

# Portfolio of Zile WU

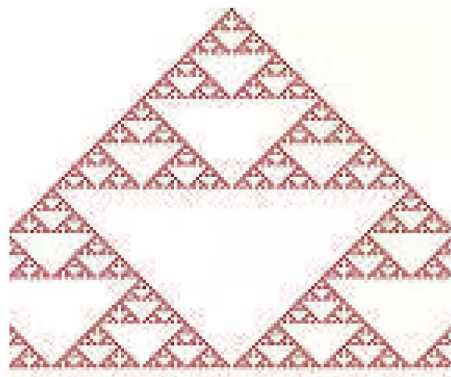
Selected works 2016-2021

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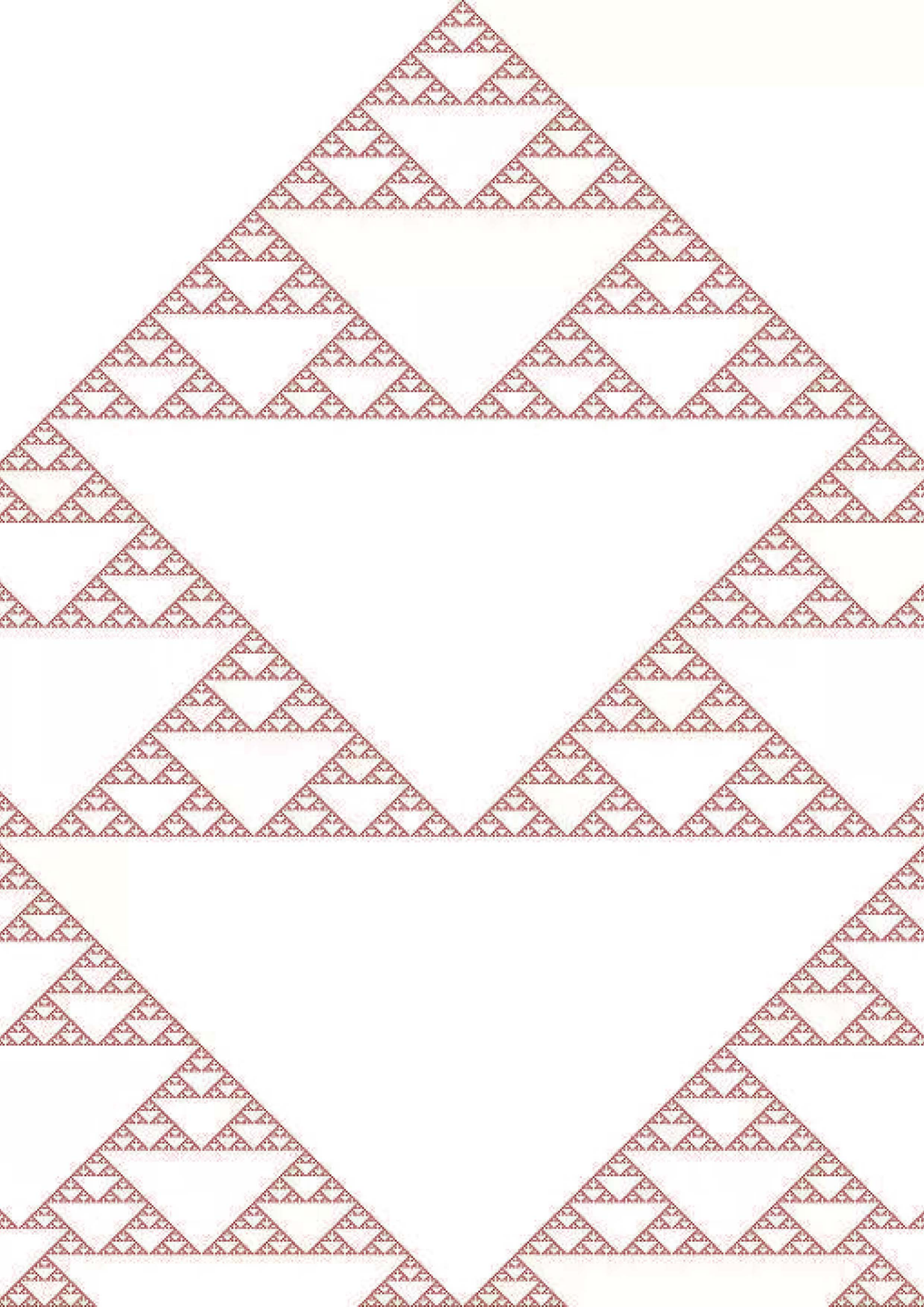
Yangpu, Shanghai, 2020.03-2020.06



**06** Documentation about me, with a band, a shanty town, and the rural context

**OTHER WORKS**

In China, 2016.09-2021.12



## 01 CA-MARKOV MODEL-BASED ANALYSIS

### Analysis of Rural Landscape Resources and Simulation of Their Evolution

**Location:** Jiangxin Island, Zhenjiang City, Jiangsu Province, China

**ProjectType:** National Key R&D Project

**Project duration:** Spetember to December,2021

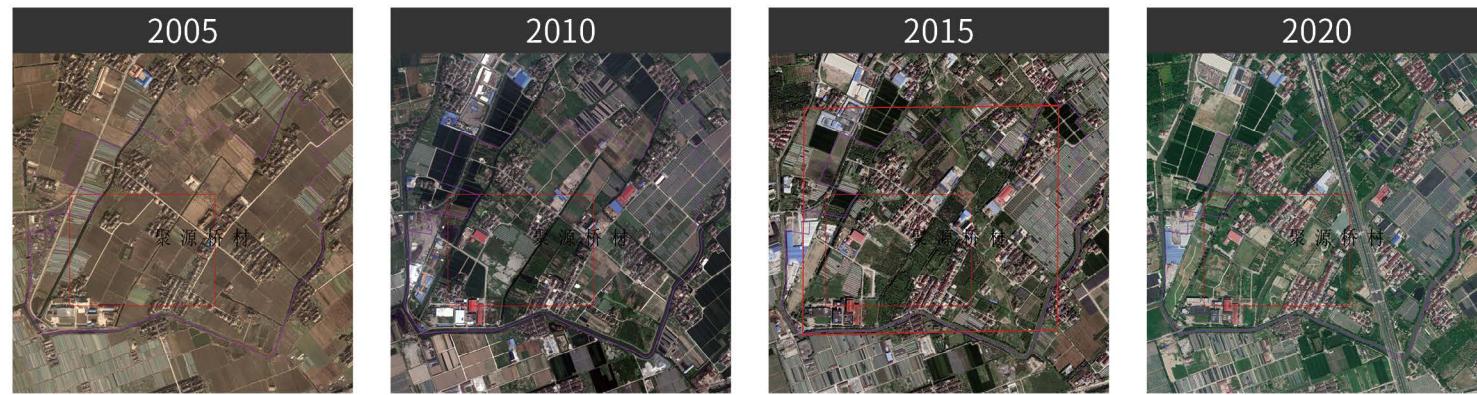
**Project Instructor:** Dong Yao, Yu Ye, Teng Zhong

**Responsibilities:** Full Process Construction, Data Processing

This study focuses on the collation of village and town plan elements and the development of unique evolutionary models for different categories of village and town elements according to their planar evolutionary patterns under the influence of policies in different stages of China's development history. Firstly, the planar evolutionary elements are rasterized and collected in real space, so that the village elements are transformed into the planar orthogonal raster model used by the classical planar metacellular automata. Next, in the customization of the element evolution model, we refine various raster cell evolution rules in three directions, such as increasing, maintaining and dying of raster cells, according to the real evolution characteristics of different types of village elements, so that the macro evolution of the planar raster group can be fitted to the actual evolution process of village elements. Furthermore, iterative simulations of village elements at different stages are combined with a comprehensive evaluation index system of villages and towns in order to evaluate the comprehensive benefits of the evolution of village planar forms under different policies.

## Research Step 1 - Experimental Village Selection

Collect satellite image data of the sample villages for four years, satisfying the following



### Criterion 1 Wide Geographic area

The villages in this experiment cover four provinces: Shandong in the north, Zhejiang, Jiangsu and Shanghai in the south, covering different geographic areas and economic and social conditions to ensure that the experimental sample is representative of China's diverse geographical environment.

Jiangsu Province  
30°45'N-35°20'N  
755 people/km2  
Per capita gdp:  
\$ 17,940

Zhejiang Province  
27°02'N-31°10'N  
561 people/km2  
Per capita gdp:  
\$ 16,008



### Criterion 2 Rich landscape

Selecting experimental villages from the national rural key tourism villages selected by the Chinese Ministry of Culture and Tourism. From an official perspective, ensure that the village landscape richness degree grows positively with the year. Provide corresponding data for the subsequent CA simulation

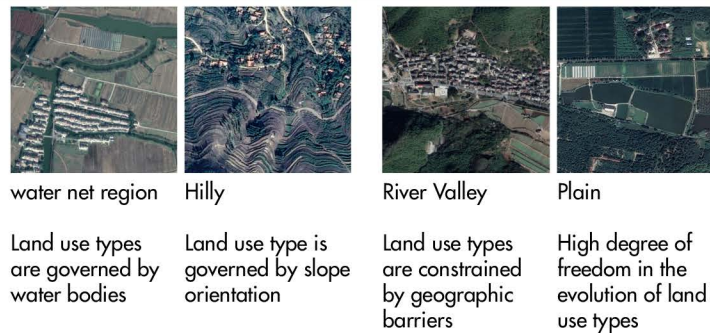
Surface land use features are identifiable.  
Annual land use shows growth  
Qianwangzhuang Village  
From 2005 to 2020  
Shandong Province



### Criterion 3 Variety of terrain

The experimental villages were selected to cover a variety of landscapes including mountains, valleys, plains, and wetlands to ensure that the slope orientation data correlated strongly with the actual village land use changes.

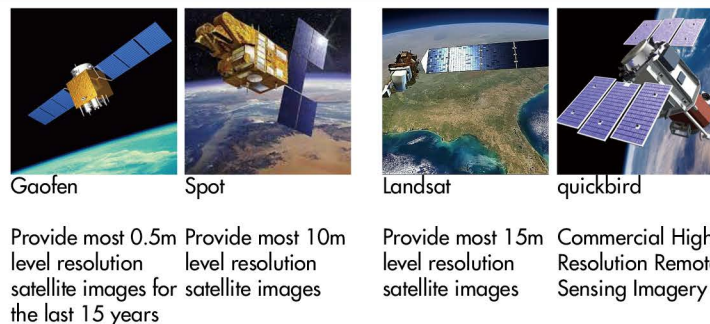
Common types of terrain between 27 and 37 degrees north latitude



### Criterion 4 Resources available

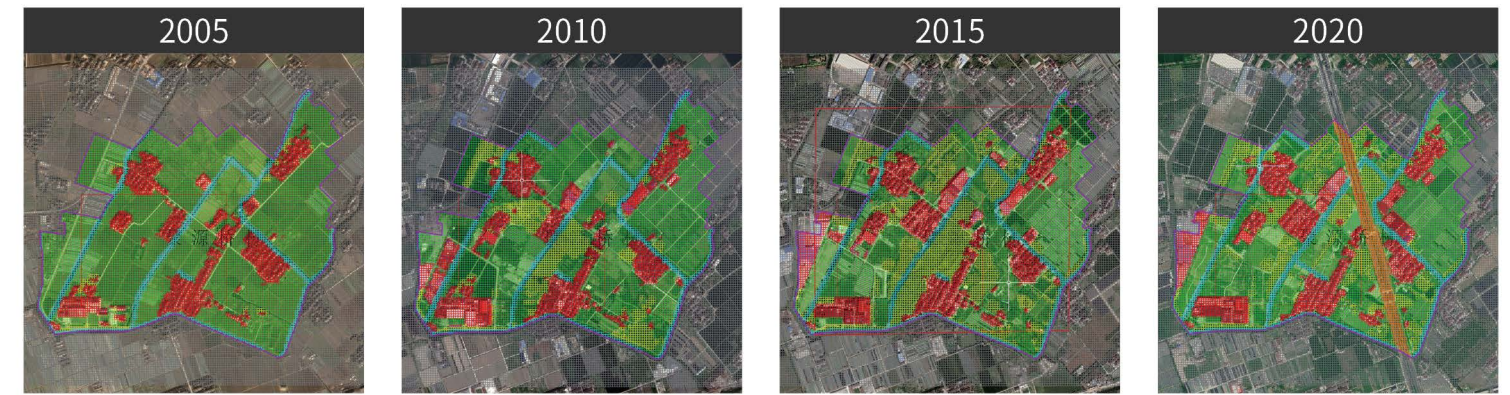
The experiment is based on the analysis of landscape resources at the mesoscopic scale, and the satellite images with the highest possible resolution can help us better identify the land use in the corresponding years, reduce the errors in the subsequent steps, and ensure the authenticity and validity of the data.

Common types of terrain between 27 and 37 degrees north latitude



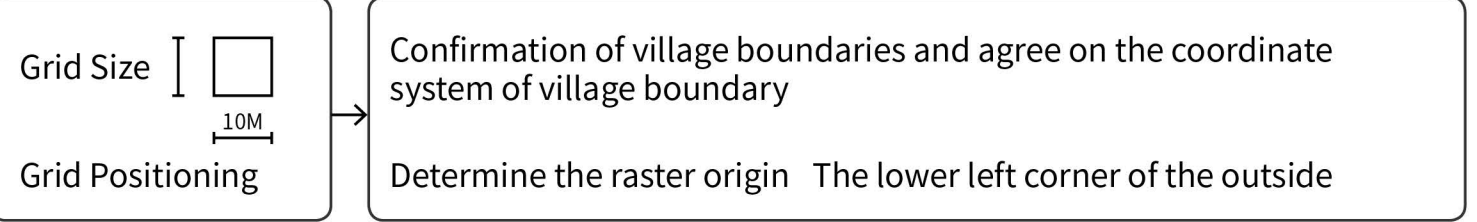
## Research Step 2 - Rasterized Satellite Images

Rasterized classification of satellite photos by land use type



### Step 1

Determine the raster network



### Step 2

Raster classification

**Grid type**

**Water**

**Building**

**Road**

**Forest**

**Farmland**

For rasters that overlay mixed attributes on the boundary (difficult to judge or cross), rasters with a river reference line crossing less than 15m wide, and raster layers assigned directly to a water body that cover more than 20% of the water body.

If the area occupied by the water body is less than 20%, determine whether the area occupied by the catchment area is more than 20%, and assign the catchment area covering more than 20% directly to the raster layer of the catchment area.

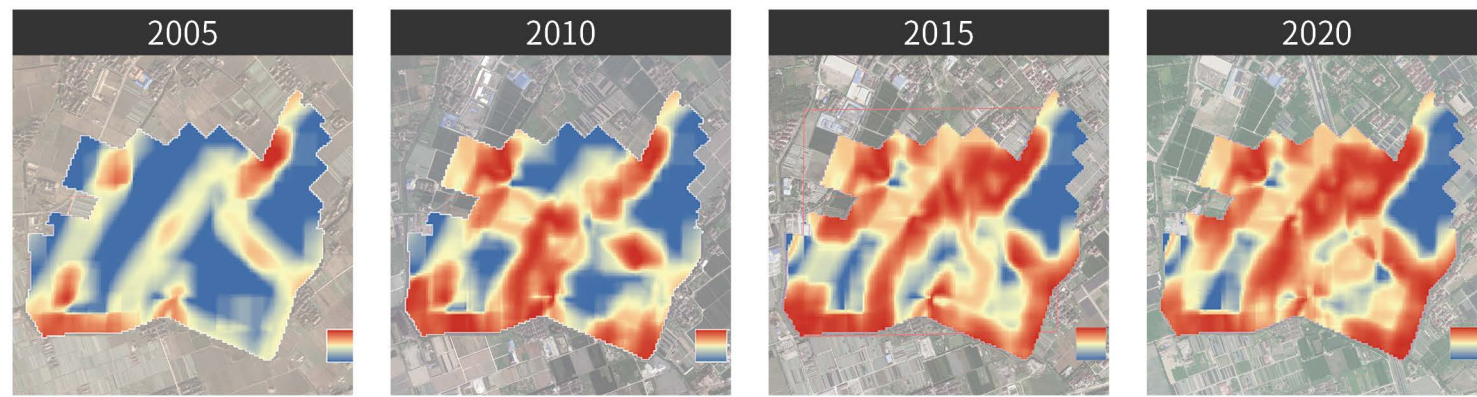
If the area occupied by the set construction area is less than 20%, determine whether the area occupied by the road is more than 20%, and assign the road covering more than 20% directly to the raster layer of the road.

If the area occupied by roads is less than 20%, determine whether the area occupied by forest trees is more than 20%, and assign the forest trees covering more than 20% directly to the raster layer of forest trees.

The rest of the grids are classified as farmland layers

### Research Spet 3 - Landscape Richness Calculation

#### Calculating landscape richness using information entropy



Quantifying landscape score magnitude: **Information Entropy.**

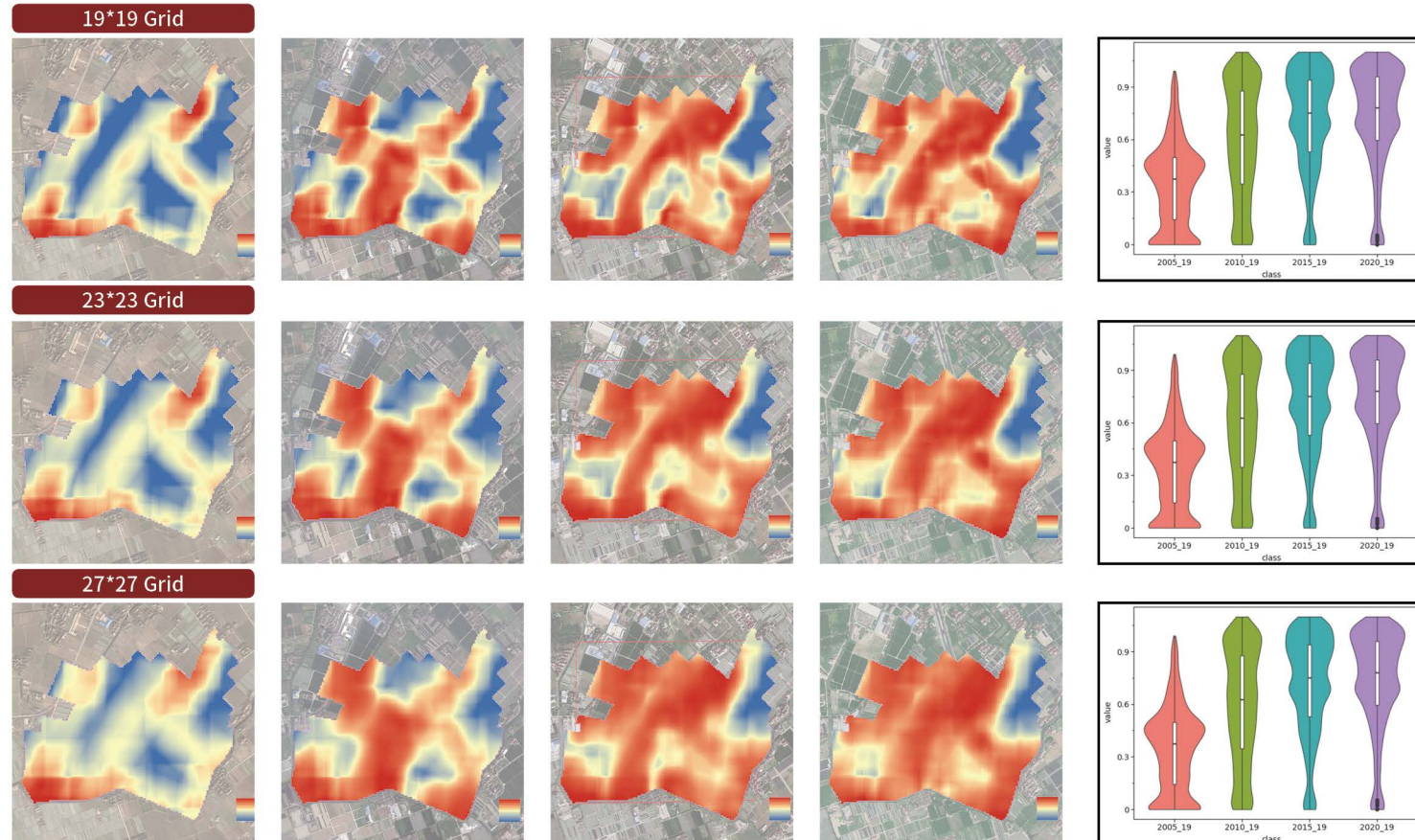
$$H = \sum_{i=0}^n P(x_i) \log P(x_i)$$

$P(x_i)$ : Frequency of occurrence of class  $i$  landscape resources  
 For example, In this 19\*19 size grid, The landscape richness is calculated as

Landscape Richness =  $\frac{134}{164} * \log \frac{134}{164} + \frac{16}{164} * \log \frac{16}{164} + \frac{14}{164} * \log \frac{14}{164}$

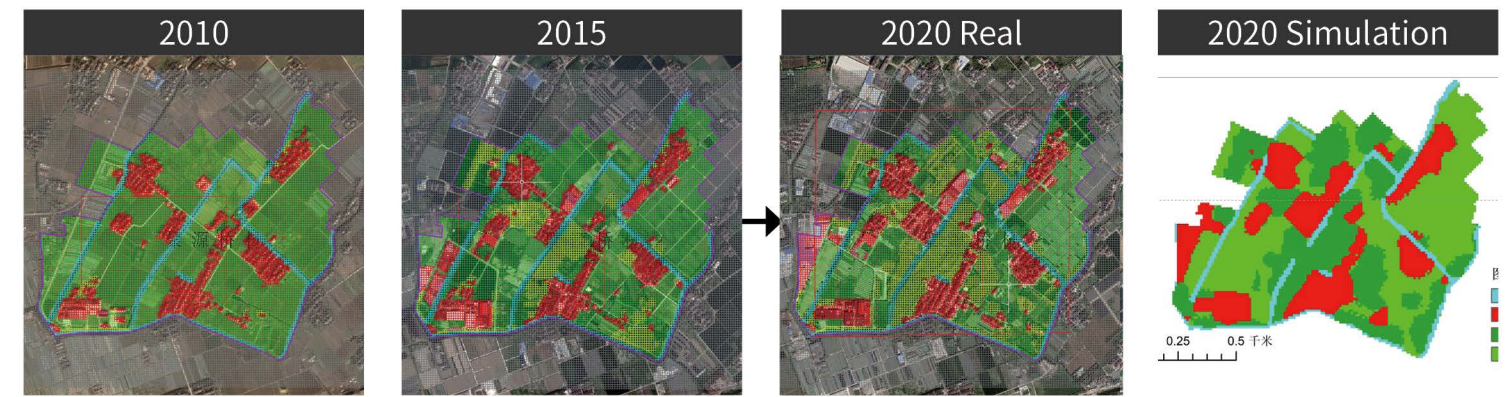
<span style="display: inline-block; width: 10px; height: 10px; background-color: #90EE90; border: 1px solid black;"></span>	Farmland Grid	134
<span style="display: inline-block; width: 10px; height: 10px; background-color: #006400; border: 1px solid black;"></span>	Forest Grid	14
<span style="display: inline-block; width: 10px; height: 10px; background-color: #4682B4; border: 1px solid black;"></span>	Water Grid	16
<span style="display: inline-block; width: 10px; height: 10px; background-color: #FFFF00; border: 1px solid black;"></span>	Center Grid	1

#### Calculation range selection



### Research Step 4 - Simulation Model Building

#### Future projection of village space using CA-Markov models



**Step 1** Build the transfer probability matrix

2010

2015

Given : Probability of changing to :

	Cl. 1	Cl. 2	Cl. 3	Cl. 4	Cl. 5
Class 1	0.8447	0.0000	0.0000	0.1553	0.0000
Class 2	0.0000	0.7564	0.0000	0.0379	0.2057
Class 3	0.2500	0.2500	0.0000	0.2500	0.2500
Class 4	0.0000	0.1117	0.0000	0.6295	0.2589
Class 5	0.0000	0.0788	0.0000	0.3092	0.6119

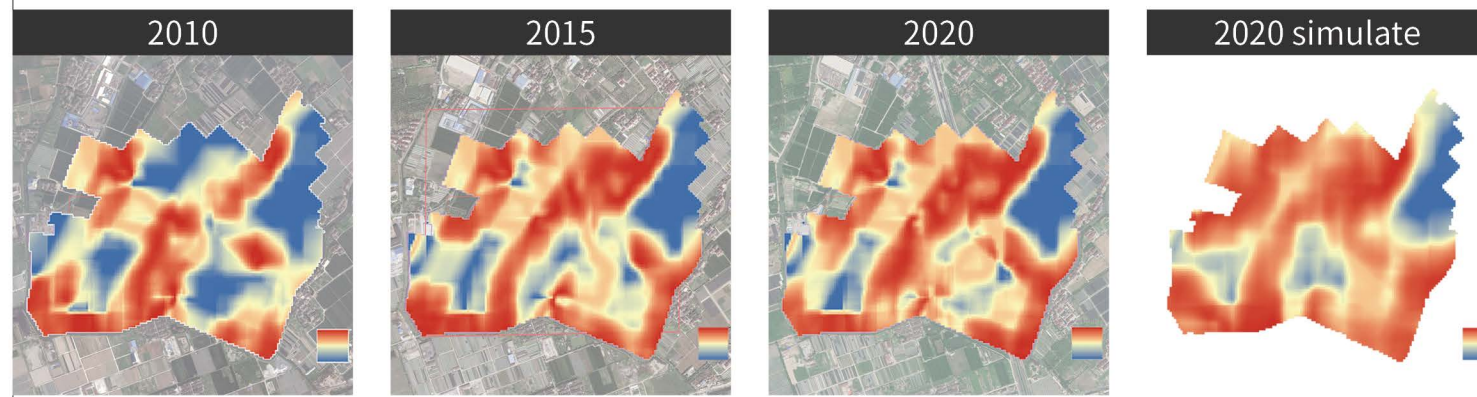
The probability that each type of metacell between two years is transformed to other types of metacells

**Step 2** Establishing suitability atlases

<p>2015</p> <p><b>Slope</b></p> <p>Based on the Digital Elevation Model (DEM), use the slope calculation tool in ArcMap 10.5 software to calculate the slope</p> <p>Calculation principle</p> <table border="1" style="font-size: 8px;"> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>3</td><td>3</td><td>2</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>3</td><td>2</td><td>2</td></tr> <tr><td>1</td><td>2</td><td>2</td><td>2</td><td>2</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>2</td><td>2</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> </table>	1	1	1	1	1	1	3	3	2	1	1	1	3	2	2	1	2	2	2	2	1	1	1	2	2	1	1	1	1	1	<p>2015</p> <p><b>Slope direction</b></p> <p>Based on the digital elevation model (DEM), use the slope direction calculation tool in ArcMap10.5 software to calculate the slope direction</p> <p>Calculation principle</p> <table border="1" style="font-size: 8px;"> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>3</td><td>3</td><td>2</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>3</td><td>2</td><td>2</td></tr> <tr><td>1</td><td>2</td><td>2</td><td>2</td><td>2</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>2</td><td>2</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> </table>	1	1	1	1	1	1	3	3	2	1	1	1	3	2	2	1	2	2	2	2	1	1	1	2	2	1	1	1	1	1	<p>2015</p> <p><b>Distance factor(water)</b></p> <p>Based on the land classification data, the set building area data are extracted, buffers are generated using the Distance tool.</p> <p>Calculation principle</p> <p>Water-based strip space Same for the distance factor for road.</p>	<p>2015</p> <p><b>Distance factor(building)</b></p> <p>Based on the land classification data, the set building area data are extracted, buffers are generated using the Distance tool.</p> <p>Calculation principle</p> <p>Point-circle space based on the set construction area</p>
1	1	1	1	1																																																											
1	3	3	2	1																																																											
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# Research Spet 4 - Scientific Research Platform Building

## Future projection of village space using CA-Markov models



### Step 3 CA-Markov simulate



A Markov chain or Markov process is a stochastic model describing a sequence of possible events in which the probability of each event depends only on the state attained in the previous event.

$$Pr (X_{n+1}=X_1, X_2=X_2, \dots, X_n=X_n) = Pr (X_{n+1} | X_n=X_n)$$

Use the IDRISI to finish the following steps.

**Build the transfer probability matrix**

Markov - Markovian transition estimator

First (base) land cover image: JYQC2005

Second (base) land cover image: JYQC2010

Prs for output conditional probability images: prw0510

Number of line periods between the first and second land cover images: 5

Number of line periods to project forward from the second image: 5

Background cell option: Average 3.0

Assign equal probabilities

Assign relative frequency

Proportional error: 0.15

**Road**

Fuzzy - Fuzzy Set membership function

Membership Function Type: Sigmoidal

Input file: dis\_road2005

Output file: fuzzy\_road2005

Output data format: Byte (0 - 255 range)

Membership Function Shape: Monotonically increasing

Control point c: 20

Control point d: 150

**Water**

Fuzzy - Fuzzy Set membership function

Membership Function Type: Sigmoidal

Input file: dis\_water2005

Output file: fuzzy\_water2005

Output data format: Byte (0 - 255 range)

Membership Function Shape: Monotonically increasing

Control point c: 10

Control point d: 300

**Building**

Fuzzy - Fuzzy Set membership function

Membership Function Type: Sigmoidal

Input file: dis\_building2005

Output file: fuzzy\_building2005

Output data format: Byte (0 - 255 range)

Membership Function Shape: Monotonically increasing

Control point c: 10

Control point d: 180

**Weights**

MCE (Multi-criteria Evaluation)

Factor: Weighted

Factor	Weight	Number of factors
dis_road2005	0.2	1
dis_water2005	0.2	1
dis_building2005	0.2	1
prw0510	0.4	1

**CA-Markov simulation**

CA-MARKOV - Cellular Automata/Markov Change Prediction

Base land cover image: JYQC2010

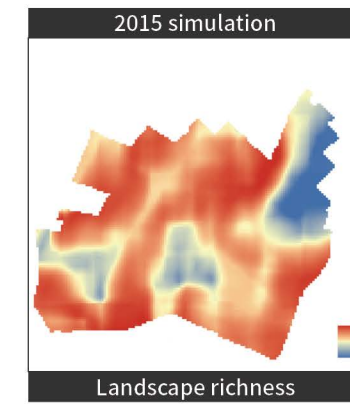
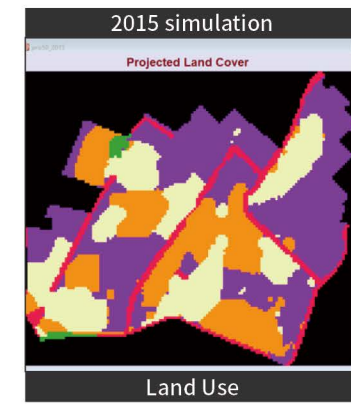
Markov transition areas file: prw0510(transition\_areas)

Transition suitability image collection: suit2005

Output land cover projection: prw05\_2015

Number of Cellular Automata iterations: 50

Cellular Automata filter type: Standard 5 x 5 connectivity filter



Using the Multi-criteria Evaluation (MCE) tool, we set weights for each factor to create a transfer suitability map for each type of site.

Using the CA-Markov tool, the simulated 2015 land use map was obtained using the 2010 land use data as the base, the area transfer matrix and the suitability atlas as the transformation rules, and the number of iterations was set to 50.

### Step 4 Keppa Test

**CROSSTAB - cross-tabulation**

Type of analysis: Hard classification

First image (column): prw05\_2020

Second image (row): JYQC2020

Third image (plane):

Use mask image

Output type: Full cross-tabulation table

**Module Results**

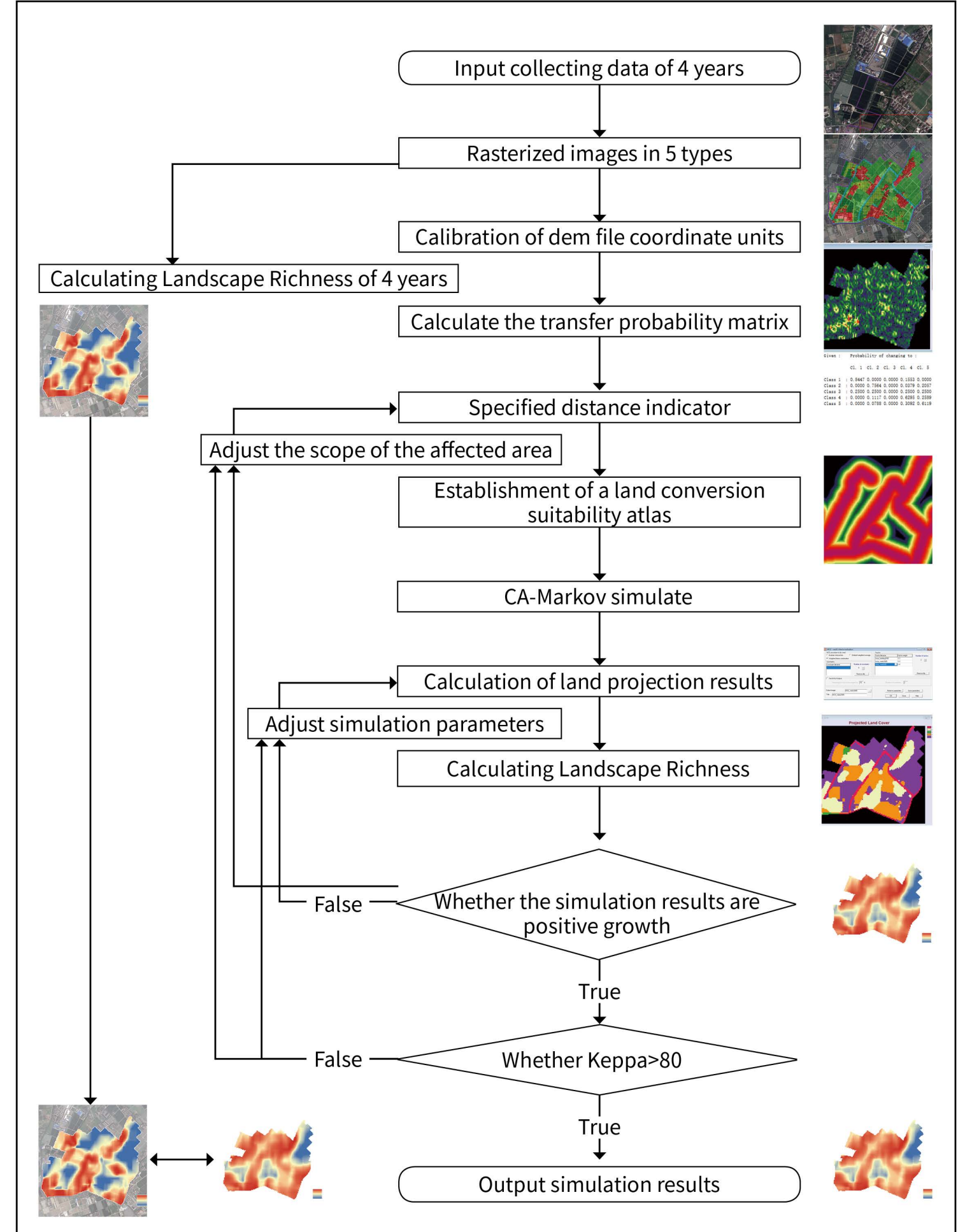
**Image Similarity/Association**

(Created: 2021/12/3 22:42:29)

Chi-square	43844.0781
df	20
P-level	0.0000
Cramer's V	0.8260
Kappa	0.7568

Kappa coefficients are a measure of classification accuracy and are widely used to evaluate the simulation results of CA-Markov models. The Kappa coefficient is calculated based on the confusion matrix and takes values between -1 and 1, usually greater than 0. It can be divided into five groups to indicate different levels of agreement: 0.0~0.20 very low agreement, 0.21~0.40 average agreement, 0.41~0.60 moderate agreement, 0.61~0.80 high agreement, and 0.81~1 almost perfect agreement.

# Summary: The Whole Process of Calculating and Predicting the Richness of Village Landscapes





## 02 WOODEN PAVILION

### Construction of Structures in the Rural Context

**Location:** Jiangxin Island, Zhenjiang City, Jiangsu Province, China

**Project duration:** October to November, 2021

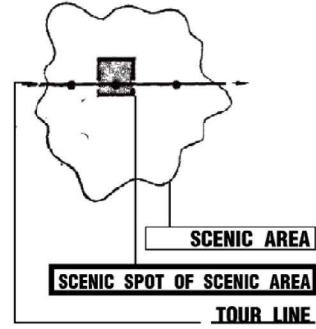
**Project Instructor:** Lifeng Lin

**Design and Analysis Team:** Zile Wu, Tianxu Wang, Qingyuan Wei

**Onsite Construction Team:** Zile Wu, Tianxu Wang, Qingyuan Wei, Sijie Wang, Leiji Jian, Ruoxin Xu, Xinwen Hu, Xintong Ye, Zhanglin Yan, Zhihua, Xi, Huanyang Li

The site is located on a small island in the center of the Yangtze River in Zhenjiang City, Jiangsu Province, where the typical Chinese countryside is reflected in a number of ways, such as residential houses along the water system, concentrated farmland and fruit trees, and roads. On this site, we summarized the whole touring route from the city to the countryside based on Mr. Feng Jizhong's theory of landscape discovery, and summarized and summarized the behavior of the corresponding space based on Lacan's spatial behavior, trying to explore the relationship between human space and nature in this 3.5m\*6m space.

Research - Landscape Discovery & Proxemics

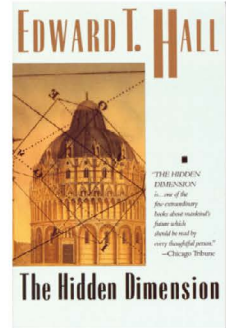
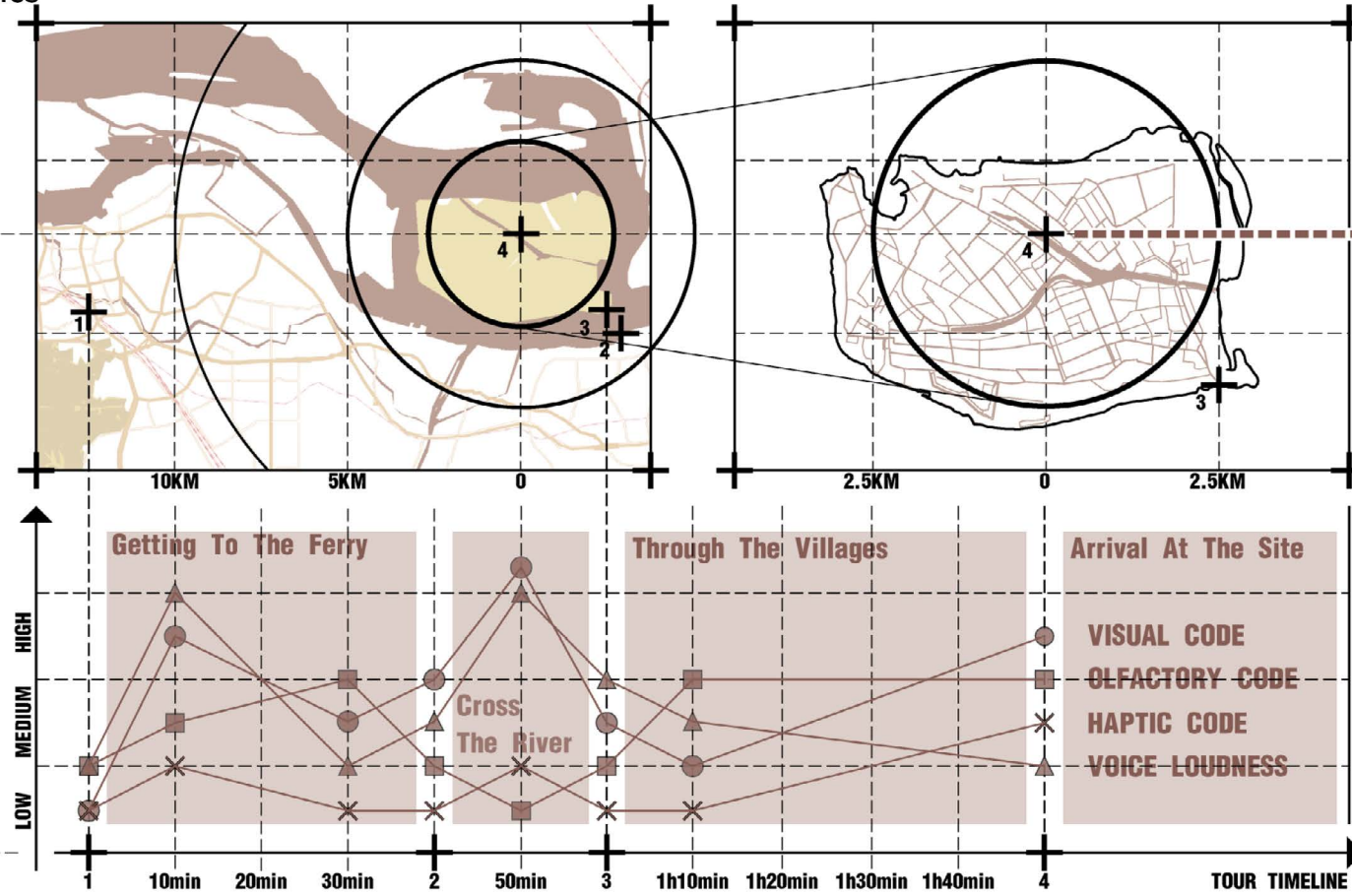


Ji Zhong Feng

May, 16 1915-July, 20 2009

was a famous Chinese architect, architect and architectural educator, the founder of modern Chinese architecture. In the late 1970s, he proposed a theory of landscape development, in which he rediscovered the rhythms of Liu Zongyuan's openness, as well as a series of theories on the visual conductors of scenery outside, within and within the scenery, providing a new perspective for understanding and inheriting classical gardens and traditional culture.

LANDSCAPE DISCOVERY

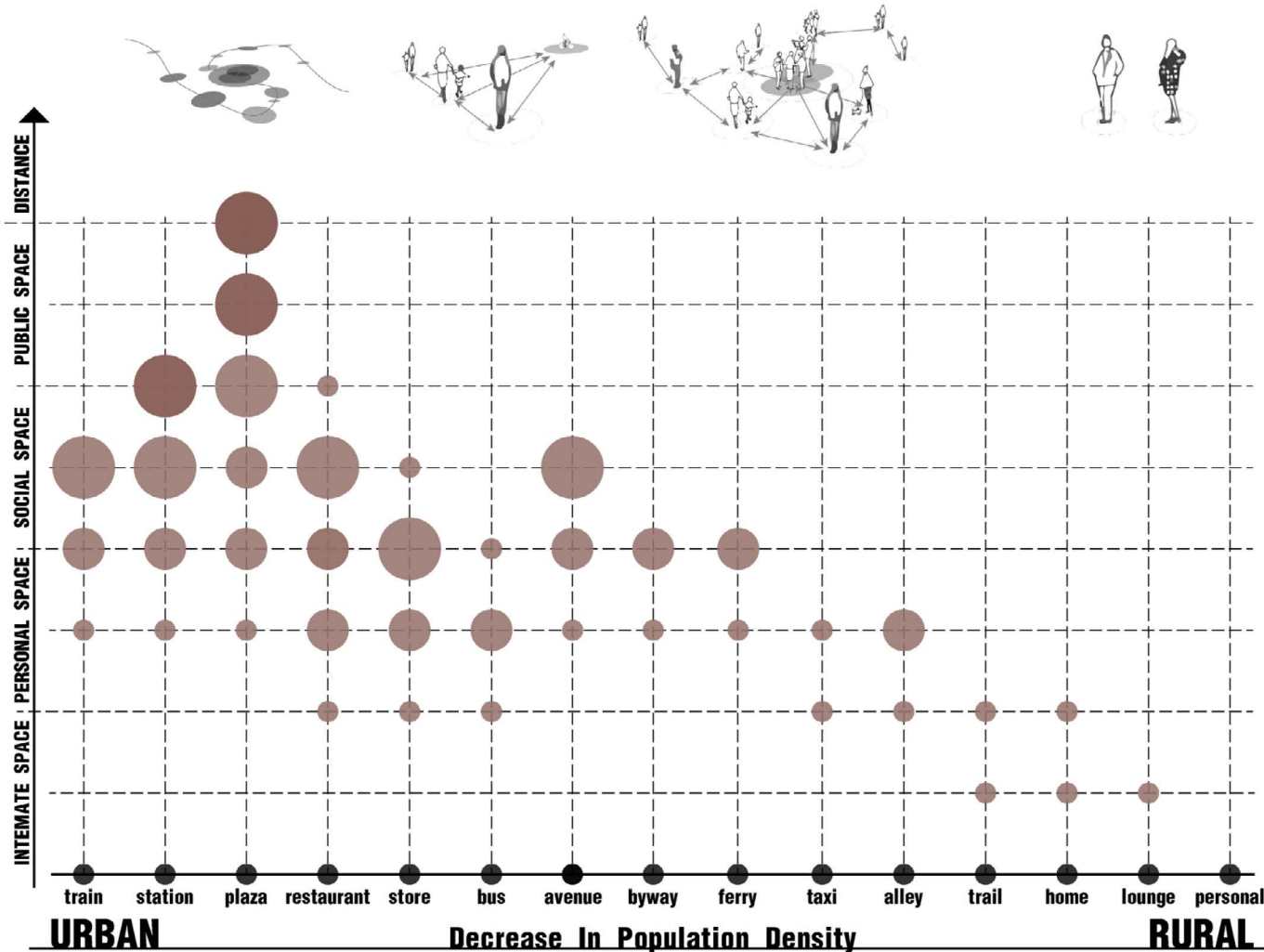
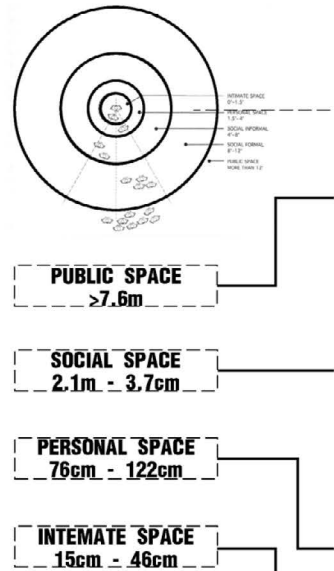


EDWARD T HALL

May, 16 1914-July, 20 2009

was an American anthropologist and cross-cultural researcher. He is remembered for developing the concept of proxemics and exploring cultural and social cohesion, and describing how people behave and react in different types of culturally defined personal space.

PROXEMAICS



Site Analysis

- VILLAGE 村
- Alley 巷
- Path 径
- Shade 荫
- Shore 岸
- River 江



# Design - Section Design - Cross-section of the Touring Space

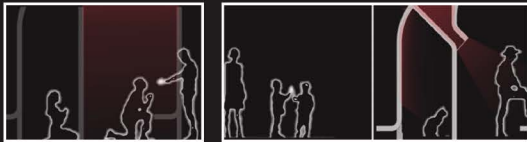


## VILLAGE × PATH

Selected Tour Path from the Space

Public Space & Social Space

The village serves as a typical environmental substrate and the tour path is controlled by the path. The inside and outside of the structure represent the village and the path, respectively, and exist as a public and social space.



## ALLEY × SHADE

Behavioral Tendencies Shaped by Light and Shadow

Personal Space & Intimate Space

The profile of the structure is defined by light and shadow, recreating the space of alleyways and shade in the tour path, providing a place for personal and intimate spatial behavior. Showing the possibility of interaction between light and shadow, space and people

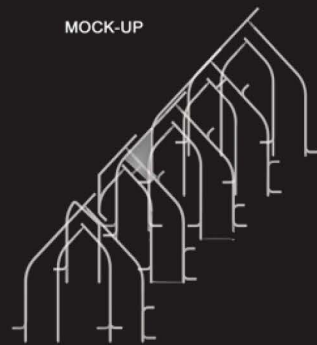


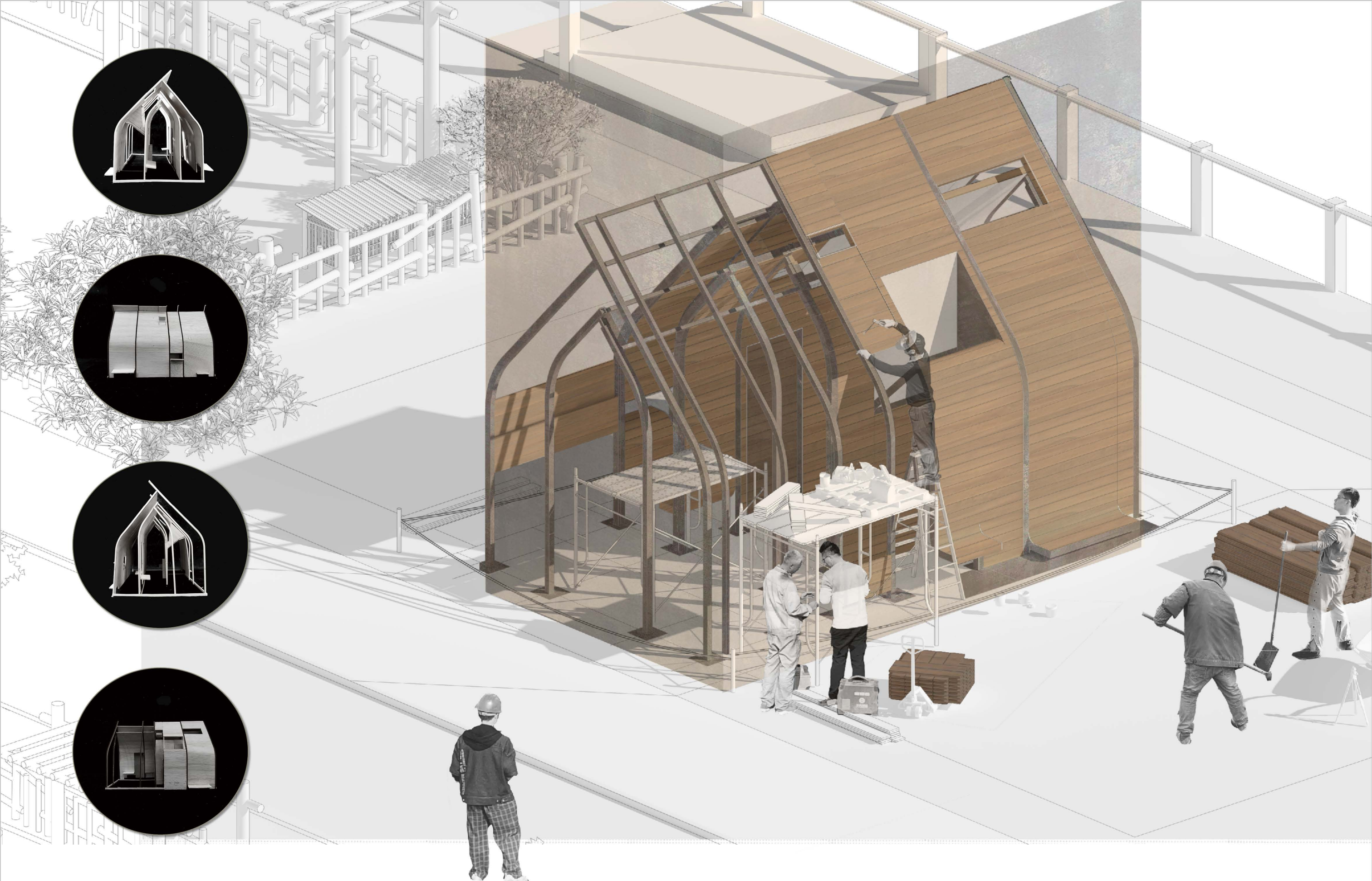
## SHORE × RIVER

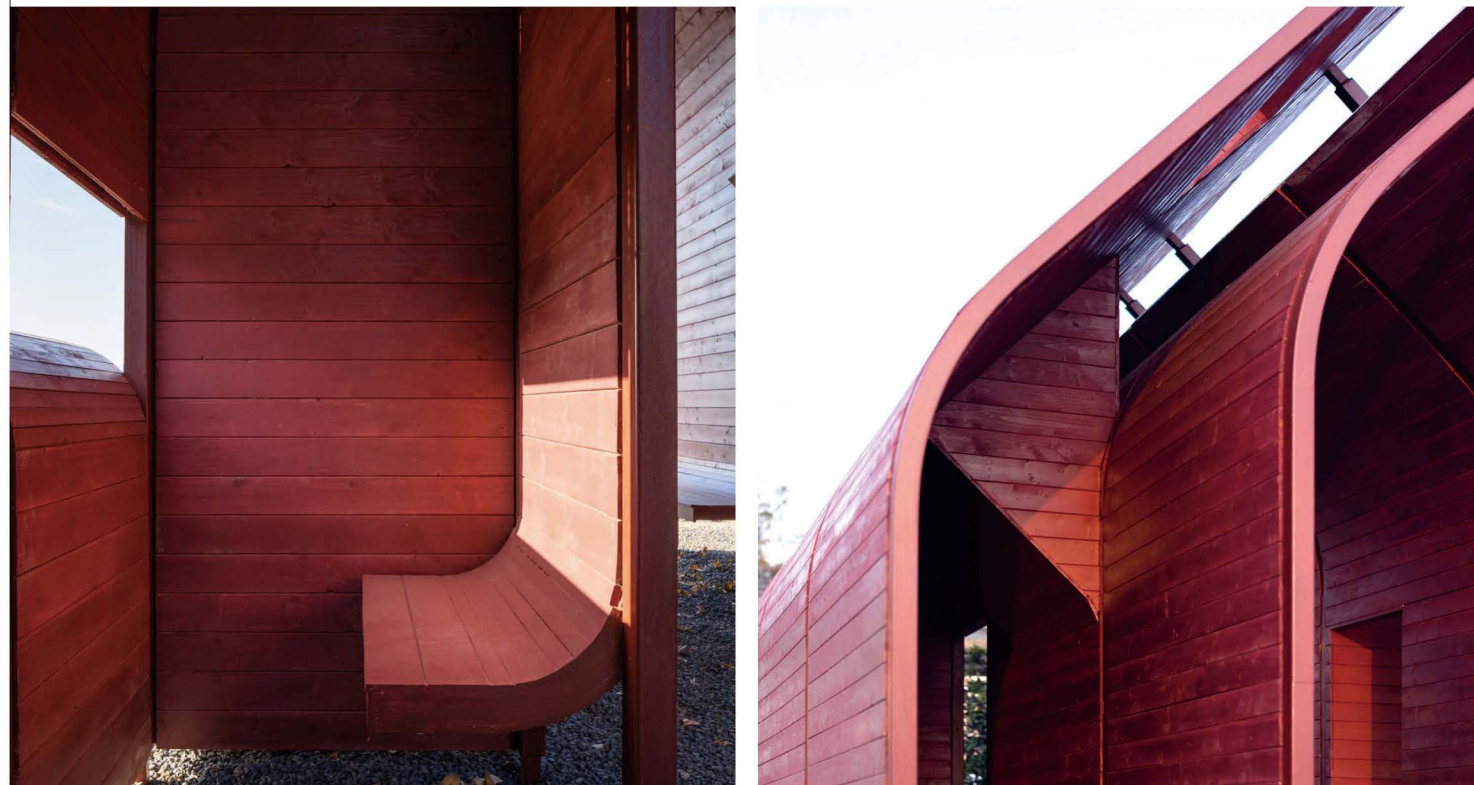
Spatial Nodes and View Control

Social Space & Personal Space

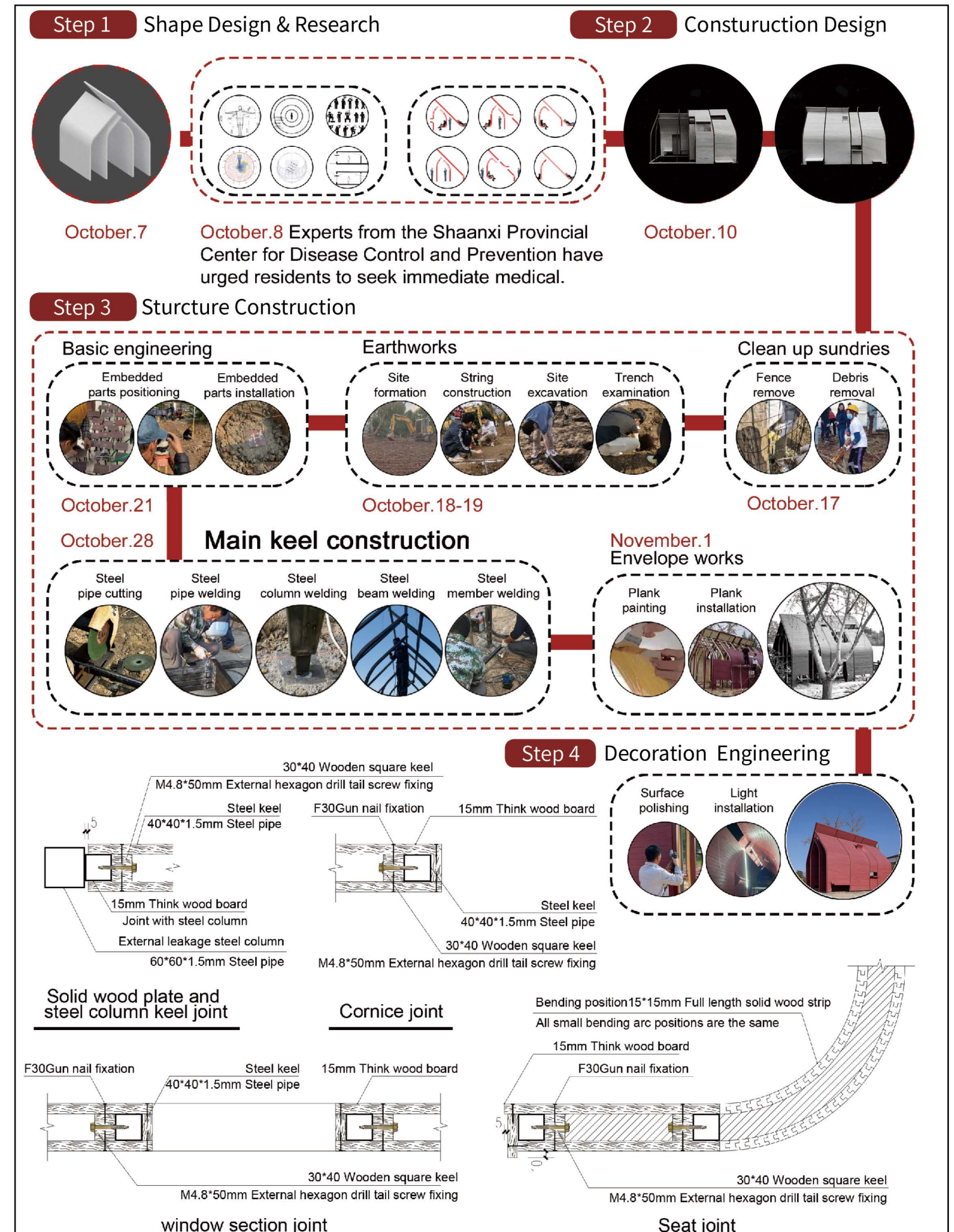
The building serves as a structure along the riverbank to achieve control. The openings of different heights and orientations in the profile are used to control the view and provide the best viewing experience.







Design - Process Design - Design Timeline & Construction Timeline





## 03 BROWNFIELD REVIVAL PLAN

### Integrated Residential Development-oriented Industrial Site Revival

Location: 523 Factory, Ganjingzi District, Dalian, China

Project duration: March to June, 2021

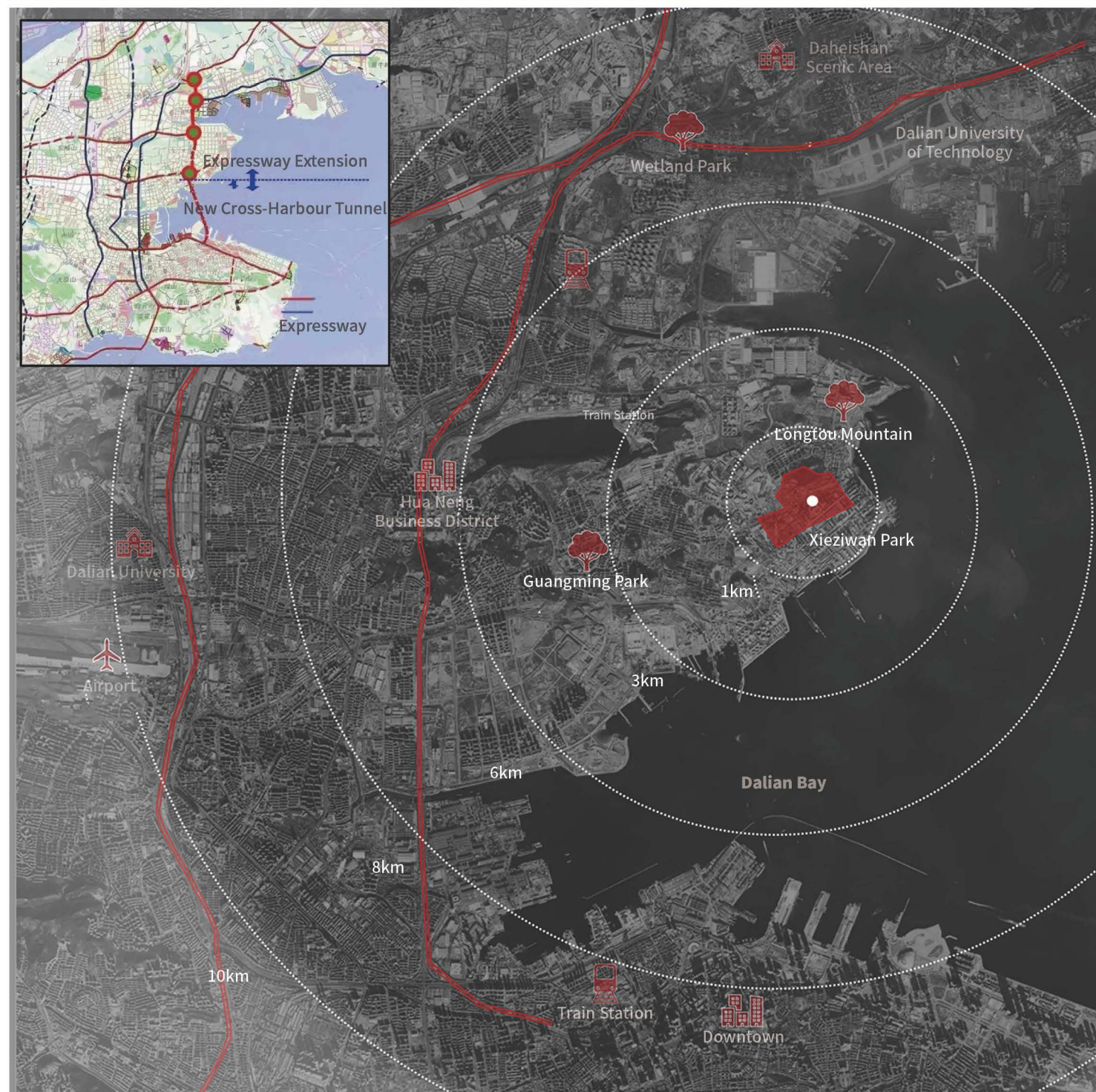
Project Instructor: Dong Yao, Lei, Sima

Individual Project

With the increasing aging rate in China and the shift of housing construction from the era of increment to the era of stock, the issue of ageing has gradually become a hot topic in the renovation of existing settlements. This paper briefly summarizes the research direction and specific problems faced by the academic community on the aging problem after 2000 through the study of the upper policy and the comprehensive analysis of literature based on citespace. In addition, we conducted a site analysis and residents' research in the five twenty-three factory where the graduation design is located, and summarized a set of building renewal and community rolling design development model based on the premise of rolling development that can be adapted to the old design and partially extended to other similar old settlements. Finally, we will focus on the design of the complex functional ageing residential area of the specific site, integrate the residents' wishes and development prospects, and complete the overall design of the site based on the ageing original residence and the revitalization of the 523 Factory.

# Research - Site & People - Problem Decomposition

## Site Environment Analysis



This is a family neighborhood of a state-run military factory, which used to be the leading development in Dalian fifty years ago. However, as the state-run factories shut down, all that remains within the base now is a severely aging population and housing.

Dark Grey: Build before 1920s  
 Grey: Build in 1920s  
 Orange: Build in 1980s  
 Lemon Yellow: Build in 1980s  
 Yellow: Build in 1980s

Orange: Build in 1980s  
 Highest retention  
 Best condition  
 The interior layout is more reasonable

Yellow Road:  
 Main market streets  
 the center of community life.

## Field Interviews and Research

Grandma Wang  
Retired senior worker  
Lived in this community for a long time

Grandpa Shi  
Out-of-towners tenant  
Used to be a teacher

Children grow up and leave the old community  
The Community is lagging behind

Moving with children after retirement  
Help care for grandchildren

Now living in a room with grandchildren

Rescue stray animals  
Staying at the community after retirement

Bad legs, struggling to go up and down stairs  
Hope to install elevator at home

Grandma Wang  
Age:68  
Retired employee  
Hope to install elevator at home

Insufficient storage space  
No bathing  
Old kitchen  
Wet and slippery floors

Poor Lighting Conditions  
Cluttered Items  
Risk of Falling  
Living with Grandchildren

Grandpa Shi  
Age:75  
Tenants  
Hope to redecorate

## Community Renewal Planning

Lack of event space

The community is seriously aging, and the infrastructure is seriously outdated due to the age of the buildings. Lack of fresh blood in the community

Large site height difference

The site has a large height difference, and the building is not equipped with elevators, making the safety of the elderly a lot of hidden dangers whether going up and down the stairs or traveling within the community

Insufficient storage space

Limited space inside the house, old decoration pattern, difficult to adapt to modern life, and aging infrastructure such as plumbing, which is very likely to cause residential safety problems

Shabby bathrooms

The bathroom is small, the pipes are aging, there is no shower function, and there is a height difference between the inside and outside of the bathroom, which is problematic in terms of convenience and safety.

**City Level Issues**

The community is on the fringe of the development of Dalian city. The remains of old industrial sites have created a series of problems for the development of the community. The shutdown and reorganization of factories has directly led to an exodus of population. In this context, the community development lacks the necessary population support, so the development potential lags behind other areas, forming a vicious circle of community development.

**Community Level Issues**

The current community lacks the necessary commercial facilities to support it. The community's internal facilities are only adequate to meet the needs of the food supply. Community planning is decoupled from natural resources and development opportunities. Targeted analysis of development options based on the current state of each parcel is needed.

**Residential Level Issues**

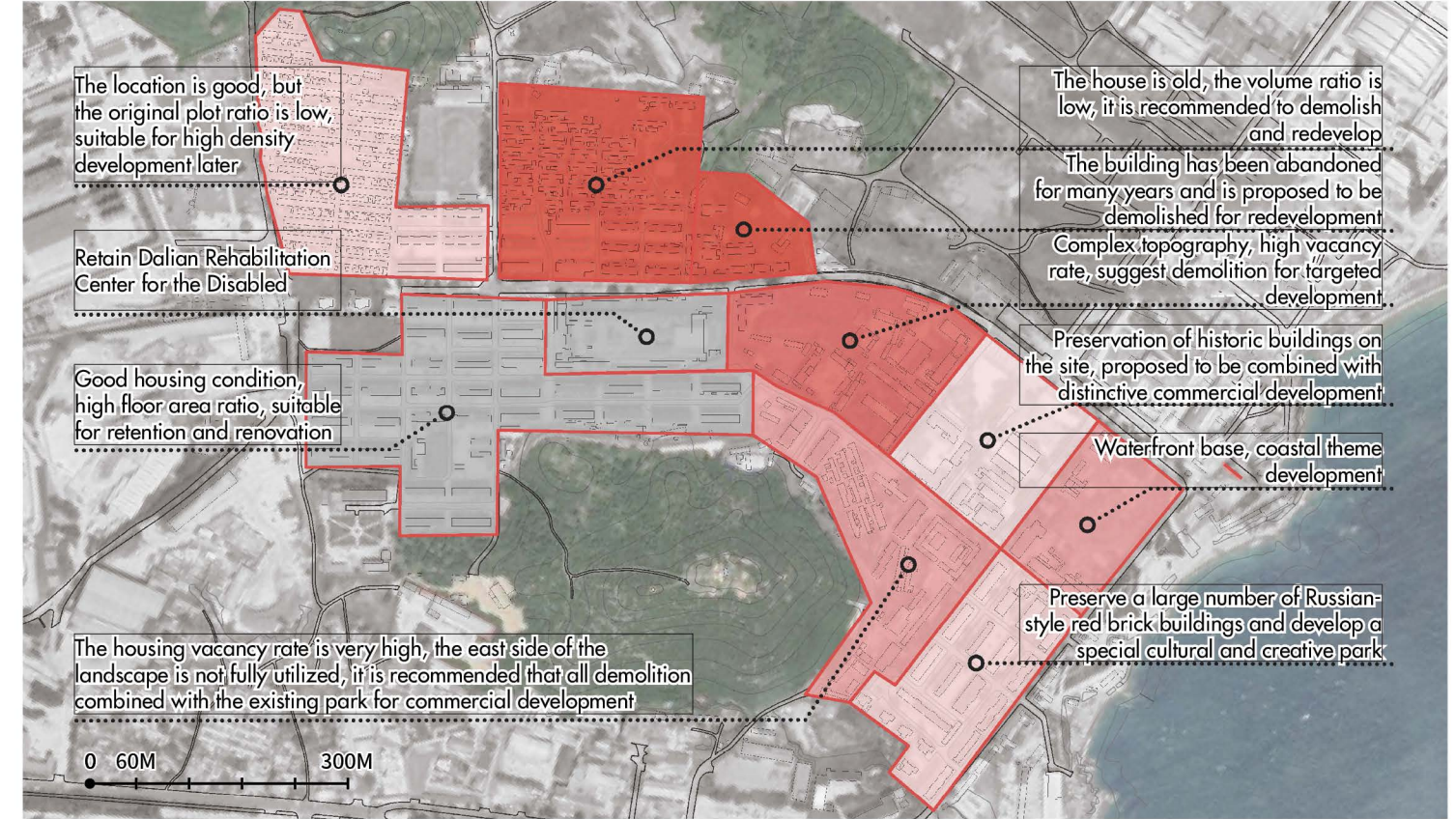
Most of the homes in the community were built before the 1980s and are mainly multi-story. In the context of an aging population, the stairwells, kitchens and bathrooms of the existing homes are not adequate for basic living needs. There is a need for an assessment and renewal program for different types of housing.

1. Community Renewal Planning

2. Age-appropriate renovation of old buildings

3. Residential Renewal Development

# PART ONE: Design - Community Renewal Program - Phase Development Plan



## Pre-Development Assessment

	Building Area: 19335m <sup>2</sup> Land Area: 45910m <sup>2</sup> Plot Ratio: 0.42 Households: 155 Buildings: 58 Aspect: Sunny slope		Building Area: 13397m <sup>2</sup> Land Area: 13189m <sup>2</sup> Plot Ratio: 1.01 Households: 261 Buildings: 6 Aspect: Sunny slope		Building Area: 7039m <sup>2</sup> Land Area: 31641m <sup>2</sup> Plot Ratio: 0.22 Households: 295 Buildings: / Aspect: Sunny slope
	Building Area: 6627m <sup>2</sup> Land Area: 10017m <sup>2</sup> Plot Ratio: 0.66 Households: 136 Buildings: 6 Aspect: Sunny slope		Building Area: 9460m <sup>2</sup> Land Area: 7885m <sup>2</sup> Plot Ratio: 1.20 Households: 336 Buildings: 6 Aspect: Sunny slope		Building Area: 26600m <sup>2</sup> Land Area: 13555m <sup>2</sup> Plot Ratio: 1.96 Households: 504 Buildings: 8 Aspect: Sunny slope
	Building Area: 15627m <sup>2</sup> Land Area: 17578m <sup>2</sup> Plot Ratio: 0.88 Households: 459 Buildings: 10 Aspect: Shady slope		Building Area: 12404m <sup>2</sup> Land Area: 5654m <sup>2</sup> Plot Ratio: 2.2 Households: 234 Buildings: 4 Aspect: Shady slope		Building Area: 5400m <sup>2</sup> Land Area: 5762m <sup>2</sup> Plot Ratio: 0.94 Households: 72 Buildings: 3 Aspect: Shady slope
	Building Area: 18606m <sup>2</sup> Land Area: 41000m <sup>2</sup> Plot Ratio: 0.45 Households: 120 Buildings: 2 Aspect: Shady slope		Building Area: 30720m <sup>2</sup> Land Area: 25489m <sup>2</sup> Plot Ratio: 1.21 Households: 576 Buildings: 10 Aspect: Shady slope		Building Area: 26379m <sup>2</sup> Land Area: 21785m <sup>2</sup> Plot Ratio: 1.21 Households: 276 Buildings: 10 Aspect: Sunny slope

Type 1. Building should be demolished - Plot 1, 3, 4, 5, 11

Type 2. Buildings suitable for age-appropriate retrofitting - Plot 2, 6, 7, 8, 10, 11

Type 3. Architecture suitable for cultural and creative development - Plot 9, 12

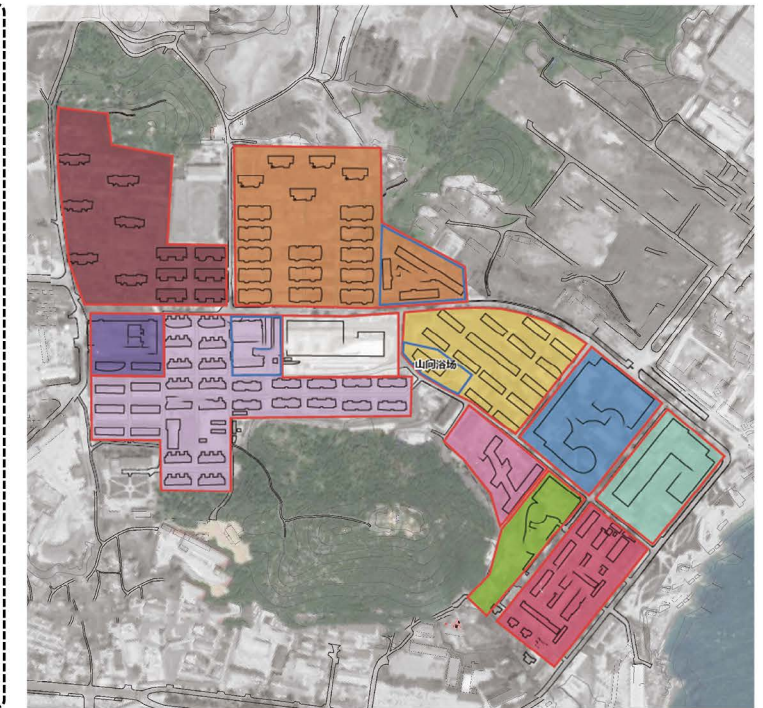
- 1. The buildings are mostly located on the sunny slope, with high land development value.
- 2. The original buildings have high density, low volume ratio and low land use efficiency.
- 3. The indoor functional configuration of the original building cannot meet the living needs.

- 1. The buildings are mostly located on the shady slope, with limited redevelopment value.
- 2. The building was built in the 1980s, multi-storey building, land use efficiency is still possible.
- 3. Large number of household types, with the possibility of mass industrialization.

- 1. The building is coastal and has the best landscape resources in the development area.
- 2. The building is a Soviet-style red brick building with a characteristic exterior and the possibility of adapting and renewing the interior space.

## Subplot Development Objectives

<b>1. Community Renovation</b> Plot 6-10 Served Area: 66087m <sup>2</sup> Households served: 1845 Age-appropriate renovation of old buildings	<b>5. Settlement Development 3</b> Plot 1,2 Land Area: 32732m <sup>2</sup> Proposed new area: 88650-98196m <sup>2</sup> Target plot ratio: 1.5-1.66
<b>2. Settlement Development 1</b> Plot 11 Land Area: 41000m <sup>2</sup> Proposed new area: 67986-82000m <sup>2</sup> Target plot ratio: 1.65-2	<b>6. Commercial Development</b> Land Area: 12500m <sup>2</sup> Establishing community business
<b>3. Settlement Development 2</b> Plot 3,4,5 Land Area: 49543m <sup>2</sup> Proposed new area: 69378-99086m <sup>2</sup> Target plot ratio: 1.5-2	<b>7. Integrated Market</b> Land Area: 13000m <sup>2</sup> Utilization of fishery resources
<b>4. Cultural District Renovation</b> Plot 15 Land Area: 26379m <sup>2</sup> Building area: 21785m <sup>2</sup> Target plot ratio: 0.82	<b>8. Central Park Construction</b> Plot 8 Land Area: 25350m <sup>2</sup> Provide public space
	<b>9. Core Commercial Development</b> Land Area: 20800m <sup>2</sup> Take advantage of the metro
	<b>10. Hotel Development</b> Land Area: 11900m <sup>2</sup> Integration of tourism resources



## 1. Stages of Community Renewal Planning

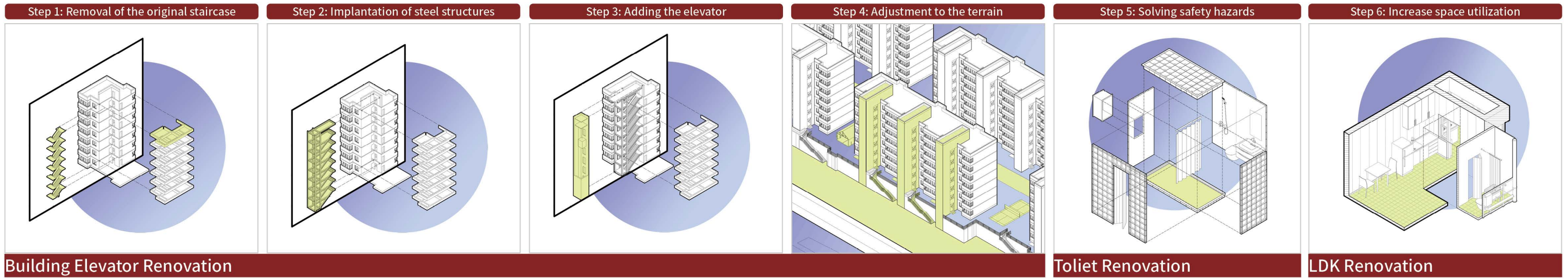
## Development of Vision collage



PART TWO: Design - Section of Home Modification - Meeting the Needs of the Elderly



In order to achieve barrier-free renovation through elevator home improvement, the original stairwell was removed and replaced with a single-run staircase, thus meeting the requirements for horizontal elevator access. Bathroom space remodeling with modular components made of SMG. The traditional solution of using cement is avoided and the construction period is greatly reduced. Providing security for transformation efficiency. The renovation of the dining room integrates the relationship between the kitchen, dining room and living room in a limited space, and provides a more efficient use of space for the residents by using modern cabinetry.



PART THREE: Design - Section of the New Community - All-age Residential Area with Public Space Complex



Full Section

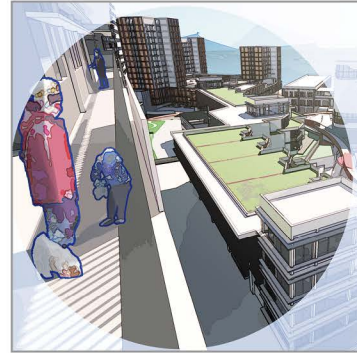
Youth Apartment Entrance



Youth Apartment Public Space



Youth Apartment Balcony



Community Center Entrance 1



Rooftop Garden



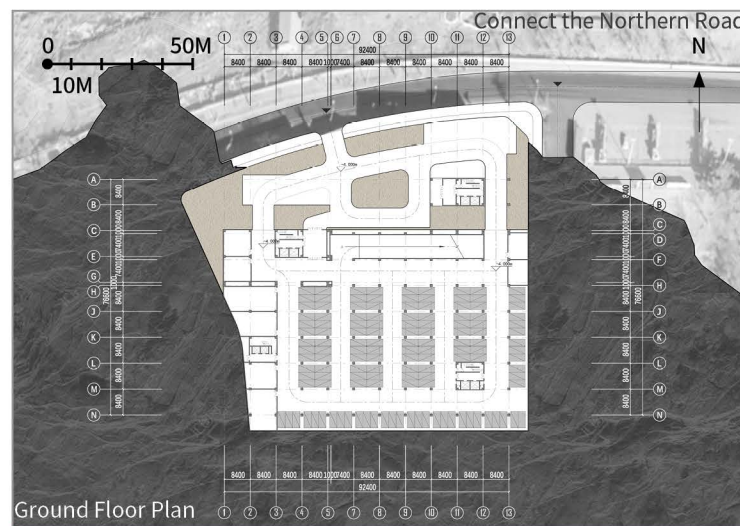
Community Center Commercial



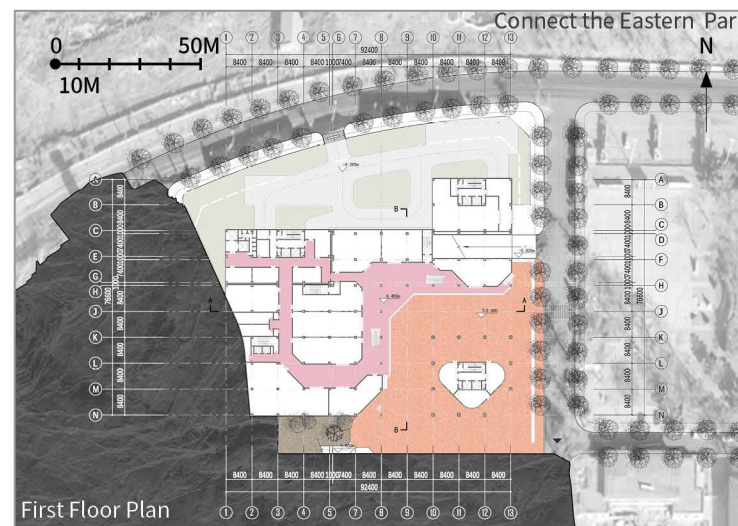
Community Center Entrance 2



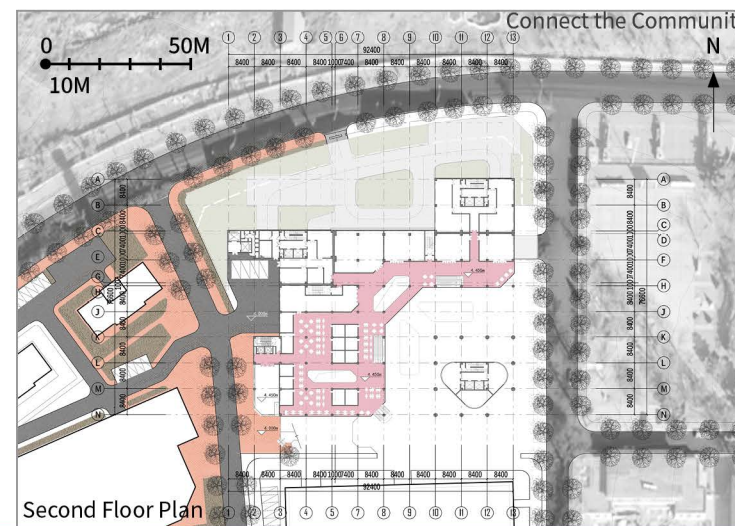
Community Center Entrance 3



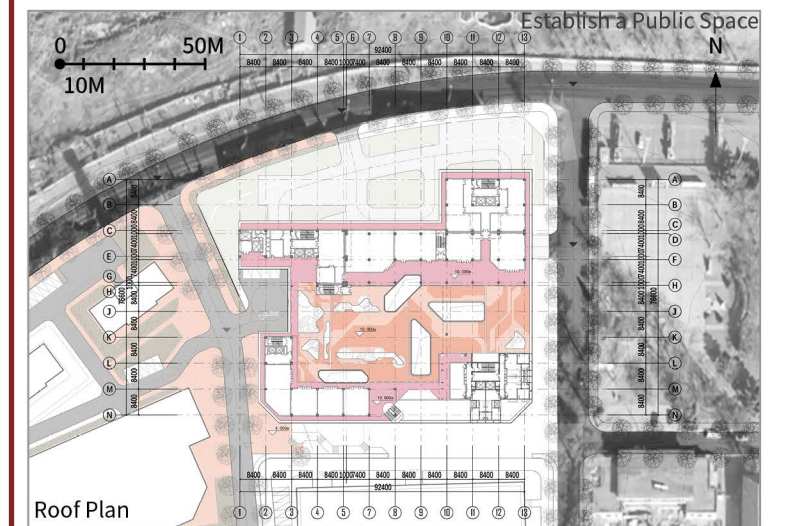
Ground Floor Plan



First Floor Plan



Second Floor Plan



Roof Plan

Plan of New Community Complex



PART THREE: Design - Aerial View of Residential Area - Public Space Linked by Nodes





## 04 URBAN REGENERATION OF TONGJI COMMUNITY

### *A Green Settlement Under High-density Development*

Location: Yangpu District, Shanghai, China

Project duration: September to December, 2019

Project Instructor: Dong Yao

Individual project

Tongji New Village is located on the east side of the Siping Road Campus of Tongji University, between Siping Road and Changwu Road. It was built in 1952, with a total area of 16 hectares and a total construction area of 195,000 square meters. The district adopts a modernist approach to planning large settlements, and has been gradually improved over the course of 60 years of construction to form a large settlement in the city center with a total of 3,819 households consisting of low-rise and multi-story buildings. The design starts from the residential design, explores the spatial potential of the settlement, sorts out the surrounding site relationship, and completes the urban design based on the former Tongji New Village site and the design of the settlement group based on the waterfront space in the northeast of the site.

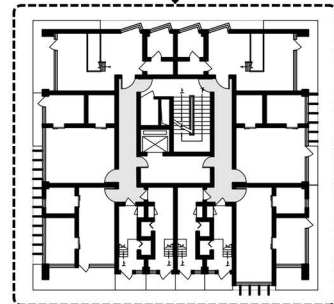
# Research - Residence & Site - Building a Natural Community Under a High Density of People

## PART ONE: Identifying Small Homes and Residences

**Living Problems in site**

As one of the basic units of an urban community, housing plays an important role in the design of an all-ages community, and **the contradiction between limited land and a large number of people** is an inescapable problem in Chinese society today. In order to solve this problem, I searched and drew excellent examples of single, double and triple family homes in the early stage of design, and used my previous knowledge to complete the design of the subsequent residential towers.

Combination of the three



**LIVING BIG**

**Single residence**  
 Building Area: 8m<sup>2</sup>  
 Location: Tokyo  
 Feature: Use of floor height Plan combination

Living Big in a Small Tiny House

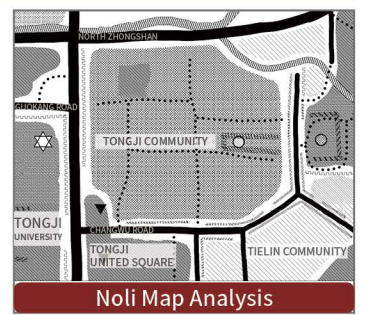
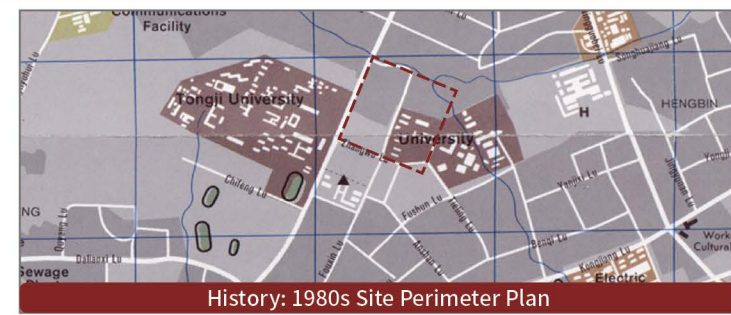
**Couple's residence**  
 Building Area: 27m<sup>2</sup>  
 Location: Sydney  
 Feature: Integrated living room

Never Too Small

**Residence for a family of three**  
 Building Area: 36m<sup>2</sup>  
 Location: Beijing  
 Feature: Stacked bedroom

Living from The Heart

## PART TWO: Meet Our Community



The urban spaces such as parks and green corridors designed during the Great Shanghai Project in the 1920s can be seen in the master plan of the site today, and recognizing these spaces was the first step in our design.

With the rapid development of China's cities, the original green spaces and farmlands were gradually covered by the new cities after 1980, and the buildings themselves, isolated the contiguous green spaces and public spaces in the original urban plans. Our next goal is to create connections between resources based on the identification of spatial resources. Merging isolated, fragmented resources into a holistic and comprehensive urban park experience, using green belts to link nodal spaces, and opening up fences as appropriate to create visual corridors in the landscape.

The west and north sides of the site are adjacent to the city's arterial roads, while the south and east sides are the city full of life of the existing commercial streets, using Kevin Lynch's urban intention to analyze our site, the site is carefully planned using the principle of small streets and dense road networks.

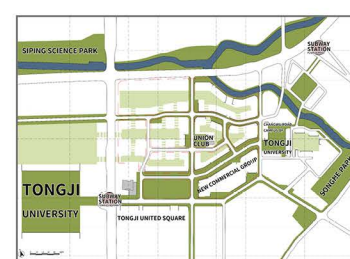
### Space Resources Analysis



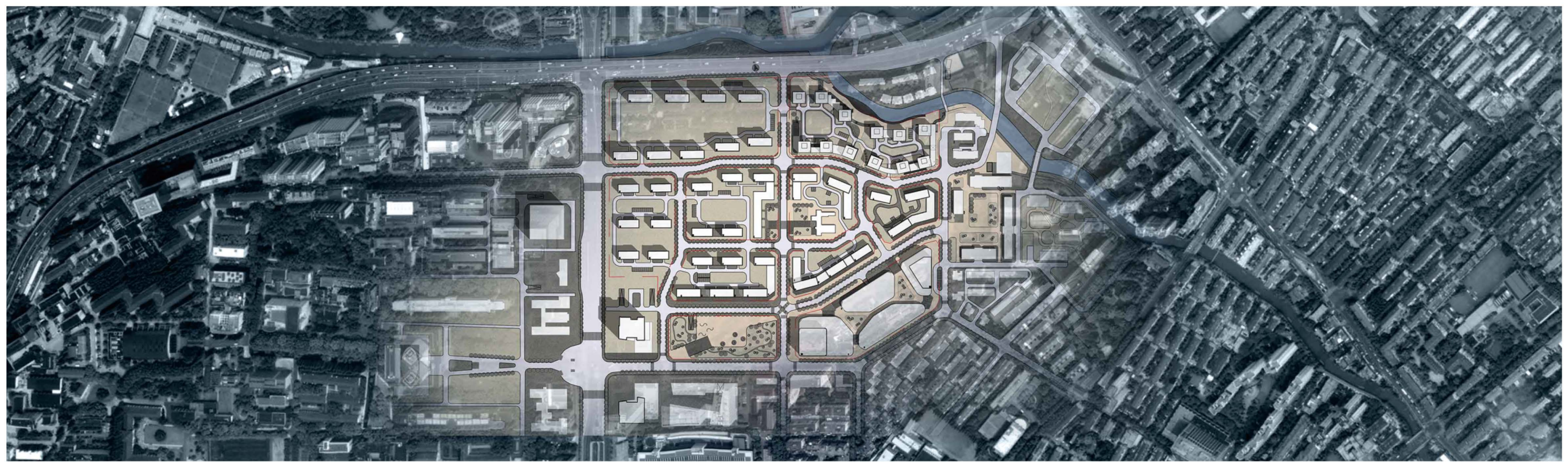
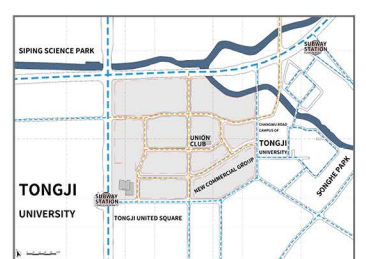
### Public Space Analysis



### Landscape Analysis

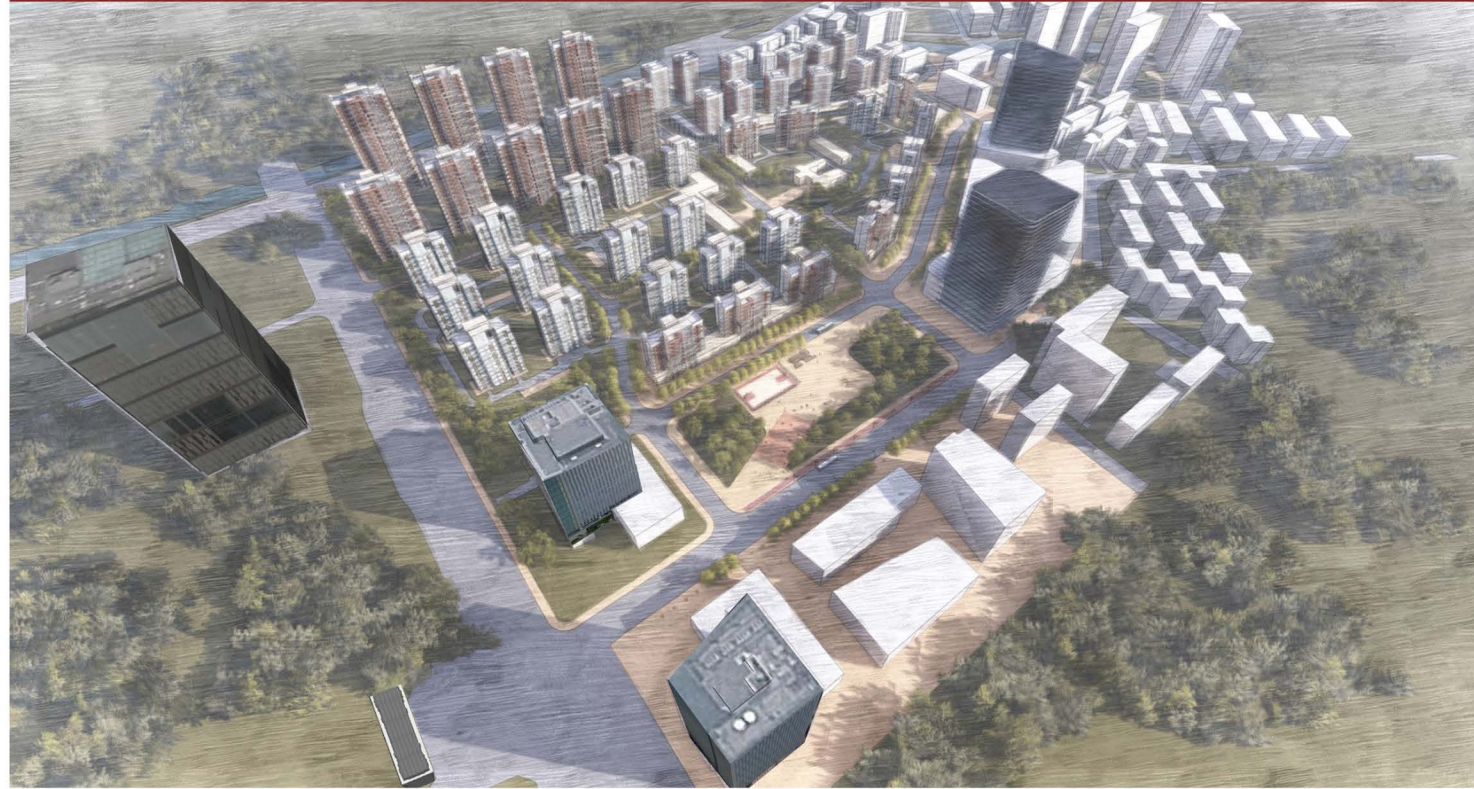


### Traffic Analysis

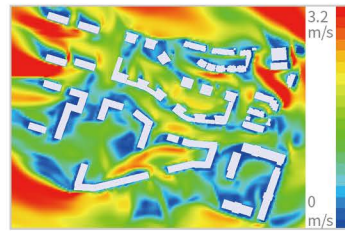


# Design - Aerial View of Urban Design - A Community for All

## PART TWO: Meet Our Community

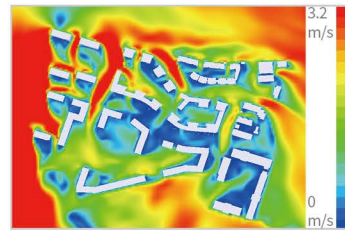


Total land area:  
20000.92m<sup>2</sup>  
Total building area:  
40383.74m<sup>2</sup>  
Community Support Area:  
5748.14m<sup>2</sup>  
Rental residential development  
area:  
34635.60m<sup>2</sup>  
Plot area:  
2.02  
Greening rate:  
26.09%  
Building density:  
27.73%  
Motor vehicle parking space per  
household:  
1.06 per household



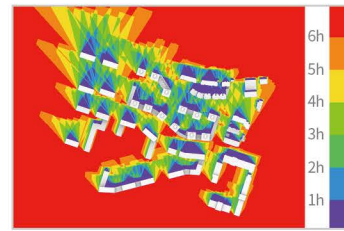
Wind Environment Simulation 1

Summer:  
Tower placement ensures  
adequate natural ventilation  
in summer and reduces overall  
energy consumption in the  
residential area



Wind Environment Simulation 2

Winter:  
The enclosed plan effectively  
controls the wind speed in  
the public space of the winter  
residence to ensure the usability  
of the public space



Daylight Analysis

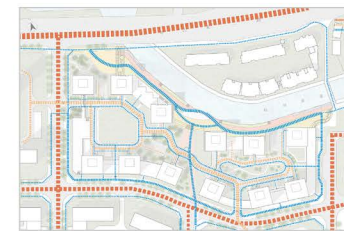
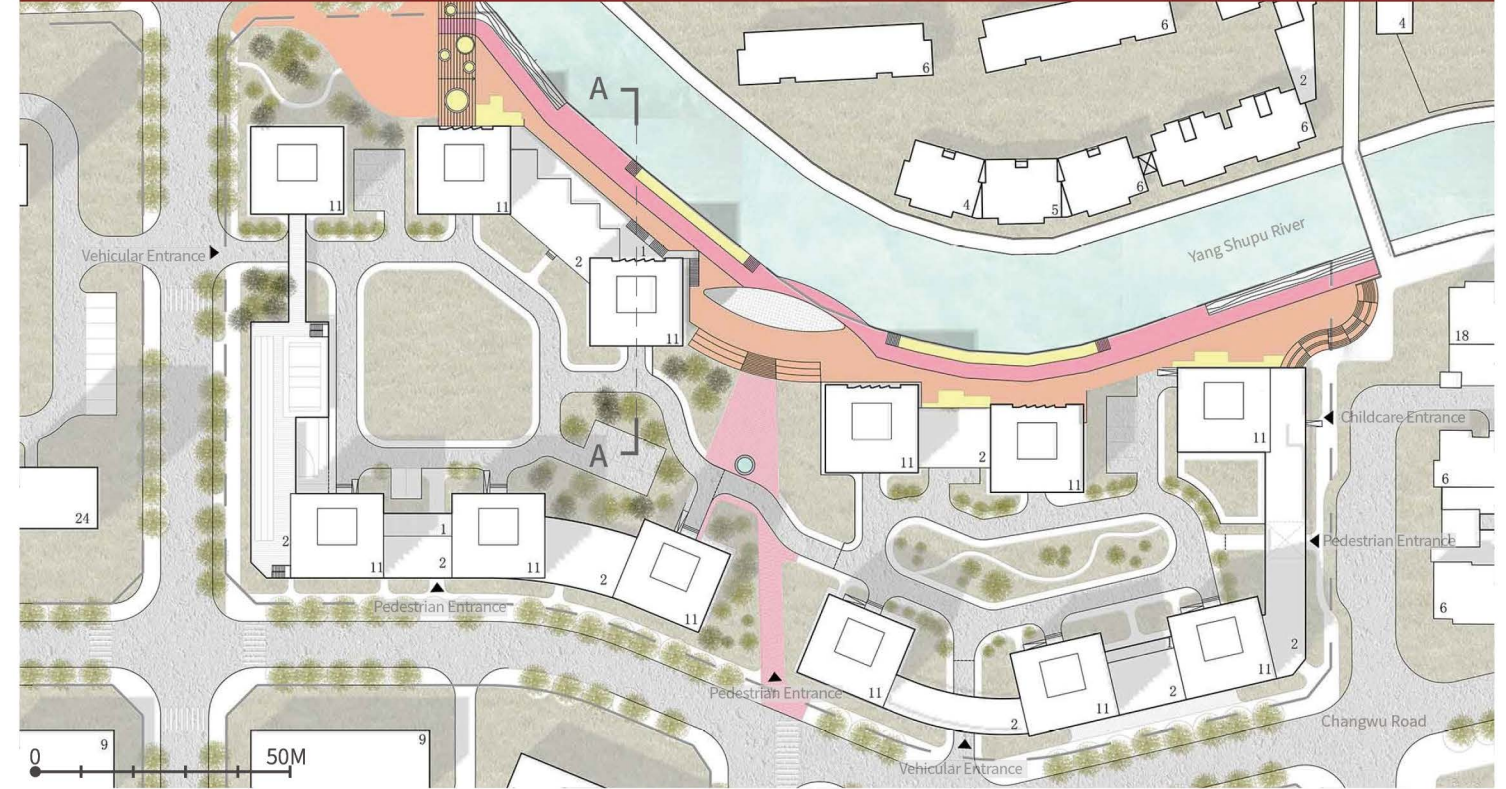
summer:  
The residential group uses  
distributed tower apartments  
as the main part to ensure  
sufficient daylight as much as  
possible

SECTION A-A



# Design - Settlement Master Plan - A Community for All

## PART THREE: Meet Our Neighborhood



Traffic Analysis

Orange Line: Vehicle Road  
Yellow Line: Shared Road  
Blue Line: Sidewalk  
Partially mixed pedestrian  
and vehicle traffic inside the  
settlement to ensure space  
efficiency



Public Space Analysis

Yellow Line: Public space  
Green Line: Landscape  
Orange Line: Commercial  
Ground floor retail is arranged  
with public space to support rich  
waterfront activities



Operating Areas for Ladder

Orange Line: Fire Lane  
Orange Area: Operating Areas  
The interior of the residential  
group combined with the  
public space design to meet the  
requirements of fire fighting



Ground Floor Plan

The ground floor is divided into  
a podium at the bottom, a public  
green space and a waterfront  
space, making full use of  
existing landscape resources  
and providing sufficient public  
space.

SOUTH ELEVATION



NORTH ELEVATION





## 05 SERVICE-LEARNING

### Social Practice for Residents to Build Together

**Location:** Wangjatang, Xuhui District, Shanghai, China

**Project duration:** March to June, 2020

**Project Instructor:** Dong Yao

**Building Renewal Design:** Zile Wu, Zhiyu Qing, Jiajie Liu

**Event Planning:** Zile Wu, Zhanhao Fan, Yixuan Chen

**Course Participation & Project Internship**

John Dewey's idea of "learning by doing" has had a profound impact on contemporary education, and was first introduced to American site design schools in the 1990's. In 2015, Tongji University, in collaboration with the Hong Kong Polytechnic University, conducted the first service learning course, and the projects presented in this chapter are a continuation of that course. presents a project that is a continuation of that course. It will take an old community building in urgent need of renewal as the starting point of the whole design, and use the mutual support of two lines of spatial renewal and activity planning to awaken the residents' sense of community while completing the renewal of the community center, and help the community renewal plan from the inside out

Pervious - What We Have Done? - Establishing a Platform for Resident Self-governance

Part One: What is service-learning? & Past Experiences

Service Learning is an educational approach where a student learns theories in the classroom and at the same time volunteers with an agency (usually a non-profit or social service group) and engages in reflection activities to deepen their understanding of what is being taught.

<p><b>Volunteerism</b></p> <p>Volunteerism is acts of service performed out of free will without expectation of recompense and is generally altruistic in nature; the main beneficiaries (at least in a visible sense) are generally those served by the student.</p>	<p><b>Community Service</b></p> <p>Community service is quite similar to volunteerism, the main difference being that it is said to "involve more structure and student commitment than do volunteer programs."</p>	<p><b>Internship</b></p> <p>Internships can provide students with experience in various fields of work; however, unlike volunteerism and community service, students gain a more measurable benefit from this aspect of service learning.</p>	<p><b>Field Education</b></p> <p>Field education, like internships, is generally more materially beneficial to the student. Field education involves programs that, "provide students with co-curricular service opportunities that are related, but not fully integrated, with their formal academic studies."</p>
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Past Experiences

The Future Neighborhood Center in Your Eyes



Guoding Road Community Interaction Day



Open Day for Waste Separation in Yue Fang

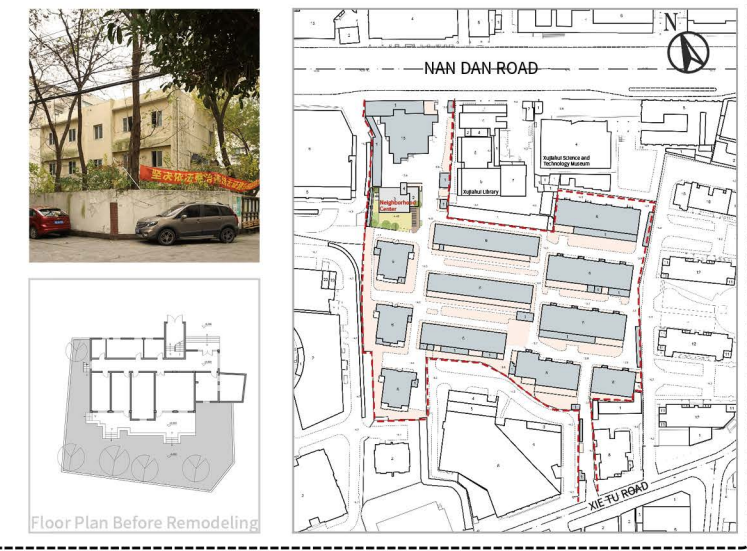


Research - Site & Requirements - A Community Center for Young and Old Alike

Part Two: How to start a service-learning? Building Renovation ✖ Community Activity

Step 1 Know your site

The site of the service learning is located in the Wangjatang neighborhood in Xuhui District, Shanghai, which was built in the 1980s as an old-age housing complex with a lack of public space and an aging population. The service-learning program uses the abandoned community center in the district to complete the community renewal with the participation of all people by means of building renovation and activity planning in parallel.



To decompose the site analysis model for the previous event, and to find the connection between the three elements of human, space and environment. Mapping the spatial analysis pattern to the Wangjatang community, identifying the core area (replicable area) and the peripheral area (expandable area as needed) in the event scenario

Step 2 Provide Space

<p><b>Community Plaza</b></p> <p>Open up the original closed space to provide a new public space for the whole community, at the same time, it can be used as the main stage of the community open day and a large venue for children to play everyday</p>	<p><b>Community Aging</b></p> <p>With regard to the aging problem in communities with high aging rate, we have also set up a teacher community aging facility on the top floor of the community center, which can easily provide care services and activity space for the elderly in the community and meet the happy life of the elderly</p>	<p><b>Childcare</b></p> <p>The Children's Day Care Center offers a weekday preschool care program for urban white-collar workers, while the addition of children to the community center also brings new energy to our activities</p>	<p><b>Community Living Room</b></p> <p>The community living room serves as the gateway to this mixed-use building for young and old, and is placed on the first floor of the building, with sofas and activity rooms, as well as the largest possible window openings and doorways to interact with the exterior site.</p>
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Section of Wangjatang community center



## Design - Activity - Based Architectural Scenes

### Part Two: How to start a service-learning? Building Renovation ✖ Community Activity

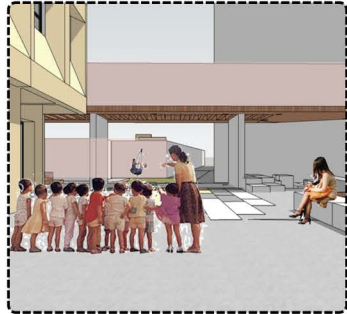
#### Step 3 Simulate Scenes



"When you walk into the neighborhood, you see the rising roof, and the paved floor extending out from the Neighborhood Gateway, and the laughter of people coming from inside."



"Walking to the entrance, I saw people still performing at the end of the square, as vibrant as the greenery behind them."



"Walking into the square, looking back at the gables people are talking happily and children are playing in the grass."



"Leaving the Neighborhood Gateway, the corner space loved ones lovely, must come early tomorrow to sit here."



#### Step 4 Organize Events



Senior Citizens Music Group



Health Lecture for the Elderly



Community Open Market



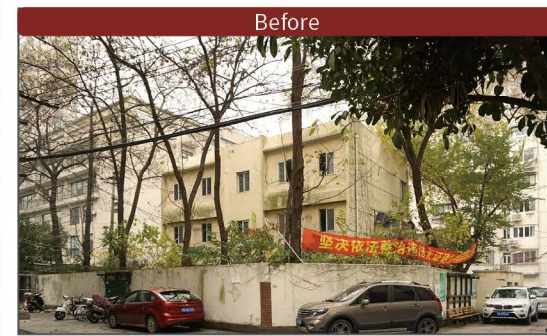
Exercise Music Classes for Seniors

## Design - Control of the Whole Process

### Before and After



Before



Before



Community Center Street View



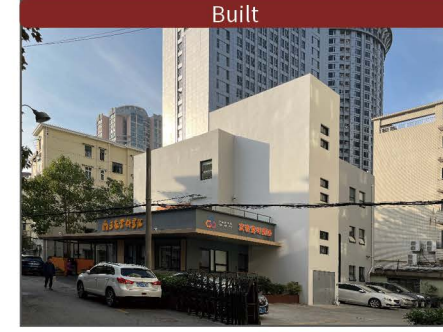
Rendering



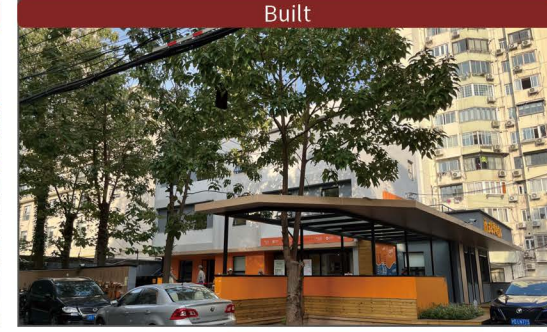
Rendering



Pocket Square



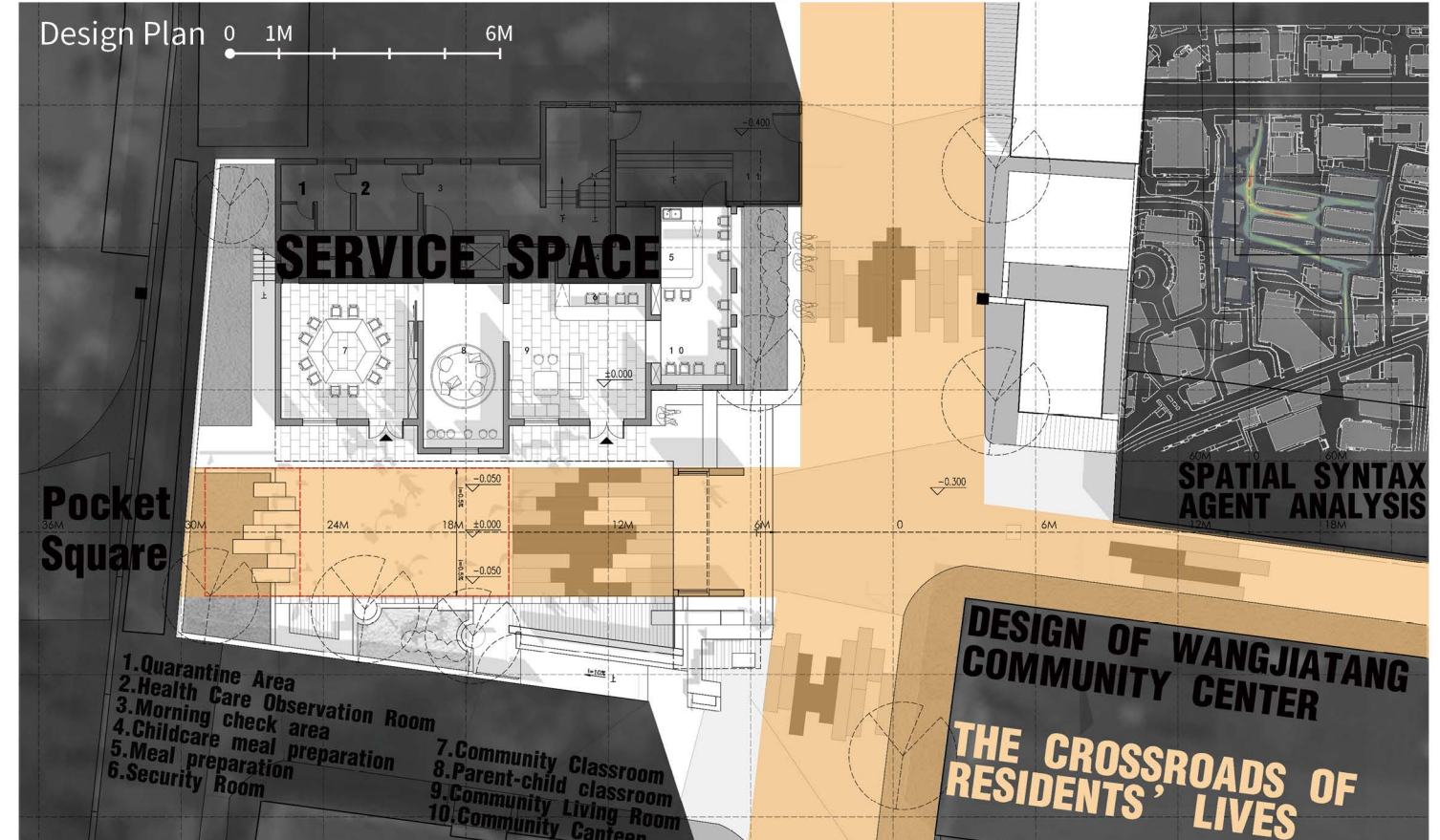
Built



Built



Plaza Entrance



## OTHER WORKS

Documentation about me,  
with a band, a shanty town, and the rural context

This section consists of three parts. One is the main part of my after-school energy during my undergraduate years, the band "Boomjoy", in which I was the drummer. In 2017, I participated in the research and design of shantytowns in Shanghai and various projects based on Chinese villages when I was a research assistant at Tongji University. I hope this section will give you more perspective on me and what I love to study and work on.

### PART ONE: Drummer of the Band "Boomjoy"

2018 Live at Shanghai University of Finance and Economics



The band was formed in the spring of 2016 and started out as a general campus band covering other people's work. Later on, the band gradually formed a stable lineup and composed original songs.

Build the band



The band won their first open competition in the fall of 2017. After that, the band participated in a series of campus band competitions and performed at the 2018 Strawberry Festival and the 2019 East Ocean Music Festival.

Participate in music festivals



Later, the band started to try to organize their own performances. From the very beginning, the band performed in public ensembles to later special shows, constantly enriching their abilities and experience.

Hold our special performance



"My biggest passion after school during my undergraduate years was music. I joined the school's guitar society at the beginning of my undergraduate studies and have since been writing with like-minded friends to bring our own music to a wider audience."



PART TWO: Shanghai Zhangqiao Shantytown Research and Residential Optimization Design

Studio Exhibition at Shanghai Urban Space Art Season (SUSAS) 2017



Zhangqiao shantytown is located in Yangpu District, Shanghai, a special product left over from the Shanghai tenement period. This studio in 2017 aims to understand the living conditions of the people here and help them improve their own lives.

We visited the local residents and found out that the people here are not as bad as outsiders may think. The couple we interviewed had their own objective living conditions and pursuit of life under poor living conditions.

I mapped the house that the couple lived in and used it as a sample for the design. To provide possibilities for their lives in a limited space.

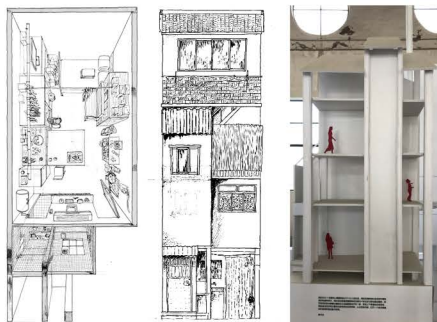
Visiting Shanghai Shantytowns



Interviews with Residents



Residential Status Profile



"Urban regeneration has always been a neighborhood of interest to me. In this 2017 studio, we visited the largest shantytown in Shanghai's inner ring, the Zhangqiao neighborhood. Learning from the residents there, we used their houses and interviews as a basis to propose our own design in a high-density built environment."

PART THREE: Design and Research in the Chinese Rural Context.

Farmers' centralized settlement in Shuiku Village, Jinsan District, Shanghai

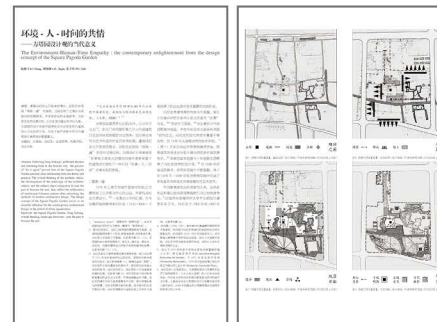


Following Feng Jizhong's published theories and returning back to the historic site, the process of "do it again" proved that of the Square Pagoda Garden presents clear relationship between theory and practice.

The design of the landscape enhancement of Li's house in Zhuangxing Old Street, Fengxian District, Shanghai. The three points of starting point of bridge, house and water are used as the starting point of the design to communicate the landscape elements.

Design of Party Group Service Center in Zhuanqiao Town, Minhang District, Shanghai. The street design is used as a carrier for party group construction to stimulate the vitality of the area.

The Research of Square Pogada Garden



Village Renewal Design Competition



Rural Party Building Center Design



"As a current hot topic in China, "rural revitalization" is an important part of my research assistant work. Theoretical research, residential design, landscape research and design, and public service design are the four perspectives that form my experience and knowledge of China's countryside."