

Between Foundation and Reaction

Peng Zhang

May, 2020

Copyright © 2020 by Peng Zhang

All rights reserved. No part of this portfolio may be reproduced or used in any manner without written permission of the copyright owner except for the use of the quotations in a review.

For more information, please contact: pz246@cornell.edu

Abstract

architecture is deeply rooted in the history of itself but simultaneously reacts to the moment we live in. Based on this, I divide my study at Cornell into two parts. The first part is to trace back the development and foundation of architecture, I call this part as Foundation. The second part, which I define as Reaction, is to bring my architecture into the contemporary context in every dimension. These two parts (Foundation and Reaction) are not independent of each other, but the intricate and intimate relationships between them compose the most exciting part of the architecture.

In this personal conclusion, I frame my study and research at Cornell with three facets including context, tectonic and space, which are all critical topics of architecture. Each of these three facets is divided into the two parts of Foundation and Reaction and will be elaborated with the studios and seminars I took at Cornell AAP.

Table of Contents

Abstract

Introduction

Chapter 1 - 1, Context in Foundation	4
Chapter 1 - 2, Context in Reaction.....	7
Chapter 2 - 1, Tectonic in Foundation	9
Chapter 2 - 2, Tectonic in Reaction	17
Chapter 3 - 1, Space in Foundation	19
Chapter 3 - 2, Space in Reaction.....	22

Between Foundation and Reaction

Peng Zhang

Introduction:

On the one hand, architecture is deeply rooted in the history of itself. On the other hand, architecture reacts to the moment we live in. The dilemma is in the gap between the past and future, so is the opportunity.

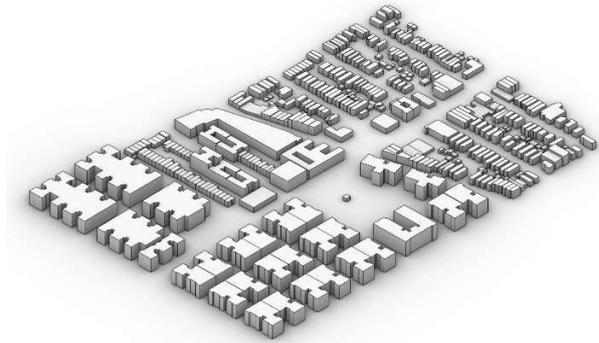
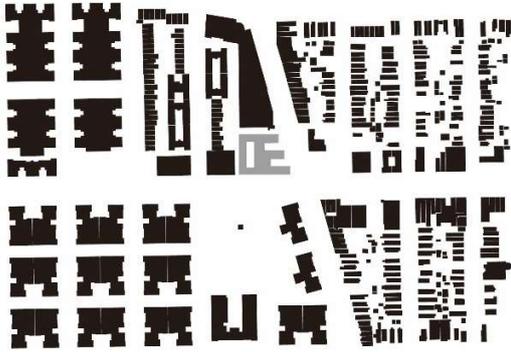
For a long time, my works were self-autonomous systems that could work independently from the environment. Yet, even with the confinement of site and program, the nature of these works seemed to be detached from reality. At Cornell AAP, I gradually realized this problem and tried to build up a relationship between my works and reality.

Through my organization of curriculum, I divide my study at Cornell into two parts. The first part is to trace back the development and foundation of architecture, which reshaped my understanding of the discipline and triggered a brand-new observation of architecture languages with this understanding. I call this part as Foundation. The second part, which I define as Reaction, is to bring my architecture into the contemporary context in every dimension, including the employment of new technology, the attention to social problems like global warming, environmental pollution, gender inequality, etc.

These two parts (Foundation and Reaction) are not independent of each other, but the intricate and intimate relationships between them compose the most exciting part of the architecture. In this personal conclusion, I frame my study and research at Cornell with three facets including context, tectonic and space, which are all critical topics of architecture. Each of these three facets is divided into the two parts of Foundation and Reaction and will be elaborated with the studios and seminars I took at Cornell AAP. The interactions between them and the influence one have posed to another would be explained case by case.

Chapter 1 - 1, Context in Foundation:

In this chapter, I would start with a small practice instructed by Val Warke. It is an assignment following a lecture he delivered at AAP NYC. In his lecture, he picked up the chapter of "context" in his book *The Language of Architecture* to further elaborate. There are three kinds of context in his book: physical context, infrastructural context, and ephemeral context. After the lecture, we were assigned to put a volume into a context wherever it is in New York City, with the understanding of his book.



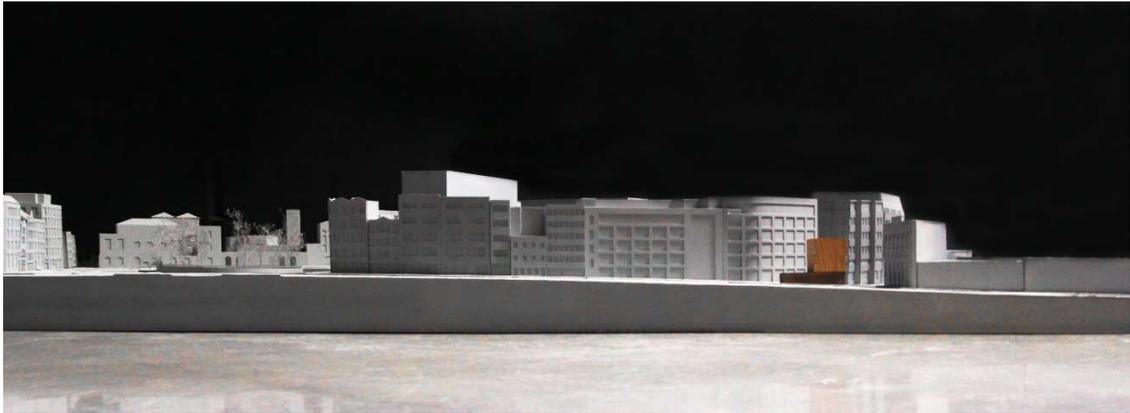
I chose my site besides the Louis Armstrong Middle School in Queens. The location's property of publicity led to the manipulation of integrating different types of buildings around this area. As is seen in the plan, there are three types of morphology in this area, including 1. building with a courtyard, 2. building reaching out a mass, 3. small building. When blending these three types of architecture, the volume's interface with urban context was taken into consideration.

The three "branches" align with the edge of Junction Road, which has resulted in the set-up length of branches. The amphibious space between these branches increases the area of the envelope and provides possibilities for interaction between architecture and urban residents at the same time. The allusion of the courtyard and small-mass space can also be found in this volume.

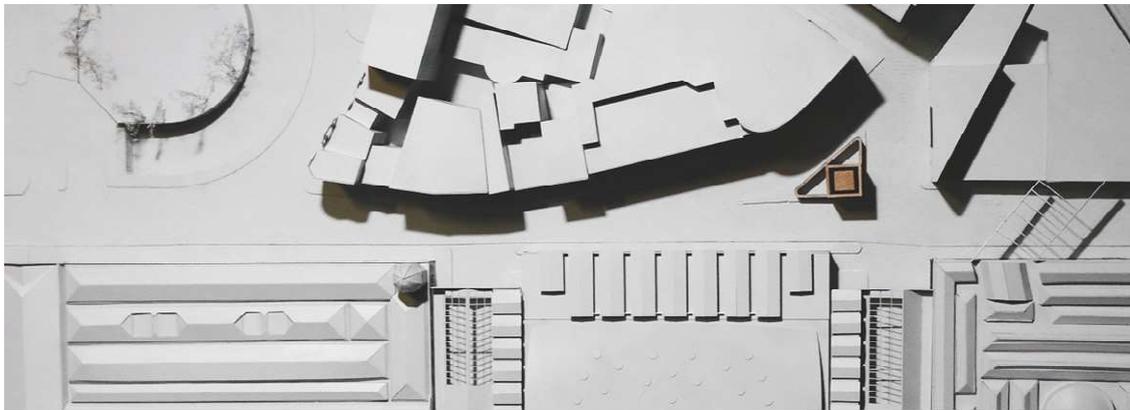


Following this practice, we were required to design another building in a context within Manhattan. The architecture is rooted in its context in two dimensions. The first dimension is about its environment, including the triangle site shaped by crossroads on Manhattan, the relationship with the original building below, the traffic and pedestrian around and across the site, and the viewpoint from a different street. The roof of this expansion building is inclined to form a rhythm in the skyline as well as to reach a balance in its subtle relationship with the original construction in terms of weight and gesture.

The second dimension is embedded in memory. Through montaging pieces of architecture from different ages of New York, it stands in a place where historical traces is hard to be found. The facade resembles 70s' highrises standing in the midtown area and the volume responds to aesthetics from 80s' Italian sense in rationality, bridging a connection with its reality in Newyork where culture and time are all in a chaotic state. It is seamless but also comes from history and common memory.

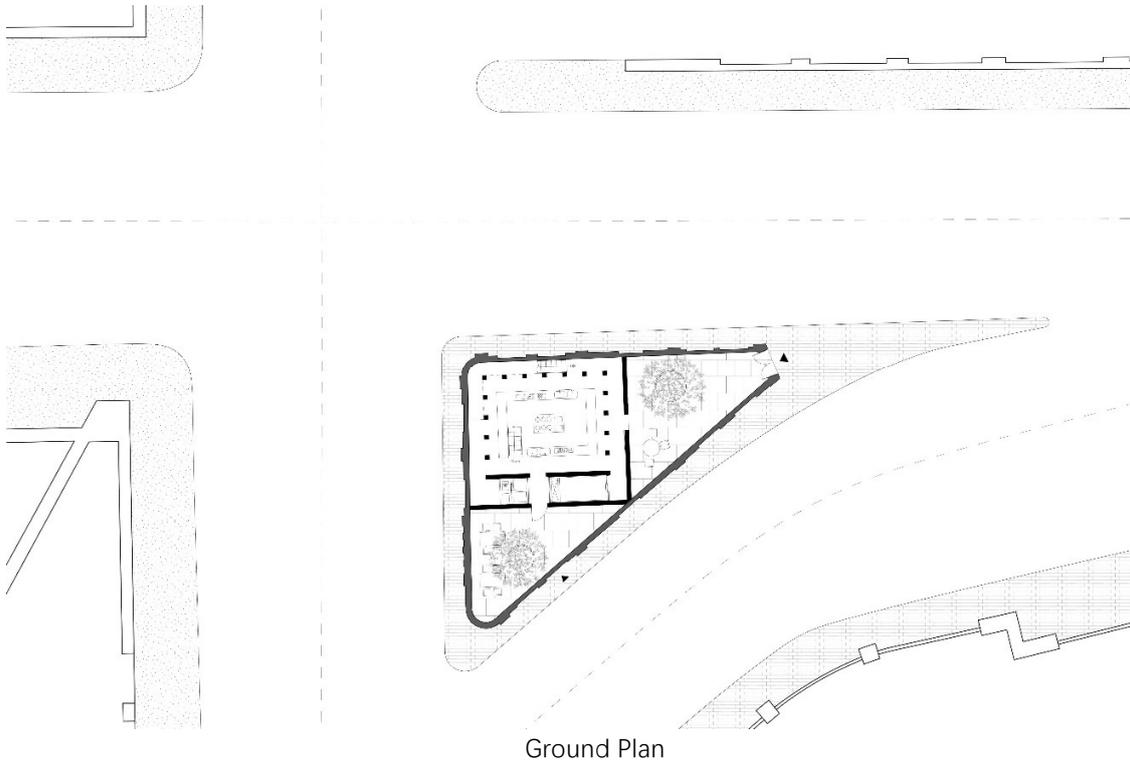


Site Model Elevation



Site Model Plan

Influenced by this practice, the strategy my project reacts to the context in the 2019 fall option studio Carmody Groarke, focuses both on the physical and phenomenal environment. This project is located in the heart of London, The Smithfield Market. This market has fed London people with food for centuries and will fed London with “mental food” in the future with the translocation of the Museum of London.

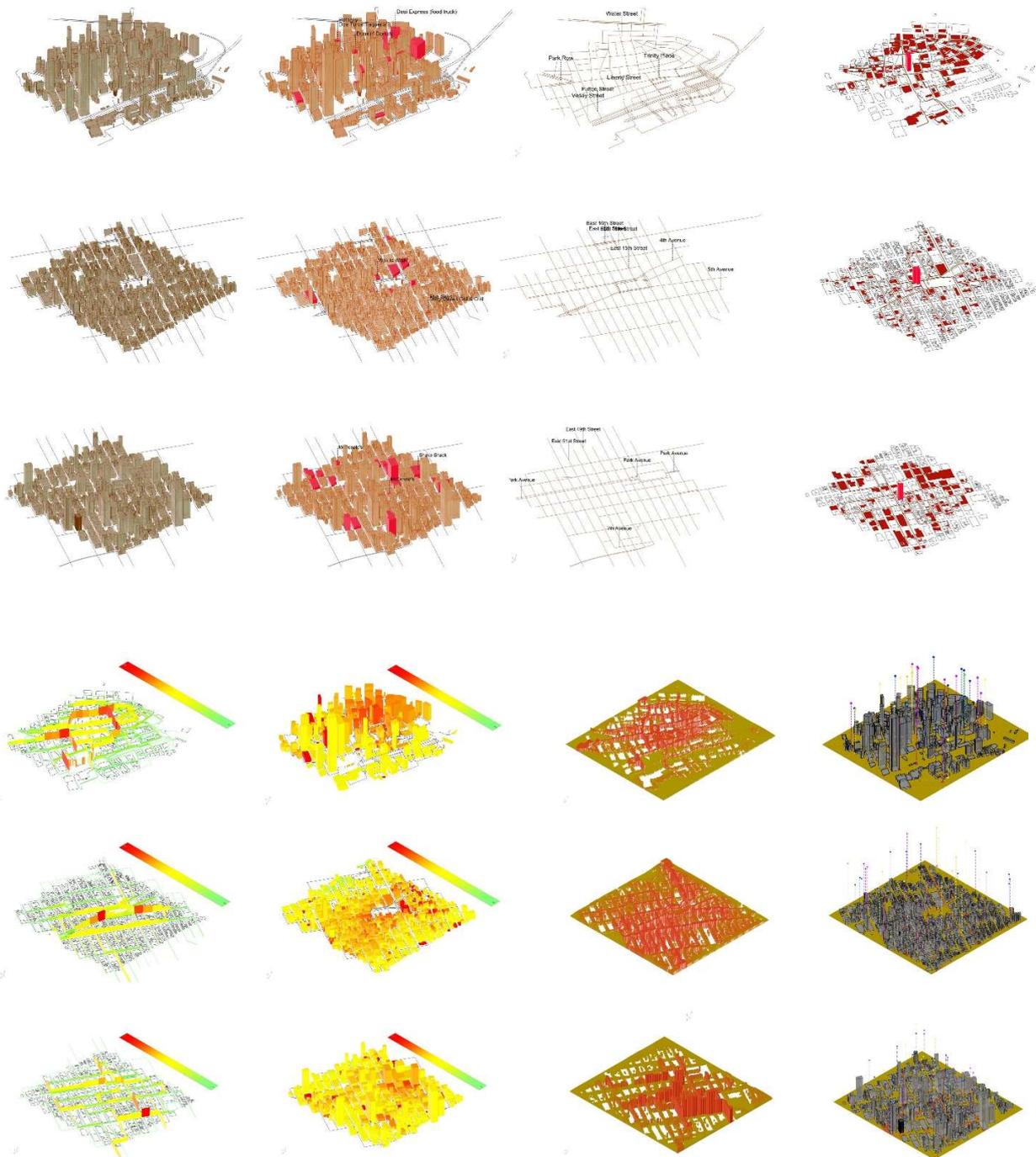


The inserted volume defined two courtyards inside the triangle, and intensify the entrance of the museum simultaneously. Privacy is protected by the closed elevation, but skylight was introduced into every level by the open ceiling and manipulation of the section. The restaurant intervenes the ruins with its volume, interface, gesture, material, to create depth of space and generate different senses of place to satisfy the need of different programs within the restaurant.



Chapter 1 - 2, Context in Reaction:

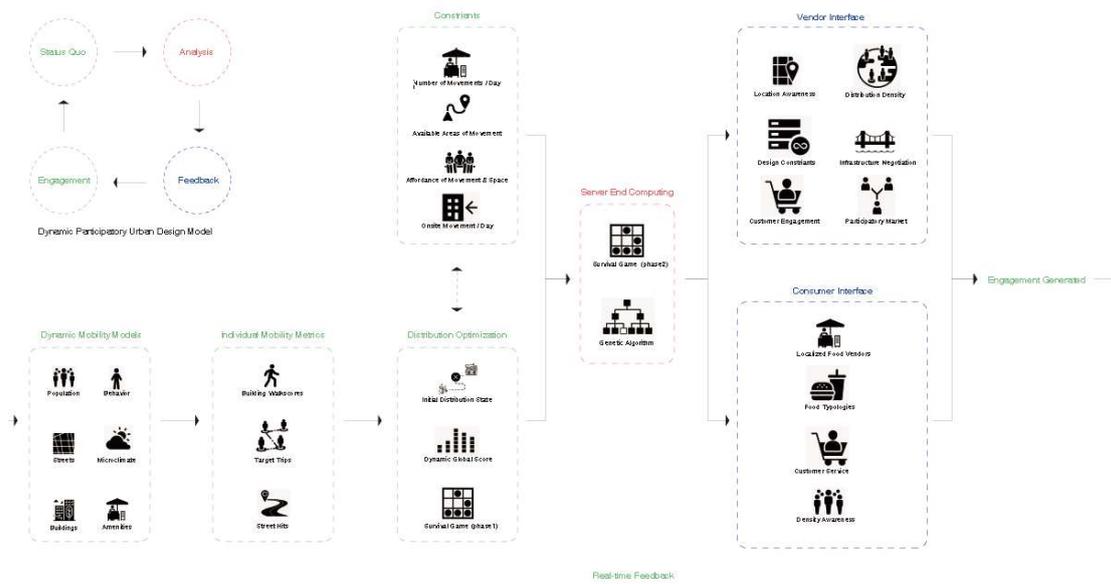
Different from the classical way of approaching a context, in the studio instructed by Biayna Bogosian at AAP NYC, I was introduced the parametric urban analysis method. In this studio, we analyzed the population, behavior, streets, microclimate, buildings, and amenities with the help of parametrical tool embedded in Grasshopper and the database on the internet.



Urban Data Analysis

These parameters were framed and analyzed with the server end computing program we coded, which employ the survival game and genetic algorithm, to realize the redistribution of vendors on Manhattan Island.

Our Project is to offer vendors with suggestions in terms of the best choice of their location through an online app on their mobile phone. The suggestion is real-time and changed every hour according the dynamic urban data collected through several databases. Below is the diagram of the workflow and a scheme of the app interfaces.



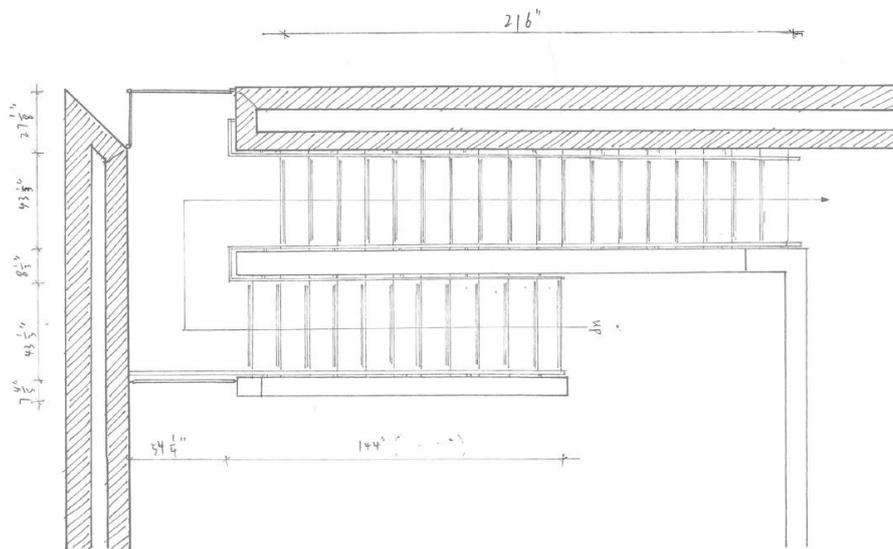
Work Flow



APP Interface

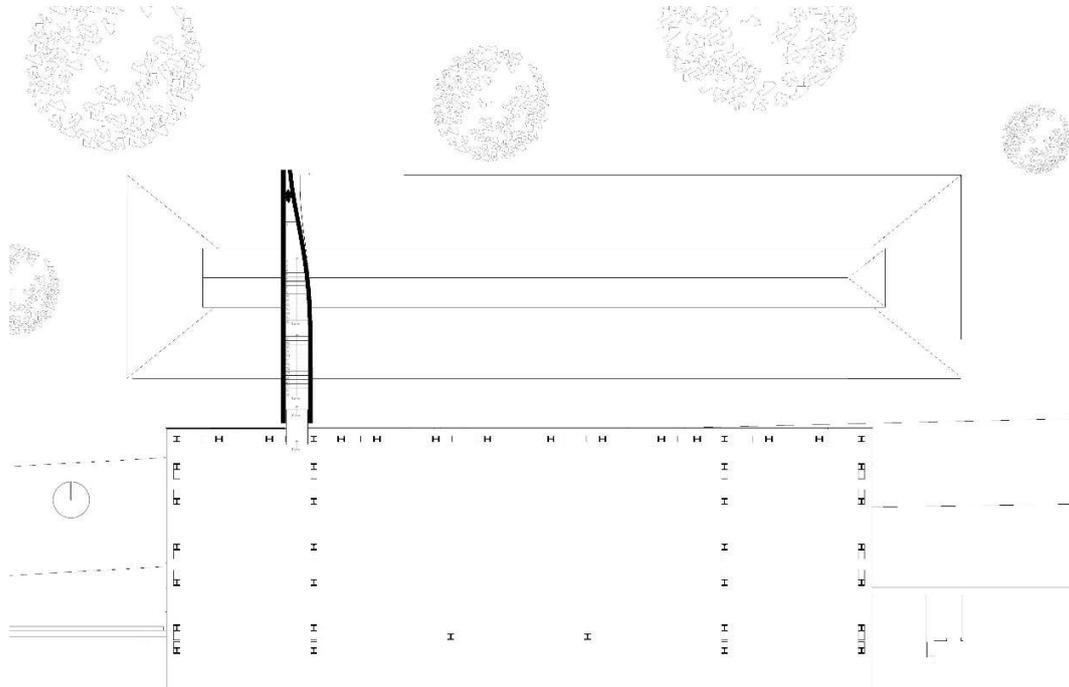
Chapter 2 - 1, Tectonic in Foundation:

In the 2019 fall seminar The Stair, instructed by Rodolfo R. Dias, we designed a new stair connection between Milstein Hall and the Foundry and Kiln Shed on the Northside of University Ave. Following his lecture series on details, we did our research and design with our focus on material, tectonics, and basic architecture languages.



Stair Plan, Johnson Museum of Art

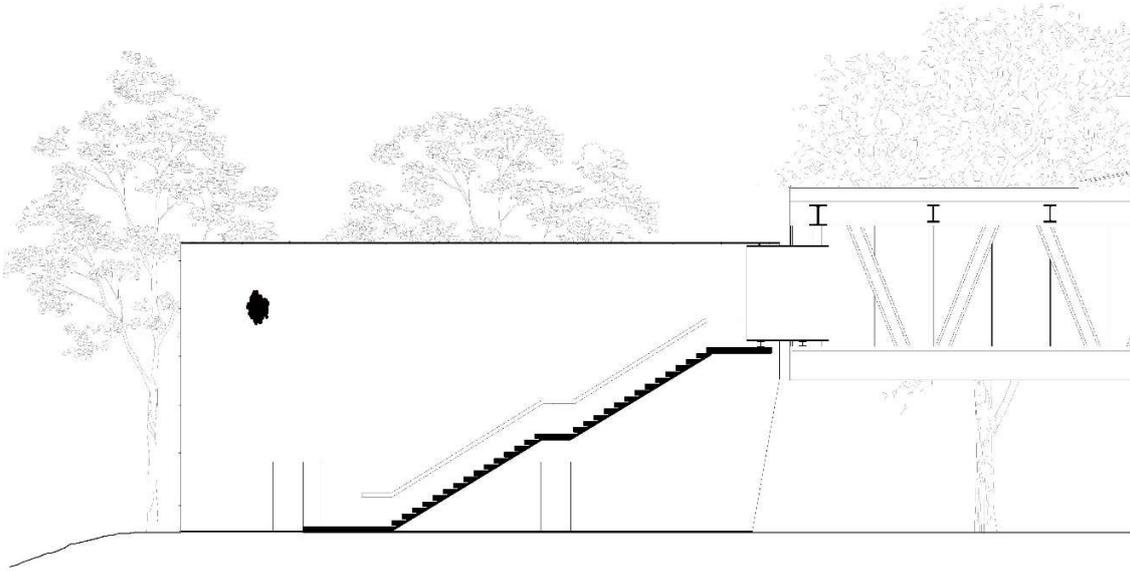
Before the stair design, we were required to do a large amount of case study to build up our vocabulary of stairs. This is the stair plan of a stair in Johnson Museum I drew, according to my measurement on site. We did several case studies to build up a personal reference library of stairs to inform our design process.



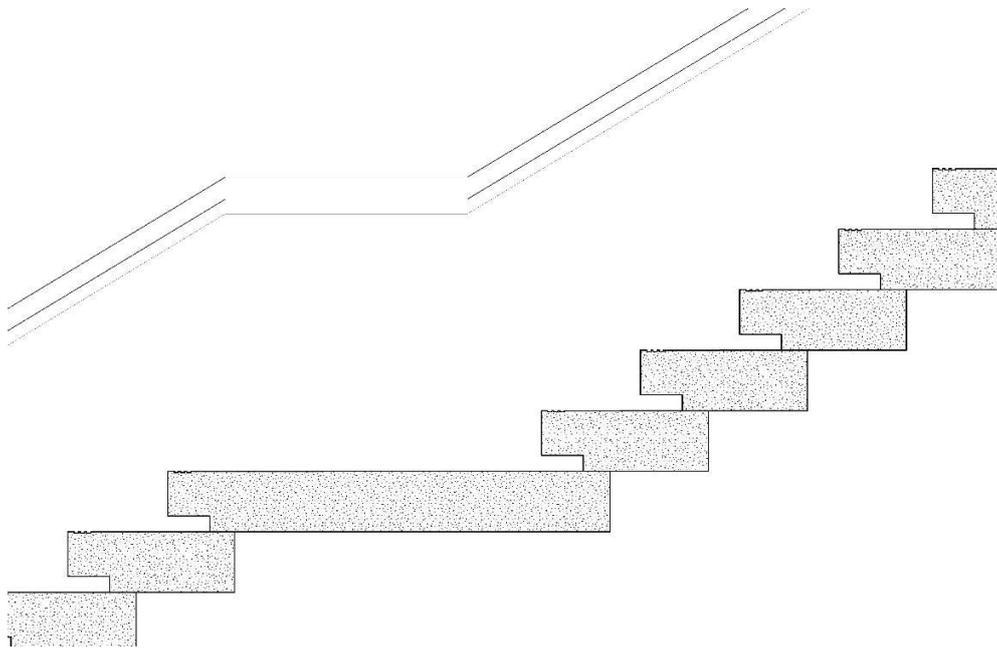
Stair Plan

Before the design, we need to select the point of contact at the Milstein Hall level and avoid destroying too many curtain wall glass panels to allow passage through. Also, we need

to select point of contact at ground floor level at Northside of University Avenue.



Section



Detail

The connection between the Milstein Hall and the concrete stair is a stainless-steel corridor, which plays a role not only connecting the circulation but also connecting the two different materials.

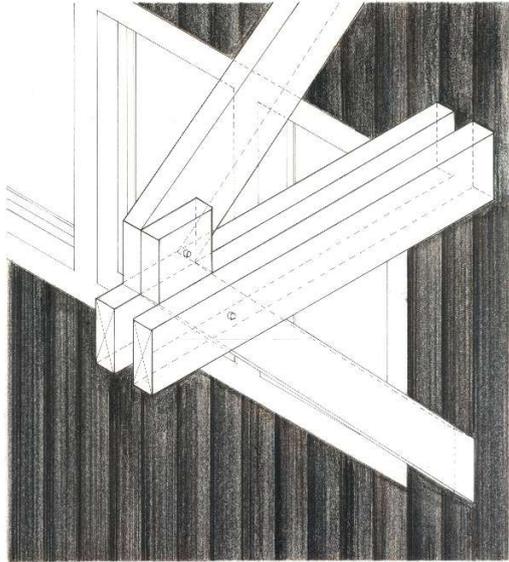


As is shown in the model, the stair I designed to cross the Foundry Hall, looking into the gorge behind.

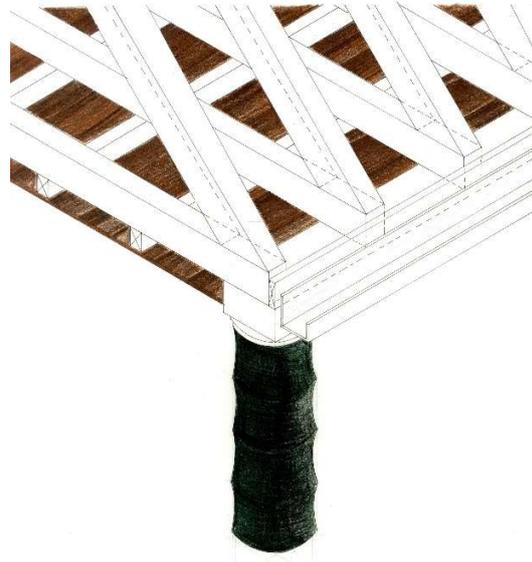


Due to Milstein Hall cantilever structural solution, a new stair pavilion cannot add any weight or connection to it. The stair must “kiss” Milstein at second level, and the stair pavilion must be self-supported. My strategy to realize the structural integrity is to employ two walls to define the space and form of stair and simultaneously support itself.

In the 2020 spring semester, I am enrolled in the option studio Universum Carrousel Journey instructed by Jan De Vylder. Jan believes that the making and meaning of architecture are deeply embedded in each other. He encourages students learn through hand-made drawing and physical models.

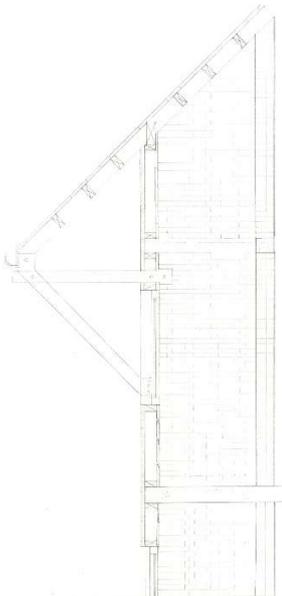


Detail, Maison Solaire

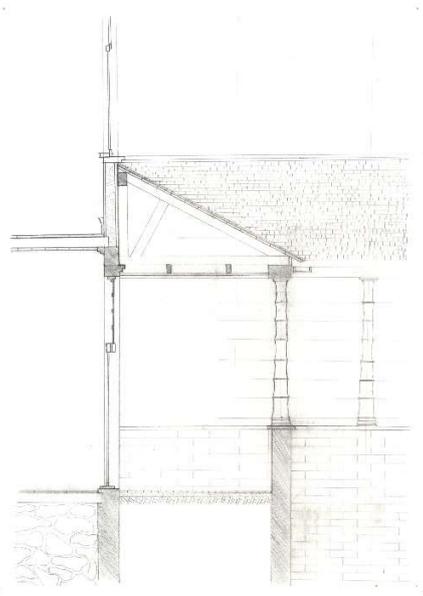


Detail, Isaac Bell House

Jan focuses his attention on material, tectonics, and the meaning created by them. In this studio, students were required to study three houses in the first movement. The three houses are from America, Japan and Europe. Based on the study, students will select a house among them to interpret, and a site to approach, then bring a house into a different cultural and physical context through the interpretation.



Section, Maison Solaire



Section, Isaac Bell House

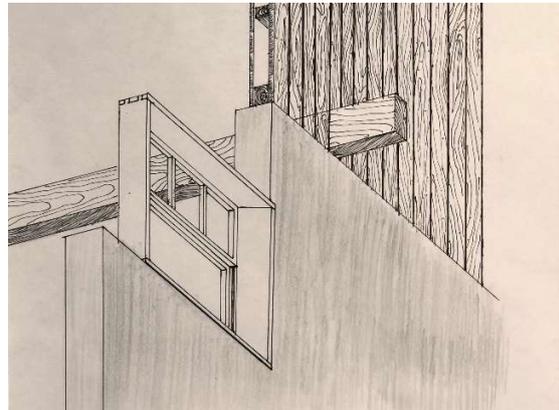
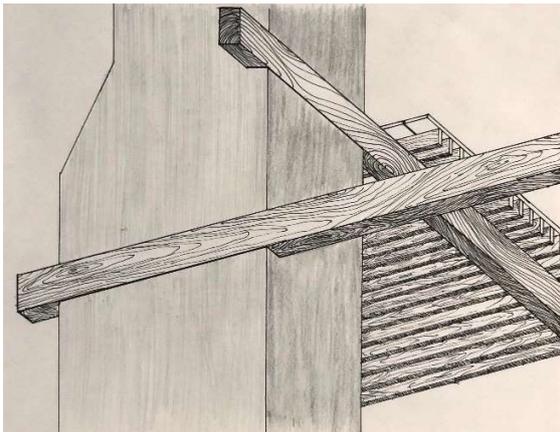


Model, Maison Solaire



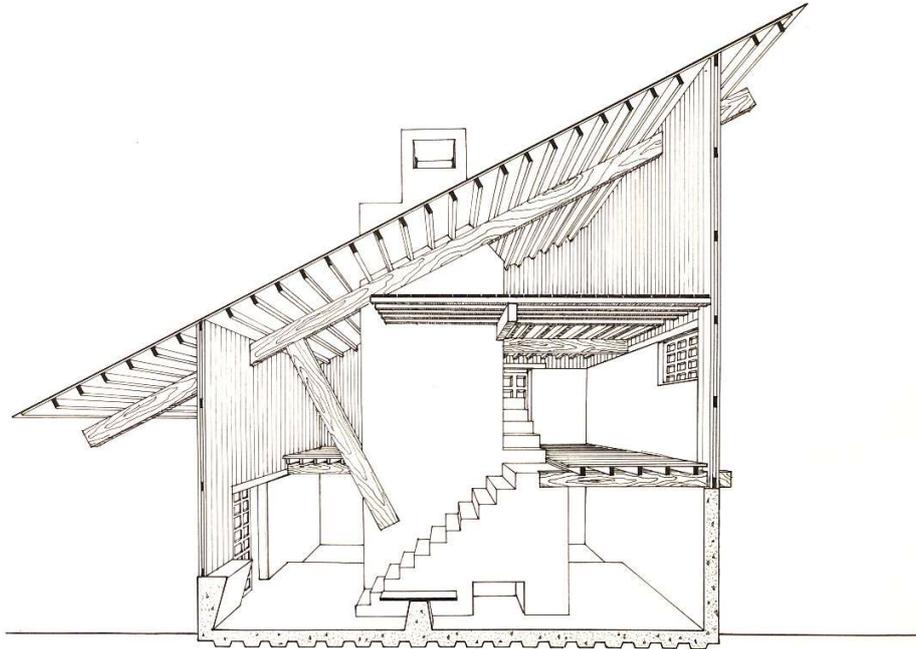
Model, Isaac Bell House

These are the study of the three houses (Maison Solaire, House in Uehara, Isaac Bell House) in terms of tectonic, based on the handcraft drawings and models I made together with my colleague Olivia Calalo.

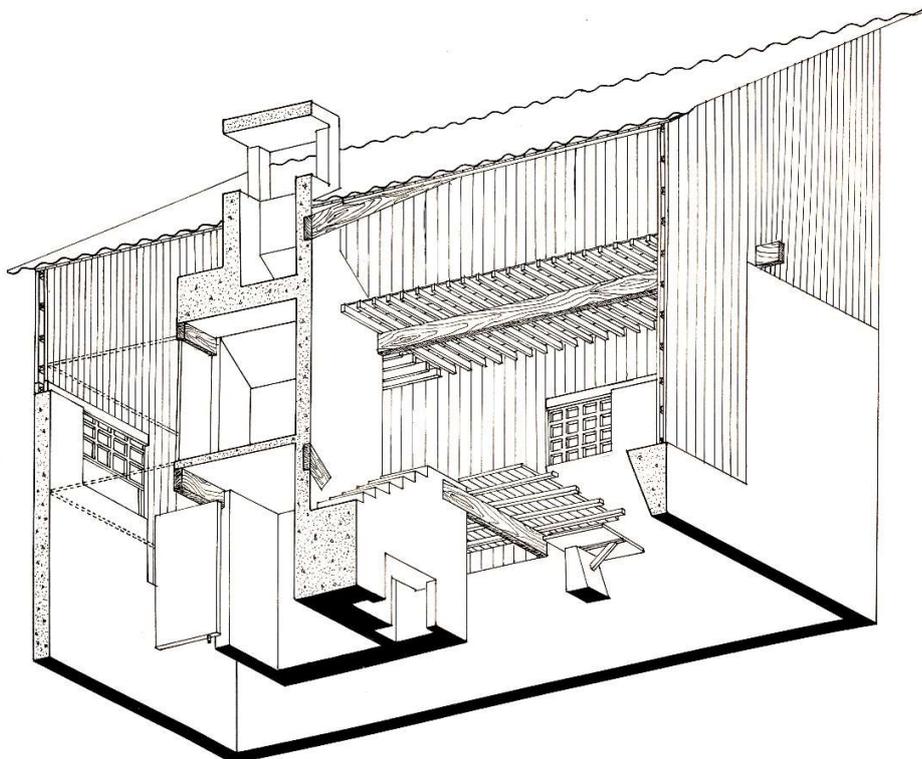


Concept of Detail

Based on the study of Mansion Solaire, I focused my attention on the relationship between heavy and light material (concrete and timber). Above is part of the scheme in my house design located in Tokyo.



Section



Axo-Section

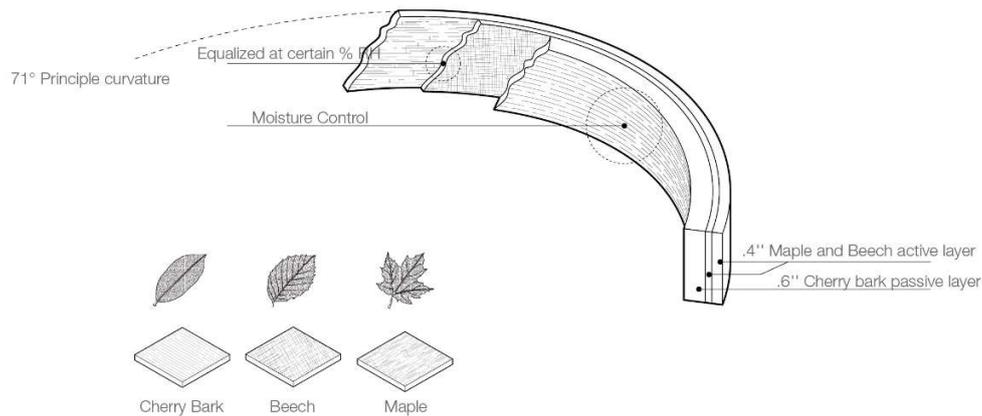


Section Model

Based on the study of Mansion Solaire, I focused my attention on the relationship between heavy and light material (concrete and timber). Above is part of the scheme in my house design located in Tokyo.

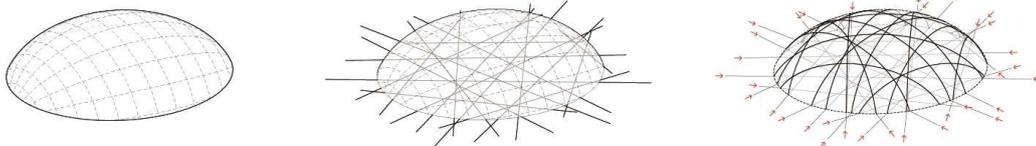
Chapter 2 - 2, Tectonic in Reaction:

In the studio instructed by Laia M. Soldevila and Jorge D. Royo, we designed a pavilion with digital fabrication on wood material. Through laminating three different timber material including cherry bark, beech, and maple, we created a composite material that is sensitive to moisture. The shape of this material will change in different moisture environments, because of the different properties of these three kinds of wood.

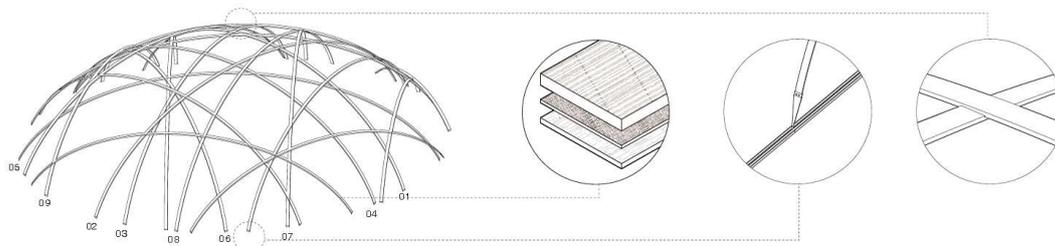


Top-down strategy and bottom-up strategy were both employed to proceed with this design. The top-down design strategy is to reach certain pure and simple forms like hemisphere and semi-ellipsoid with irregular patterns to create disturbance within harmony. By reconstructing the Timoshenko formula, we can simulate potential hydrodynamic bending behavior.

Form Conversion

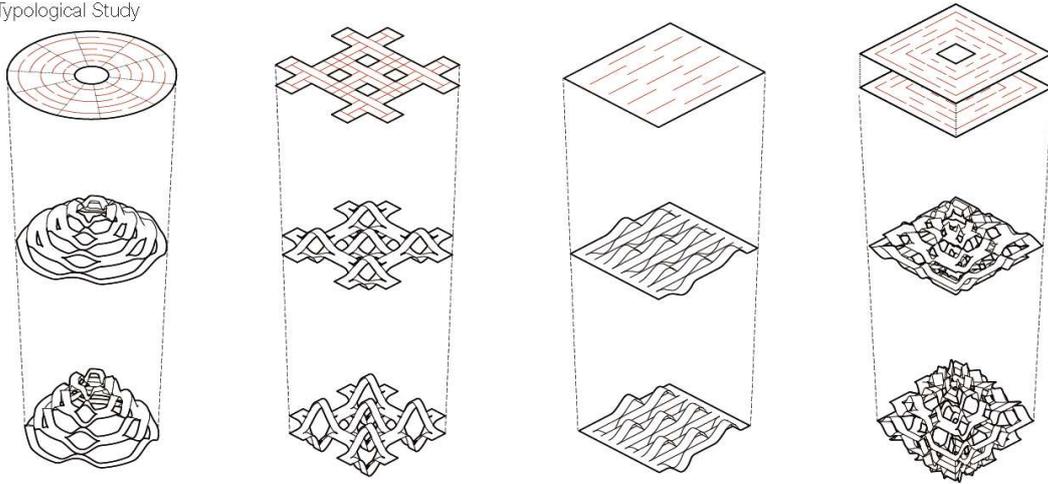


Tectonics



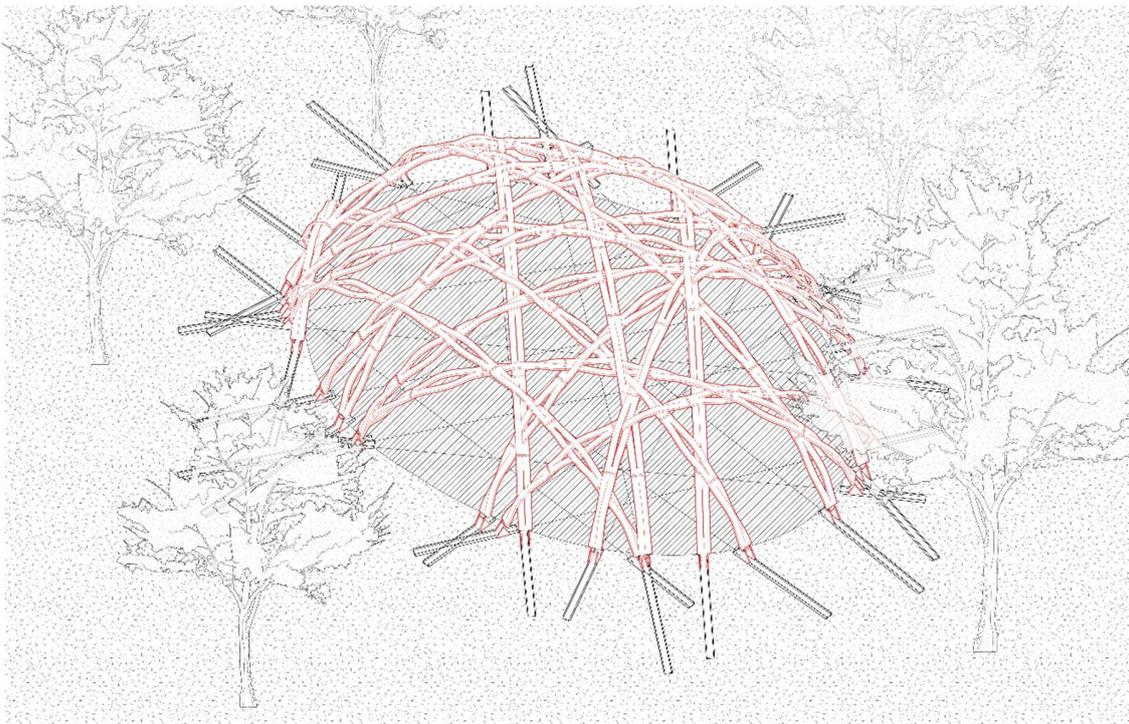
Top-down Strategy

Typological Study

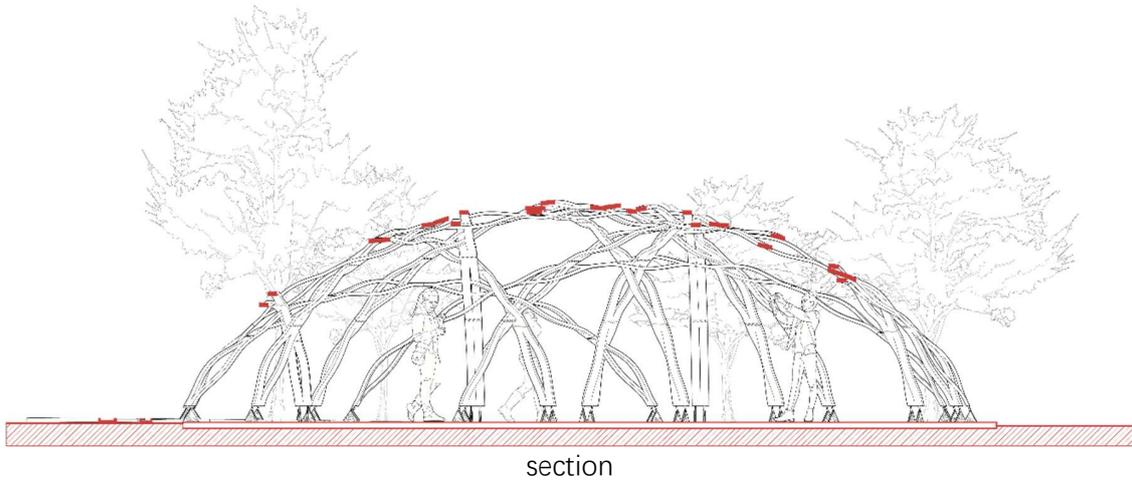


Bottom-up Strategy

In the bottom-up strategy, hydrodynamic bending behavior is applied to a more microscopic structure. According to an experiment by ICD, if we cut a line in the center of a certain wood chip and wet it, the wood chip will bend with half getting up and a half getting down. According to this mechanism, when we aggregate this kind of wood chip to make a whole flat surface, the surface will grow thicker and gain more elasticity in moist environment



Axonometric View



Chapter 3 - 1, Space in Foundation:

In the 2019 fall option studio Carmody Groarke, students were trained to use a physical model to inform design. This traditional method was partly replaced by the digital model at present, but the value of physical model is celebrated again in this studio, opening a new world for me and push me to rethink the abuse of digital media. Below is a practice we did before the formal project. The photo is based on a 1:10 model.

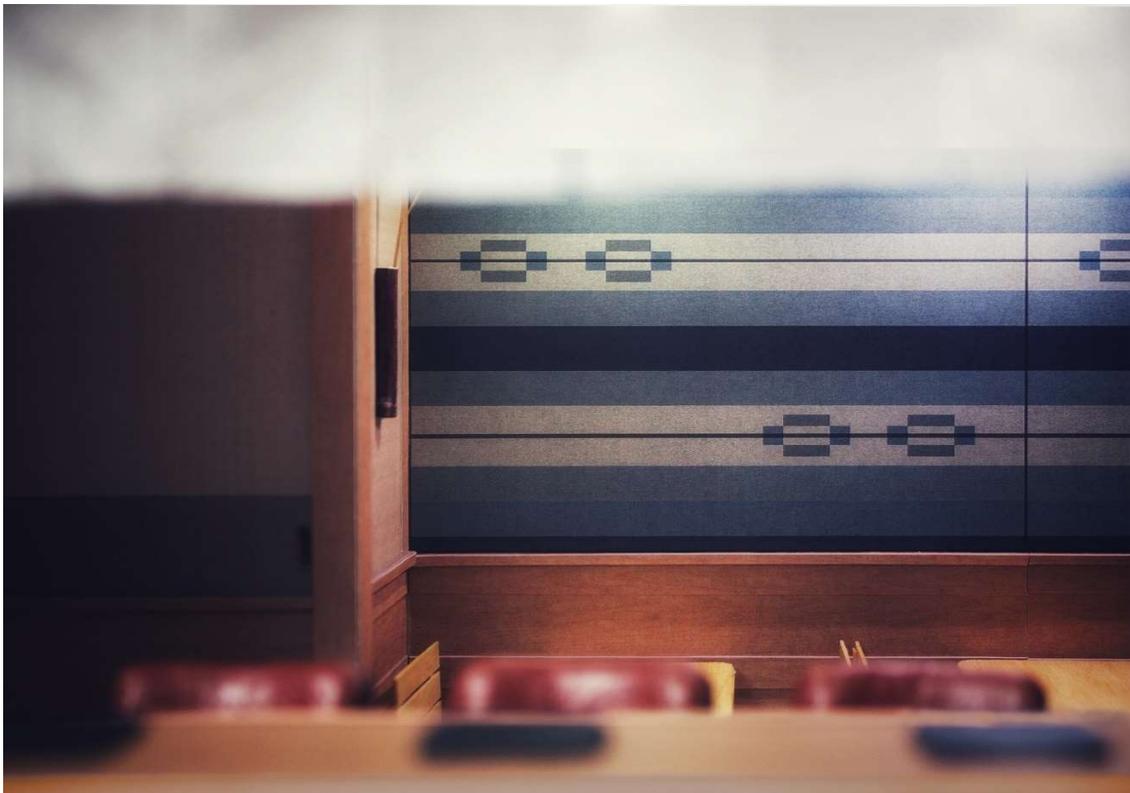


Photo of 1:10 Model, Recreating the Sukiyabashi Jiro Restaurant

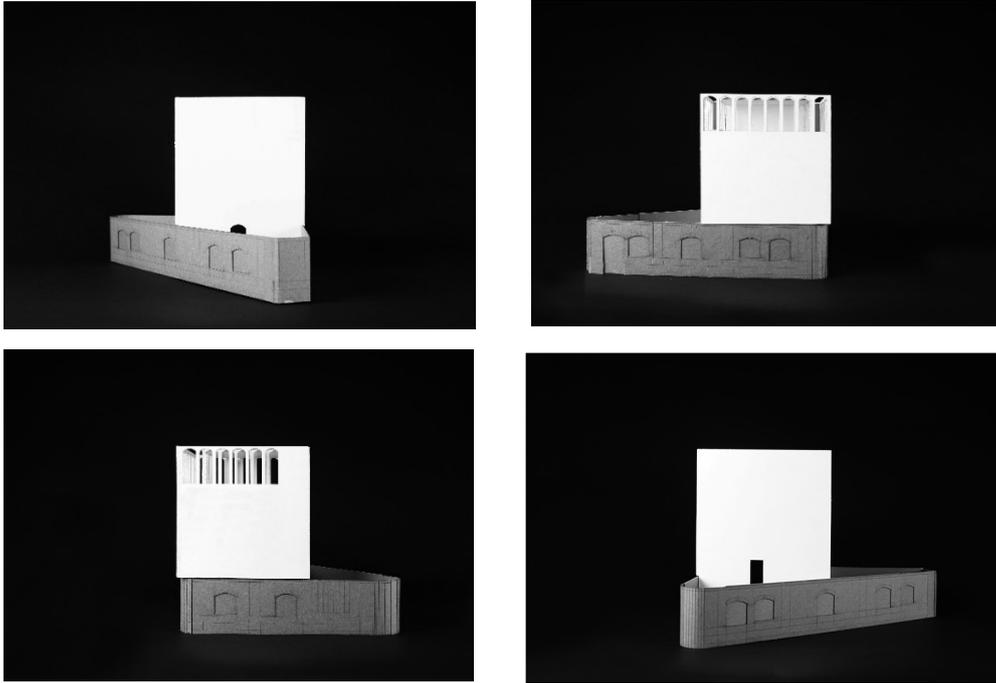


Photo of Kimbell Art Museum Model, 1:20



Similar to this practice, Project 2 in the Zenithal Light 2020 spring seminar, we were assigned to reproduce the interior lighting condition of Kimbell Art Museum with a physical model. We set the scale of this model as 1:20. These two practices not only taught me how to make a very detailed model but also take me to rethink the way atmosphere and space created with the consideration of light, material, and the dimension of space.

Following the practice, we were instructed to design a building on a ruin in central London in the Carmody Groarke studio. The task is very sensitive in terms of the complexity of that context. The Smithfield market, our site, is going to be replaced by the new Museum of London. From my understanding, It seems civilized when we replace the food trading with culture sharing, but the memory and emotion food carried in the Smithfield Market over the centuries is no less important than other collections in the Museum of London.



Elevations

I finally put a restaurant on the site. The intervention of the restaurant will bring the memory related to food back to the site, bridging the old and new Smithfield, making the preservation, processing and enjoying of food a part of the exhibition.

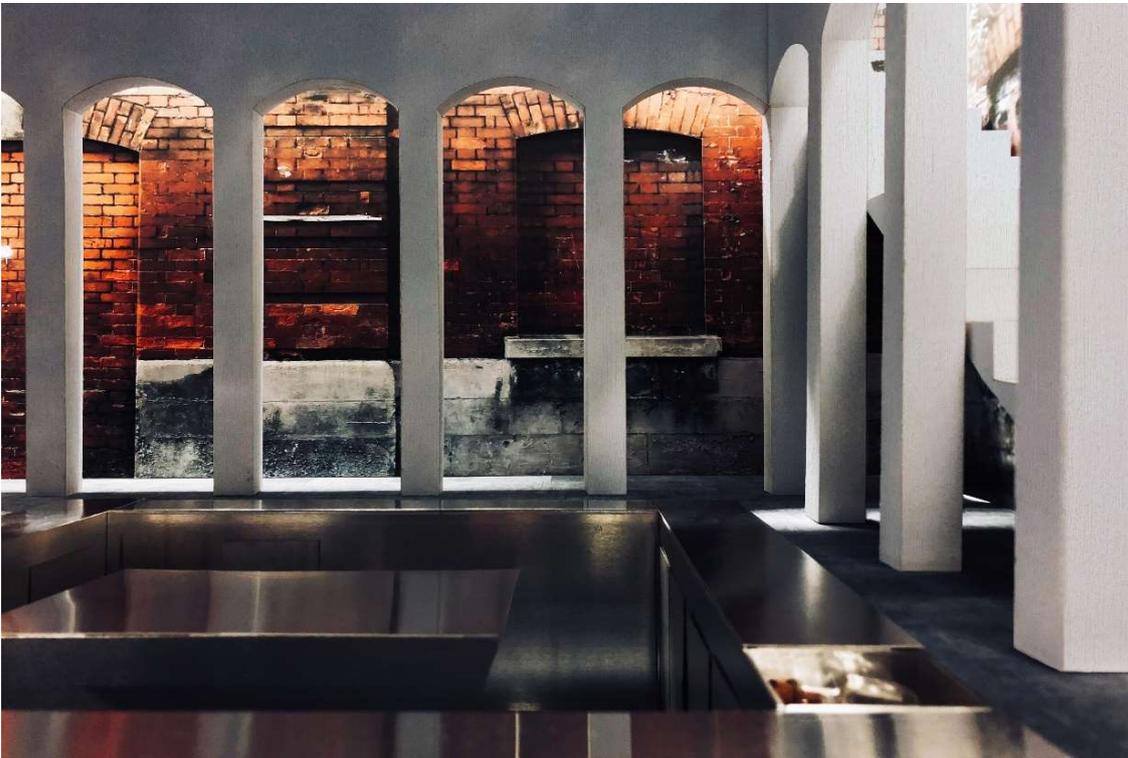


Photo of Model 1:10, Interior

The space I designed in the Carmody Groarke studio also introduce light from above, the same as the practice I did for the 1:10 model, lighting the background of space. In this scenario, the weather, season and time in a day can be felt on the ancient brick wall. Also, the double-layer structure allows circulation to happen in the in-between space, leaving the core space a pure dining place.

Chapter 3 - 2, Space in Reaction:

In view of bringing space into reality and reshaping the contemporary world with architecture, I would split my study into two parts. The first part is about gender equality, the second part is about environmental protection.

In the seminar Gender, Architecture, Intersectionality, I focused my attention on Feminism in China, which is elaborated in the final paper. In that paper, I criticized the economically and subjectively inequality between males and females in east Asia through the analysis of domestic housing.

As the vessel of all social activities and context of every individual, space is embedded in the operation of society, offering us an approach to interpret the socially, economically, and subjectively inequality between males and females. Residential architecture is the place where male and female lead an intimate communal life through the cooperation of their work and the balance of their mutual roles. Since domestic life is less exposed to the public, it reflects a more realistic condition of society.

With that deep speculation on the relationship between gender equality and housing design, I not only demonstrated the problems that existed under the seemingly optimistic appearance. But also, I captured the social influence architecture posed on society.



Aluminum-foil Paper Concept Model

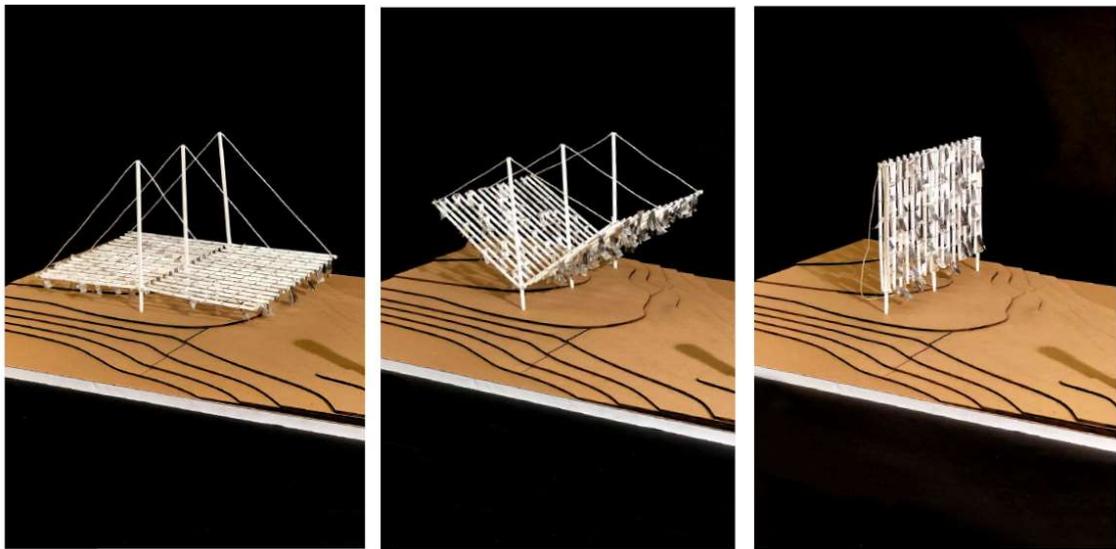


Exterior



Aluminum-foil Paper Concept Model

Besides the social influence, I also tried to engage with the physical environmental protection with the intervention of architecture, In the studio RECYCLO: Architectures of Waste, instructed by Caroline O'Donnell, I designed a pavilion with recycled material.



Pavilion with Aluminum-foil Paper

In this project, recycled aluminum-foil paper is employed to create space. It is not very acceptable when we build with such ephemeral and playful material, but it only costs a change of value, then the potential architecture has in protecting our environment will show up.