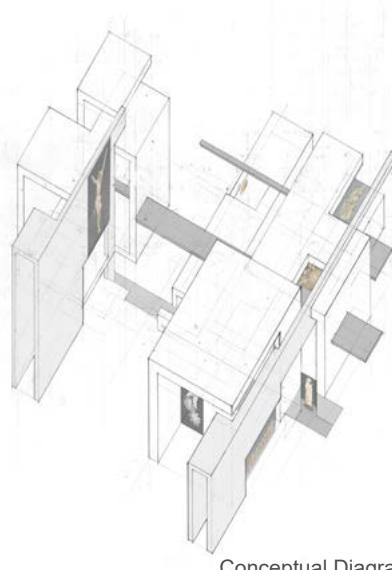


Augmented Reality Representation

Other Works



Interlocking Spaces for Artworks



Conceptual Diagram

ADAPTATION

Design II Studio
Spring 2017
Instructor: Val Warke, Luben Dimcheff
TA: Isabel Oyuela-Bonzani
Individual Work



The project proposes ways of adaptation for the

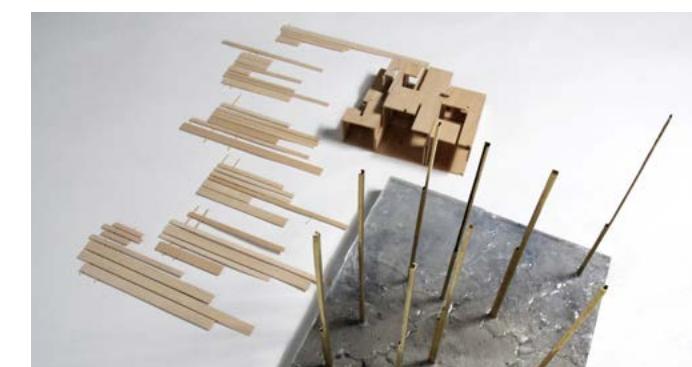
interlocking system. The puzzle was then transformed into a gallery in Greenland, where related artworks are visually connected through the gaps punctured by horizontal elements.



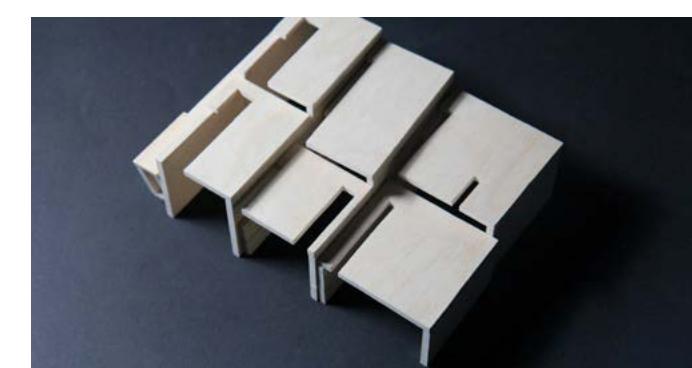
Arid Adaptation



Temperate Adaptation

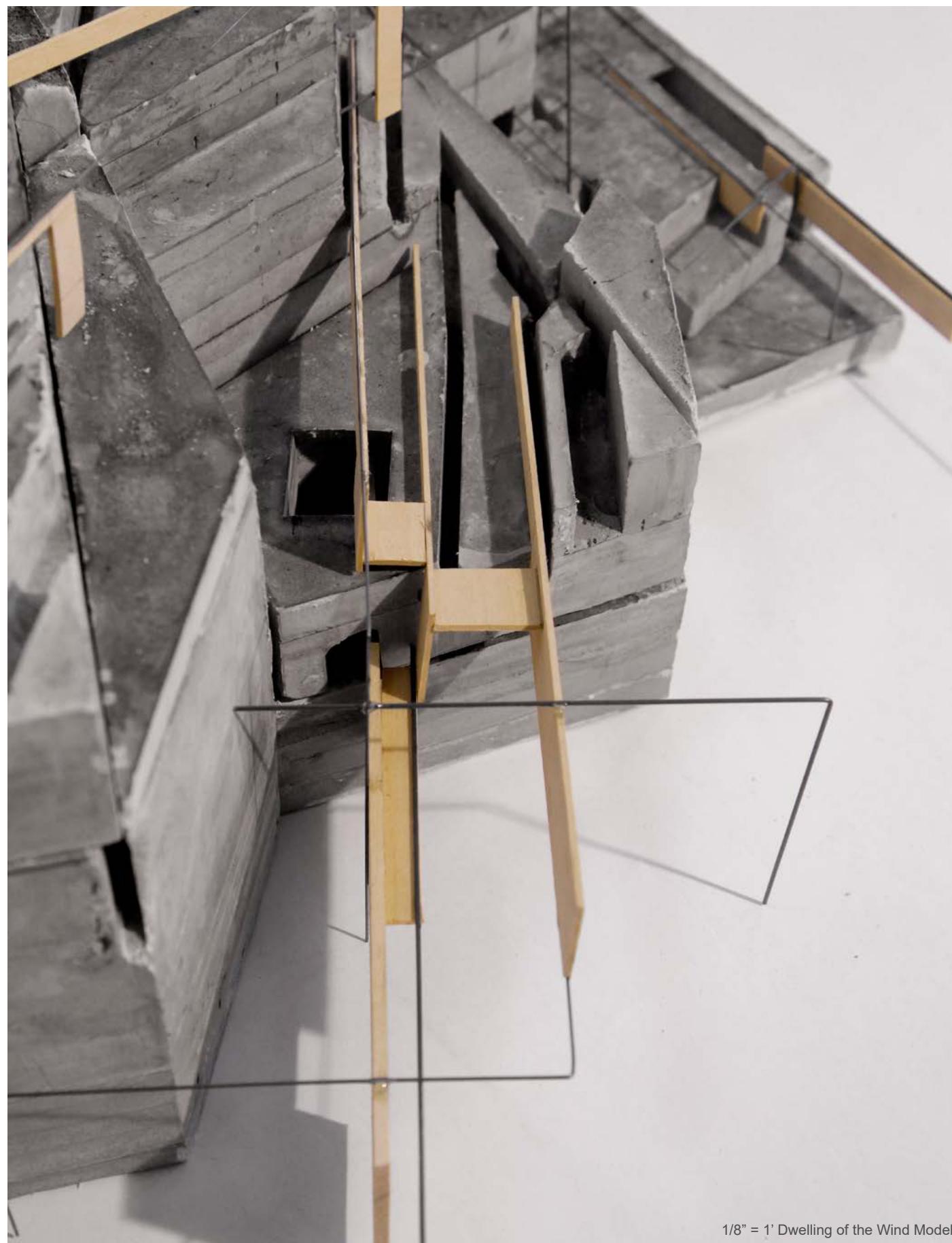


Tropical Adaptation



Polar Adaptation

Other Works



THE DRAWING MACHINE

Design I Studio
Fall 2016
Instructor: Val Warke, Luben Dimcheff
TA: Danny Salamoun
Individual Work

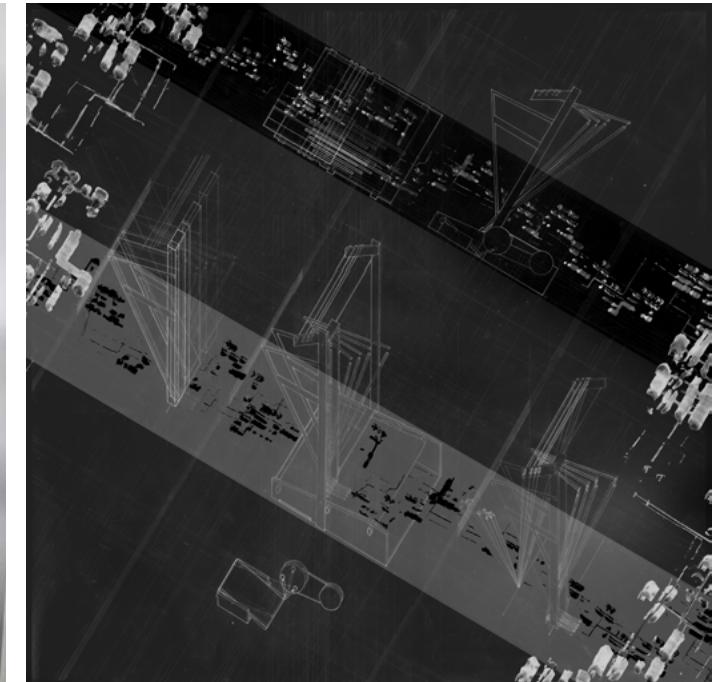
The machine translates musical notes into series of dots connected by intermittent lines. The pattern is then transformed into chambers and paths for people, wind, and sound, at the Dwelling of the Wind.



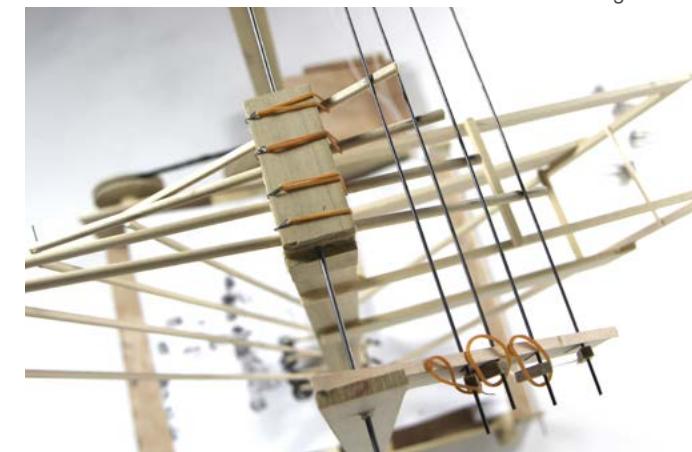
The Musical Drawing Produced



Drawing Machine



Construction Hand Drawing



Drawing Machine Detail



1/8" = 1' Dwelling of the Wind Model

Other Works

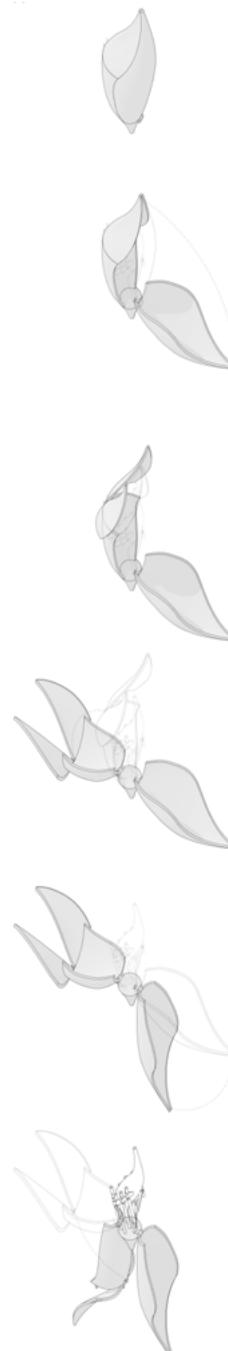
THE MUSIC DEVICE + SKIN

Design IV Studio
Spring 2018
Instructor: João Almeida
Collaborator: Zhenbang Xiong

The flute instrument consists of one organically-shaped chamber and eight sound tubes. The protective skin can be flipped open and support the instrument to match the height of a seated performer.



The Music Device

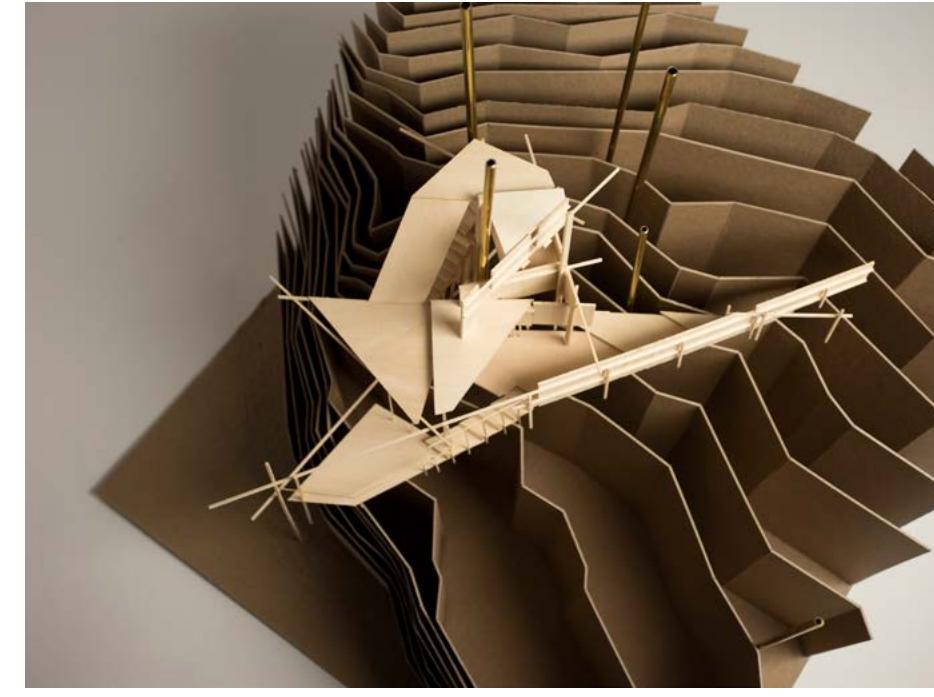


Diagrams

NATURE WATCHING STATION

BAIRD Prize, Winner
Fall 2017
Site: Ithaca, New York
Individual Work

A wooden pavilion for bird observation. The Platform of the Fall overlooks Ithaca Fall for observing large species at a distance, and the Room of the Wood is surrounded by the tree crowns for closer interaction with small birds.



1/4" = 1' Model



Diagrams