CODING

ARCHIVE

Yufan Xie

2015-2021

YUFAN XIE

UVNLAB.COM

■ Architecture ■ Computation ■ Interactive Media

Born in an art family, educated as an architect, now I'm in a transition to innovator of spatial computing and multi-sensory experience.

With years of experiences in grasshopper consultancy, I'm specialized in complex geometries, data visualization and interactive contents. I'm proficient in interactive media, such as Unreal Engine and processing. As an innovator, I'm constantly learning emerging smart technology to enhance the built environment.

EDUCATION

■ 2014 - 2019 B.Arch
Central Academy of Fine Arts, China, SoA

■ 2019.9 - 2021.5 M.Arch +2
University of Southern California, SoA

WORK

■ 2021.7 - now
Computational Designer
at Refik Anadol Studio

■ 2017.9 - 2019.7
Research Member of Parametric Group Team CAFA, Beijing

■ 2017.8 - 2017.11
Internship at Tuning-Synesthesia Studio, Beijing

■ 2020.6 - 2020.8
Internship at MADA s.p.a.m, Los Angeles

■ 2020.9 - 2020.11
GH Class Assistant for USC 410

■ 2020.8 - 2021.5
Usability Lead at USC AGP

AWARDS

■ 2019.6
CAFA Graduate Design 1st Award

■ 2020
Gensler Diversity Scholarship, 2nd Place

■ 2020
Young Talent Architect Awards(YTAA) Shortlisted

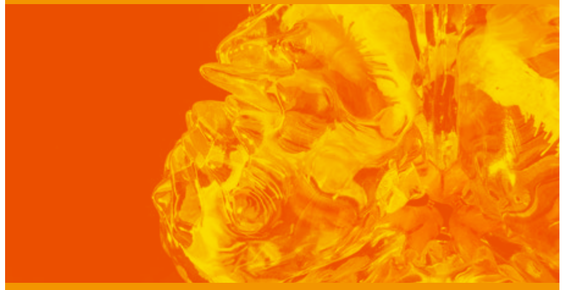
EXHIBITIONS

■ 2019.12
Shenzhen Bi-City Binnale of Architecture and Urbanism (UABB)

■ 2021.05
YTAA Exhibition in 17th International Architecture Exhibition of La Biennale di Venezia

CATALOGUE

WORLD BUILDING



THE UNKNOW CITIES

ARCHITECTURE

GAP+

WORKSAMPLES

ANT FARM
FOLDS/HOLES
SHARE THE WALL
BIT EROSION

FABRICATIONS
HIVE
MINIMAL SURFACE
KD TREE
DIFFERENTIAL GROWTH
SELF-ORGANIZING

<<< PROFILE

EMBRACING THE FUTURE.

>>> START

WORLD BUILDING

THE UNKNOWN CITIES

BI-CITY BIENNALE OF URBANISM\ARCHITECTURE
深港城市\建筑双城双年展

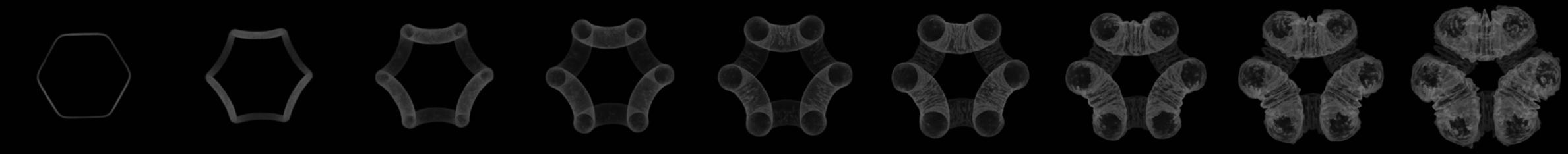
Collaborator:
Yu Chen(Curator)
Yan Wu(Writer)
Yufan Xie(Designer)

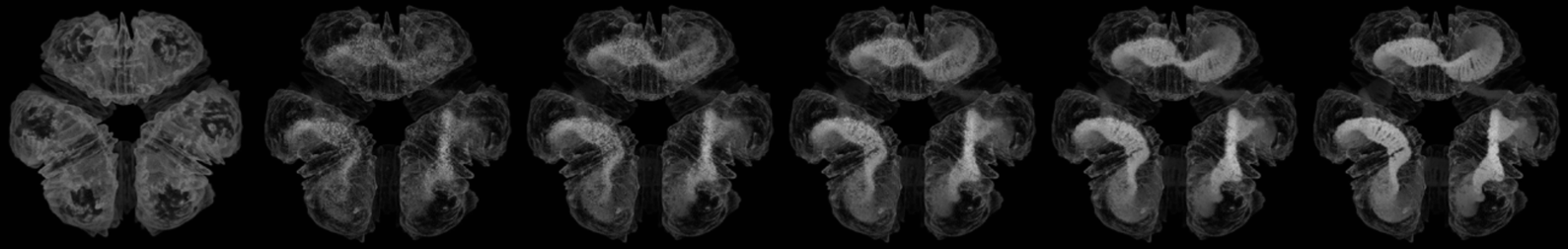
CITIES IN CLIMATE CHANGE

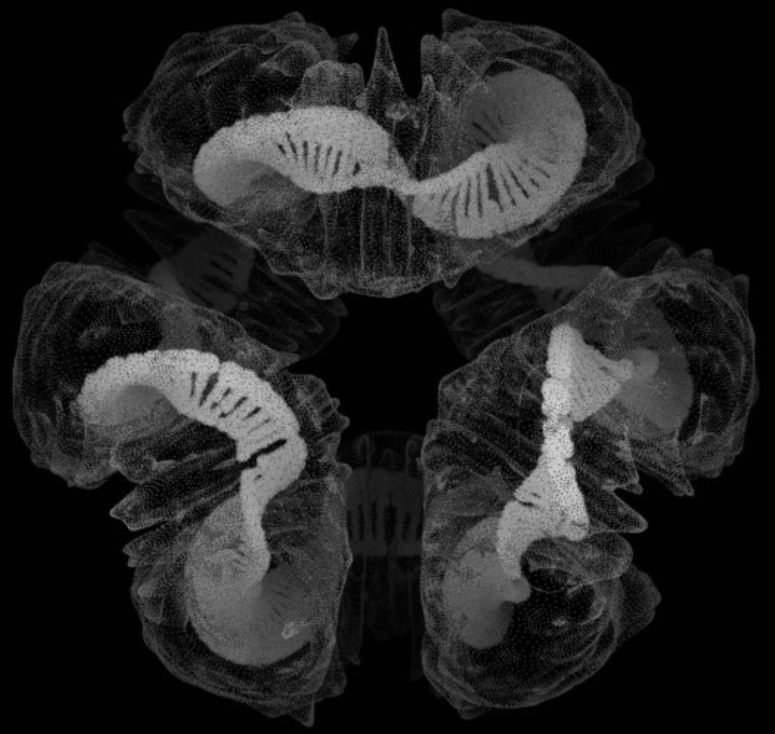
“We will die here, and, get rebirth there.
Dying is not painful, and seasonal trauma will be healed.
Rebirth is full of hope as the eye of crystal can see the light deep in the universe.”
-by Yan WU, from Nine Cities, Millions of Futures. ho return the Earth to a natural planet by reclaiming the nature from cities’ occupancy. After many attractive but upset seasons, people have discovered such methods, and at the same time, developed an approach to create a brand-new city in every unknown place of the planet within a moment.

Underwater City of Symbiosis

3d printing
158*162*111 mm
Stratasys J850







GENERATIVE SYSTEM

Typical complex systems - such as Differential Growth, can be utilized in various way, to generate complex and impressive results.

OCEAN

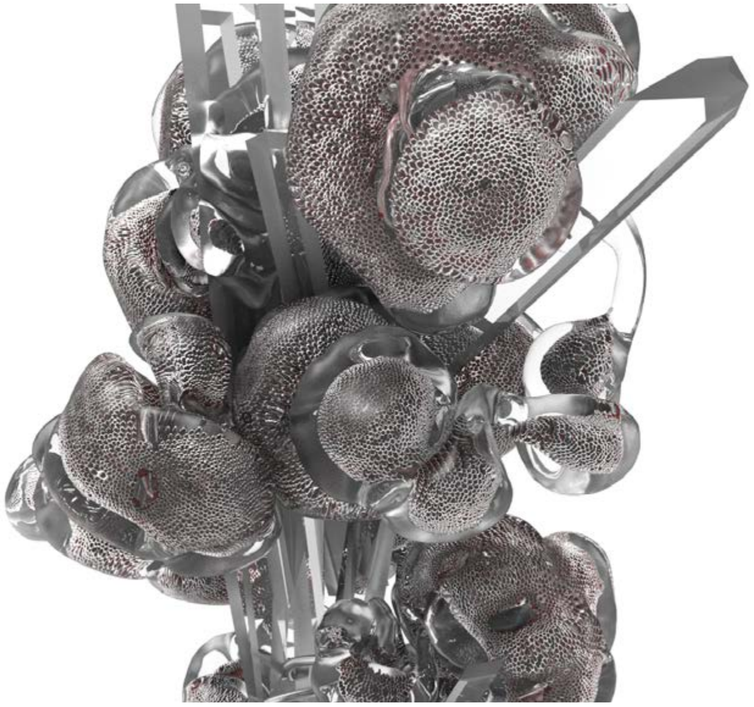
Underwater City>>>

In the future, human find a way to build symbiotic structure in the deep sea. These bio-materials from planktons becomes a shield and filter between human and sea water.

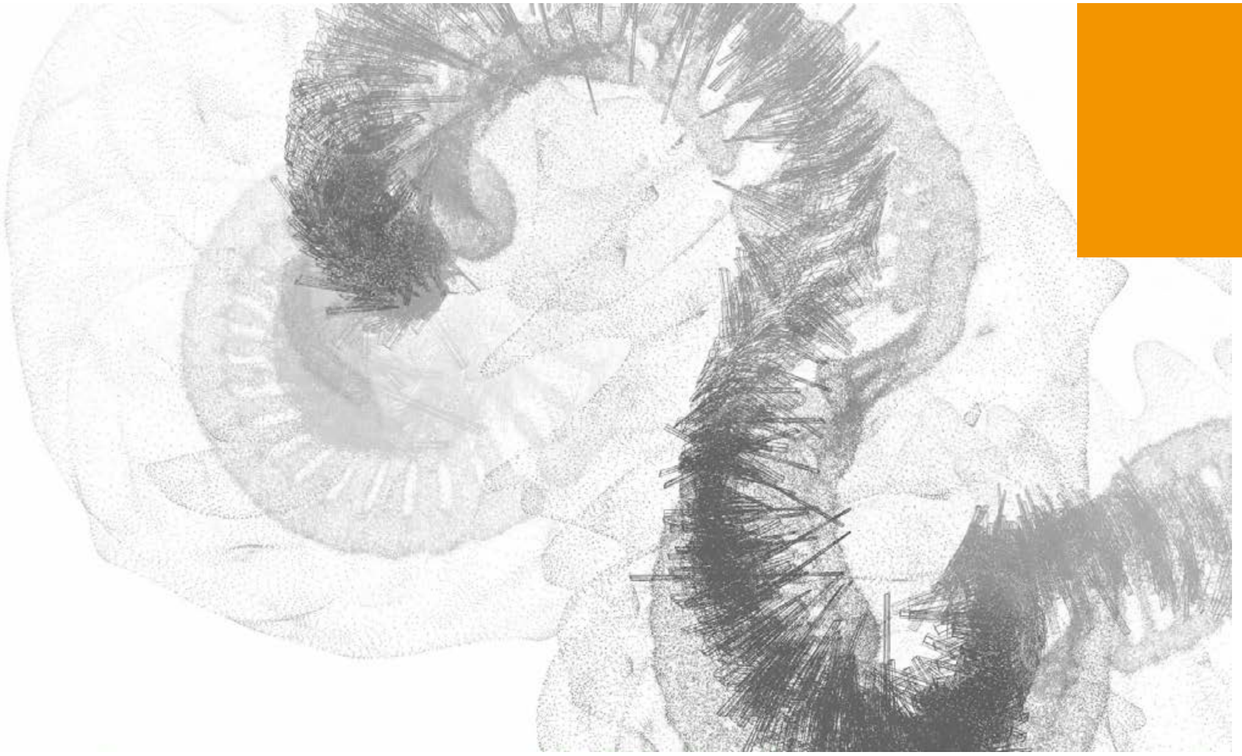
POPULATION

Hyperplastic City>>>

We imagine the city as an accumulative system of self-folding. Small structures are organized along huge spikes. Folding structure to increase surface to accomodate more residents.



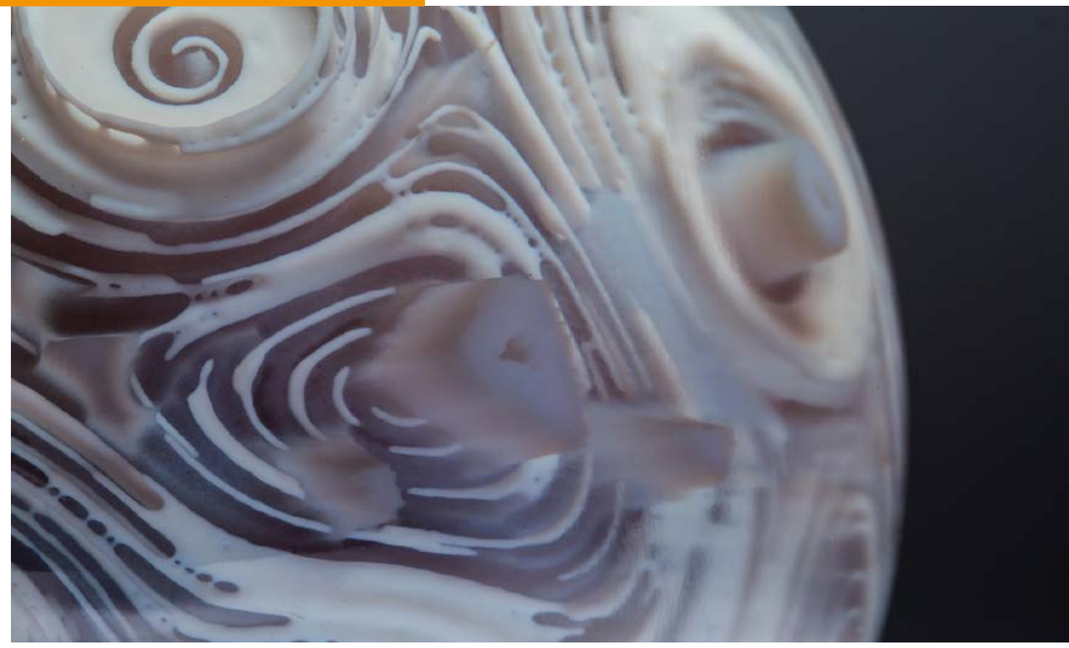
Iteration 1 10 50 100 150 200 300



Floating City, 3d printing, color-resin,Stratasys J850

The floating city is a city form of mobility. After hover vehicle being popularized and correspondingly new structure are built on earth. These spikes of junctions form orbits for public transits.
The ground level are gradually returned to pedestrian and nature.

TRANSPORTATION



ARCHITECT, WORLD BUILDER

In the past few decades, we have almost turned our imagination into reality.
How do we develop new imagination for the next generation?
How do we innovate "unfarmilar world"?
How do they take imapact on our current world?

Underwater City

City of Pipeline

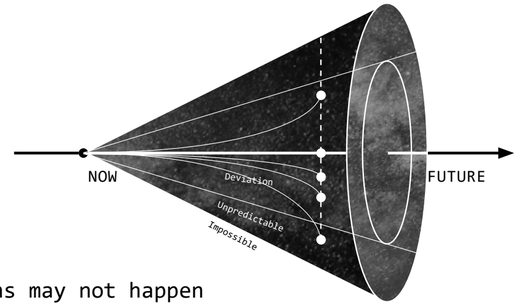
Floating City

WATER

City of Pipeline, 3d printing, color-resin,Stratasys J850

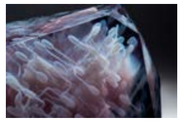
We imagine the city as a densed tree-like pipeline for water cycling and storage. It is a self-sustainable greenhouse in desert planet - which is a possible future of earth under climate change.

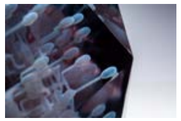
A WARNING?
OR GUIDANCE?



Some conditions may not happen in distant future, but we shall be prepared, or avoid human-caused disasters.

Our goal is proposing possible futures of human society, and providing template for the condition.





CURATION AS AN EFFECTIVE PRACTICE

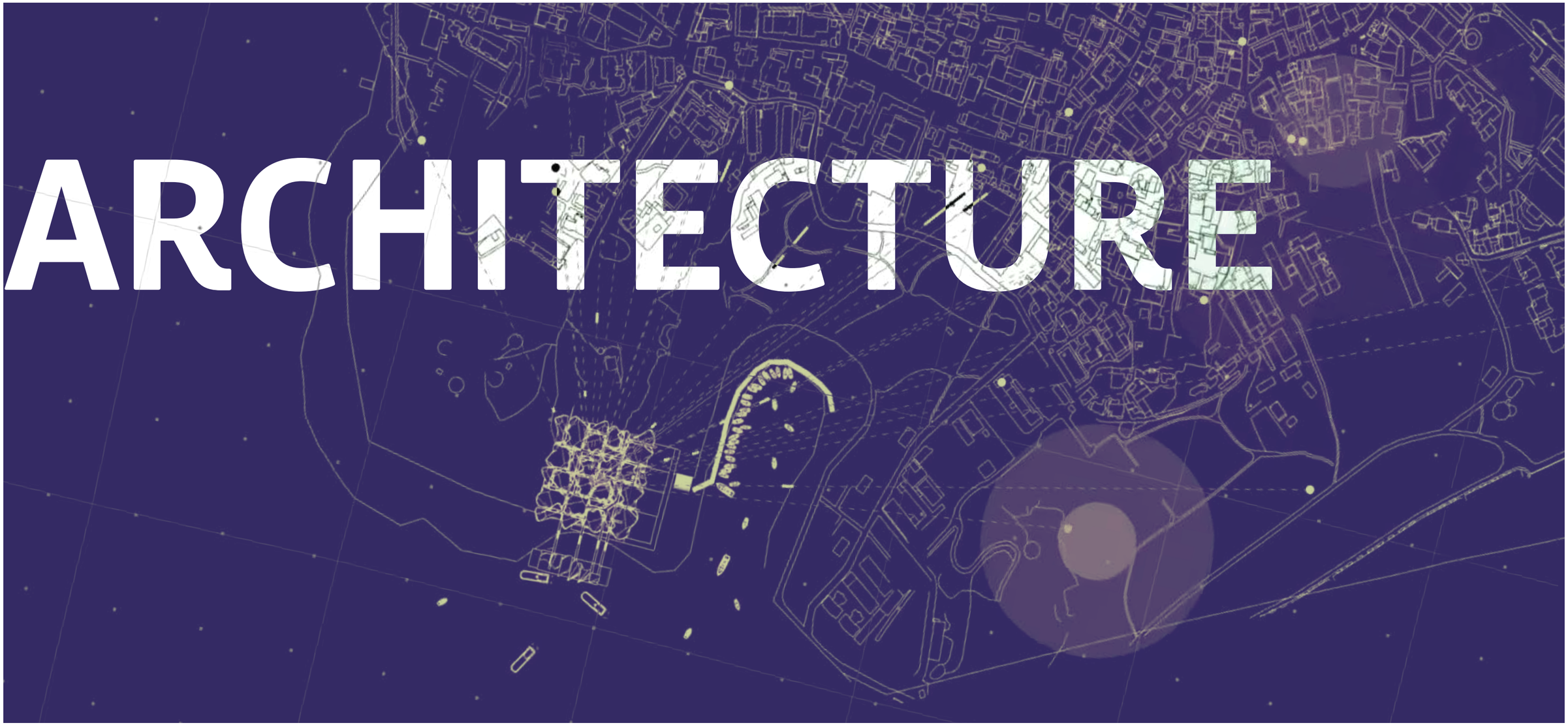
Curatorial narrative will be a core platform for concept delivery, and involve audiences, investors, and decision makers into discussion.

In the collaboration between architect, writer and curator, we succeeded in getting our voice out to the public, and policy makers.

Decision and changes can be made through collaboration, beyond single architecture industry.

>>>>Watch "The Unknown Cities" on Vimeo

ARCHITECTURE



GAP+

2019
User-centered Acoustic Museum

- 2019 CAFA Graduate Design, 1st Award
- 2020 Gensler Diversity Scholarship, 2nd Place
- 2020 Young Talent Architect Award, Shortlisted

MAX/MSP
Grasshopper
LEAP Leap Motion

This project explores the dynamic mixing mechanism of acoustic space through two derivatives - GAP+ and GAP-.

By translating experience of acoustic space in gaps, it re-defined how digital architecture and media intervenes our daily life in various ways. New perspectives of acoustic space and digital museum are proposed in a real-time and remote manner, in response to urban renovation in digital era.

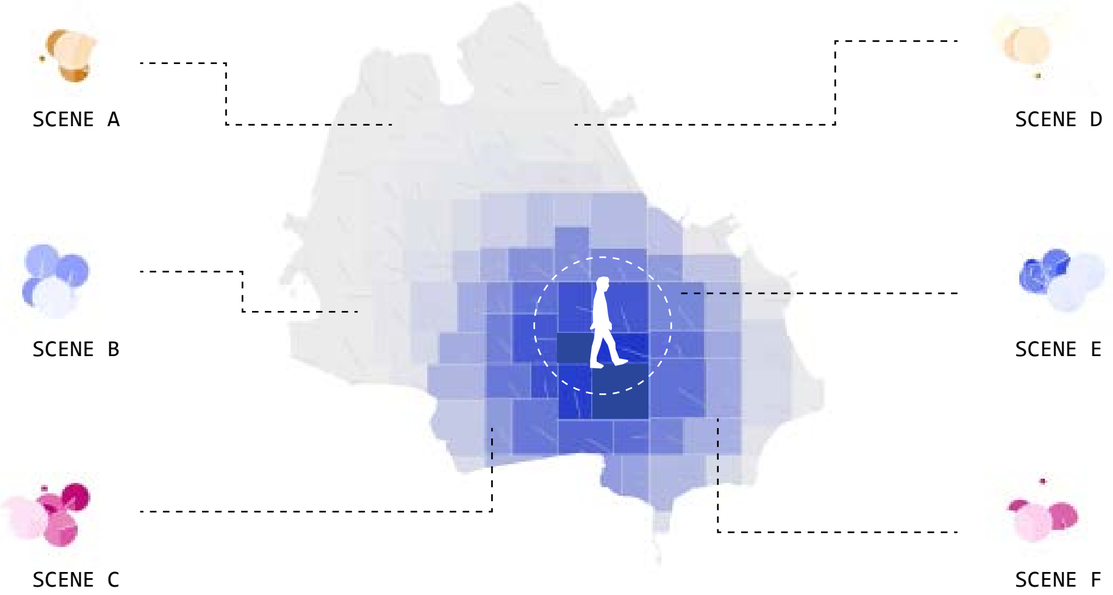
GAP

ACOUSTIC ELEMENT

GAP, A MIXER

The GAPs - where only one person could pass,
connected spaces - a room, a street, or the sea.
In twisted GAPs, visual sense is reduced
Walking through GAPs, sounds fade in, and out,
and we transit different places.
GAP, is the basic element of sound mixing on
Kulangsu. It is a narrative driven by individual.

WHAT DOES A SPACE OF GAPS SOUND LIKE?

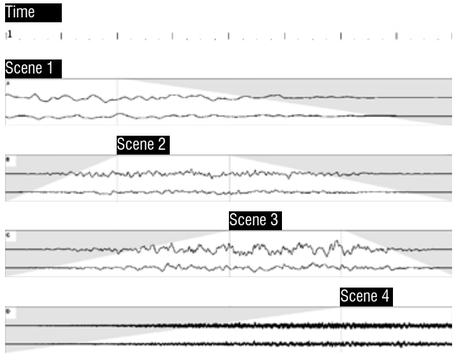


SCENE

Scene is a non-linear framework in electronic music.

It refers to a group of looping sounds
which share the same texture and spatial experience.
By switching scenes, sounds fade in and out,
presenting a real-time narrative.

THE FUTURE OF MUSEUM



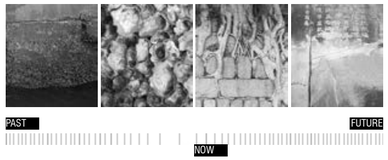
SCENE-LIVE SET

Real-time and non-linear narrative driven by time.

SCENE-KULANGSU

Real-time and non-linear narrative driven by human.

KULANGSU OF THE PAST



Linear history of print age

MUSEUM FOR THE PAST

Exhibited
Piano that nobody plays

KULANGSU OF HAPPENING

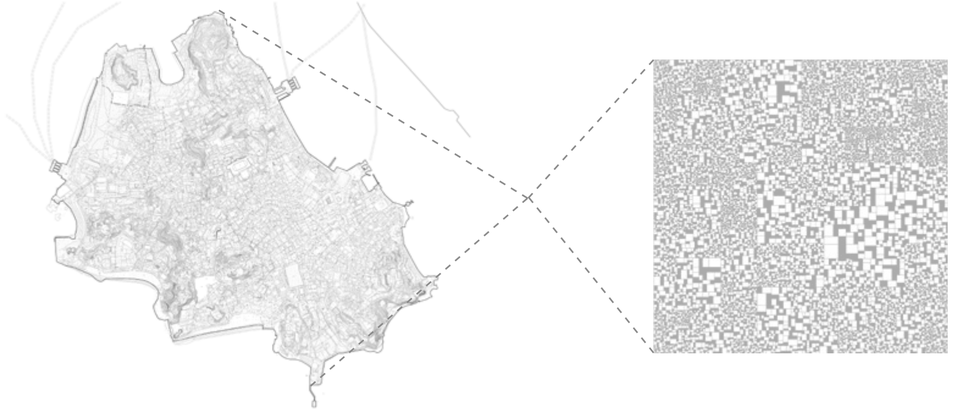
Daily life as a show.
Non-linear narrative driven by residents.

MUSEUM FOR THE "HAPPENING"

Performed
Kulangsu that everybody plays!

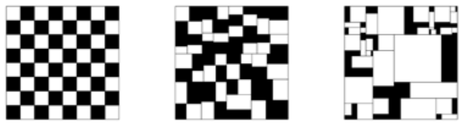
GAP+

REAL-TIME MUSEUM AT THE DOCK

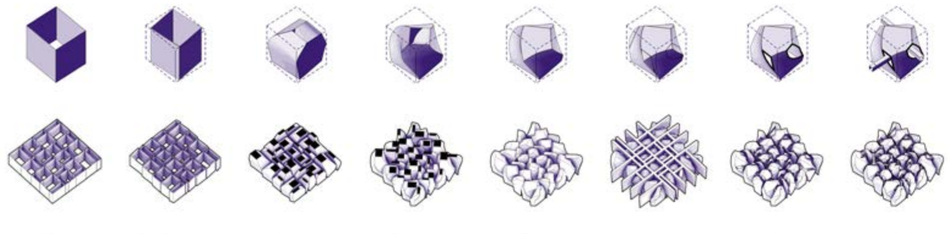


HIERARCHY

K-D Tree structure is used to generate a base grid of GAPs. The museum is a microcosm of Kulangsu.



Deviate:0.01 Deviate:0.2 Deviate:0.5



KD Original Grid
DisPlace Form the GAP
Shape Vision Details
Rotate Negative
Tilt Roof Space
Overlap with Original
Cut by Original
Cut by Original

IN GAP

Attracted
Crossing the GAP

Bottom Mix: Low

ENTER

Through holes on GAP
user step inside

Middle Mix: Midium

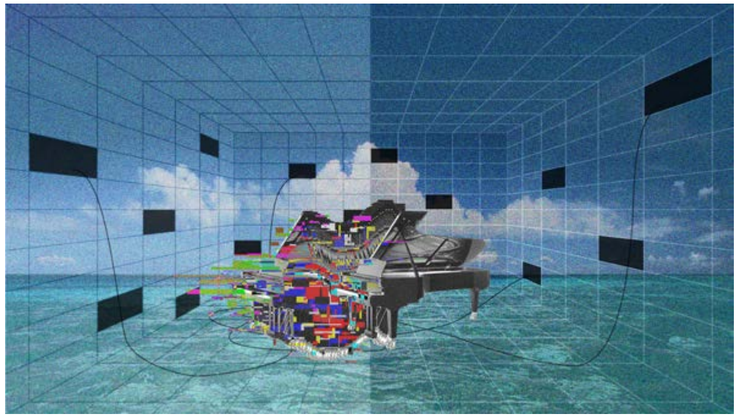
RISE

Rising, up to rooftop
The space opens gradually
Sound and activity are mixed

Top-Plan Mix: High

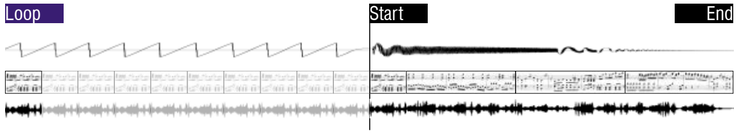
JOIN

Unit Space is awaiting

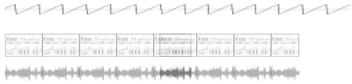


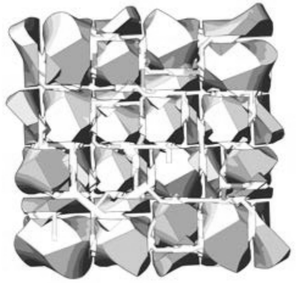
TRIGGER

Residents trigger the performance.



BACK TO LOOP





Top - Open Roof

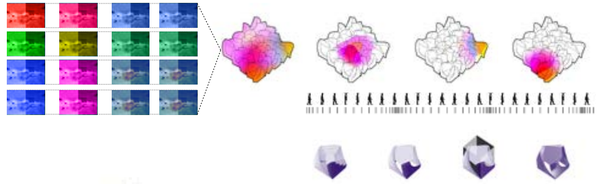
SOUND SYNTHESIS

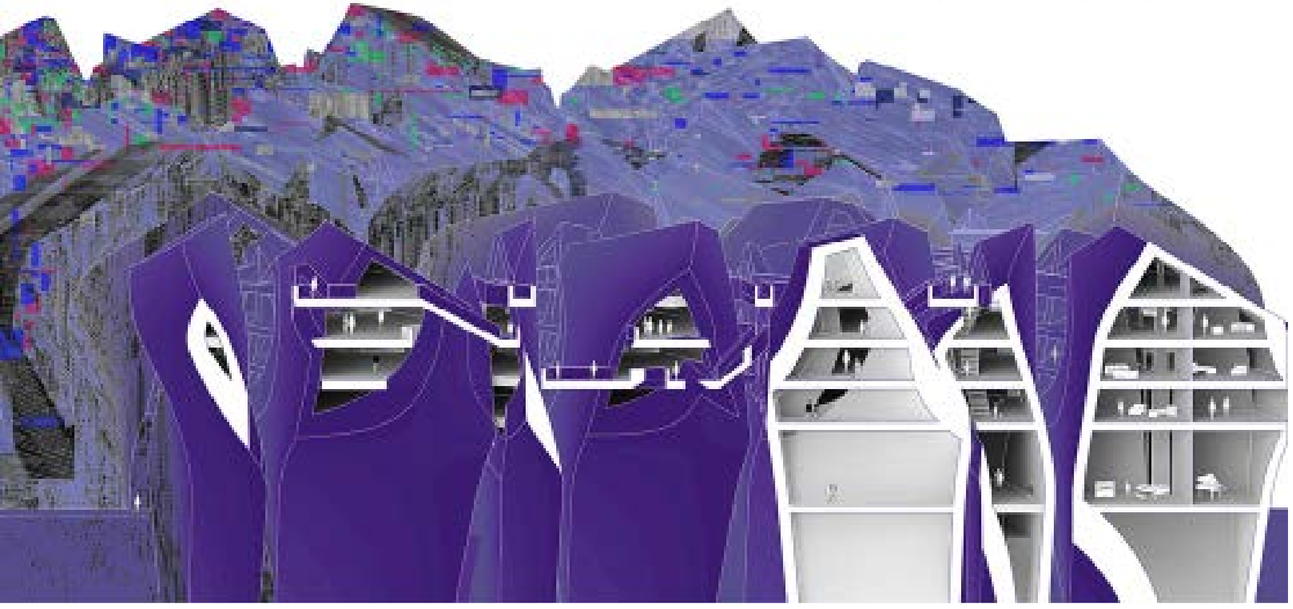
The zone-based mixing mechanism reflects a possible acoustic space in material world, that architectural elements become the medium of sound reflection and filtering.

Curved walls and openings defines how spaces entwines. Sounds, and people, share the same physical boundaries.

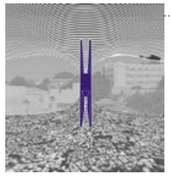
A COMMUNITY-DRIVEN ACOUSTIC MUSEUM

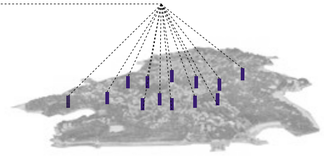
GAP+ will be an experiential space before visitors entering Kulangsu. Simply by walking through, we experience the soundscape of Kulangsu.





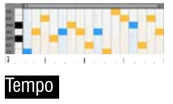
SOUND UNIT ····· **SAMPLER**



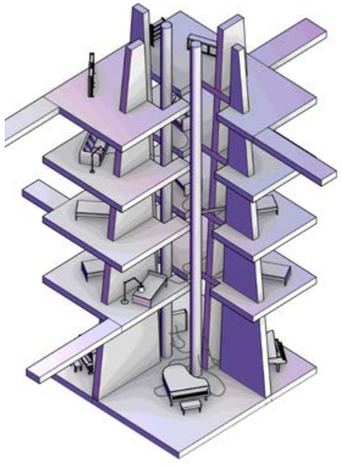


Sample from GAPs

PLAYER UNIT ····· **SEQUENCER**



Tempo



Shared Community

Residential

Private Area Museum

KULANGSU SOUND FROM KULANGSU STREET

With sensor network, sounds can be collected from Kulangsu, and reshaped by visitors in the museum.

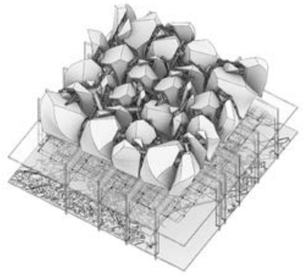
GAP-

REMOTE MUSEUM AT EXHIBITION

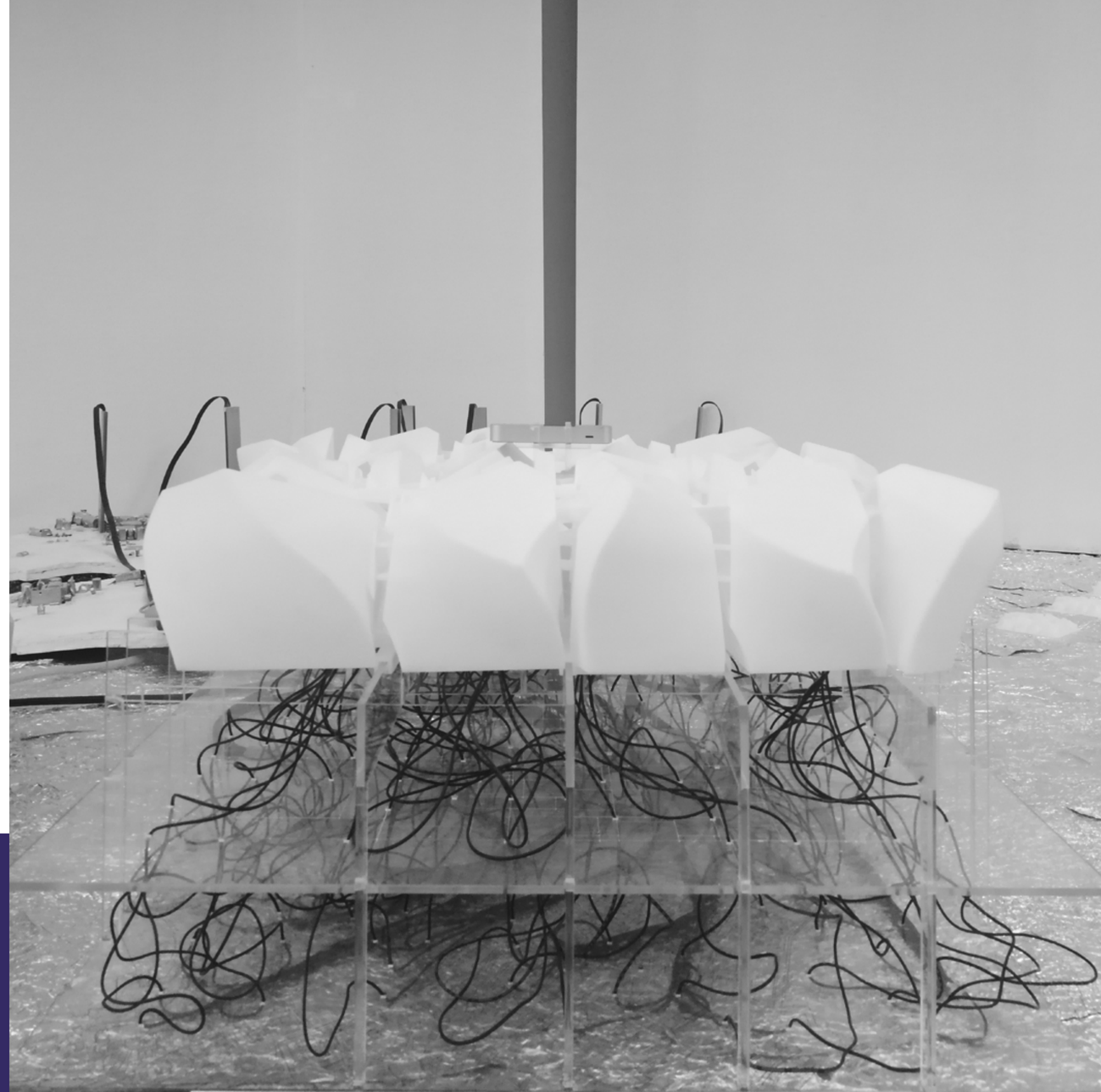
Wave
to start LiveSet!

Horizontal swipe
to switch sound

Vertical move
to modulate sound

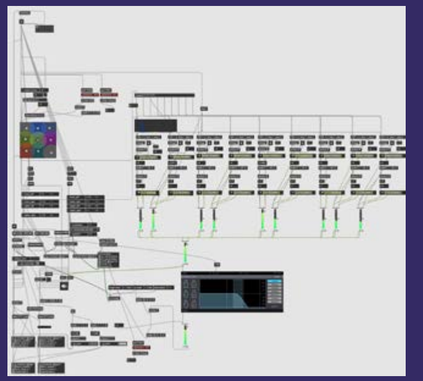


With sensors, it translate gesture into acoustic messages to control sounds from Kulangsu. When we play GAP-, we are linked with Kulangsu.



By waving our hands, we define our experience in this remote museum. GAP- brings Kulangsu to HERE and NOW, for every audience.

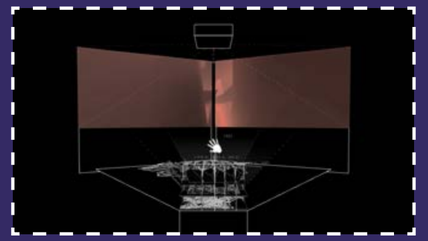
SPACE-DRIVEN SOUND SYNTHESIS



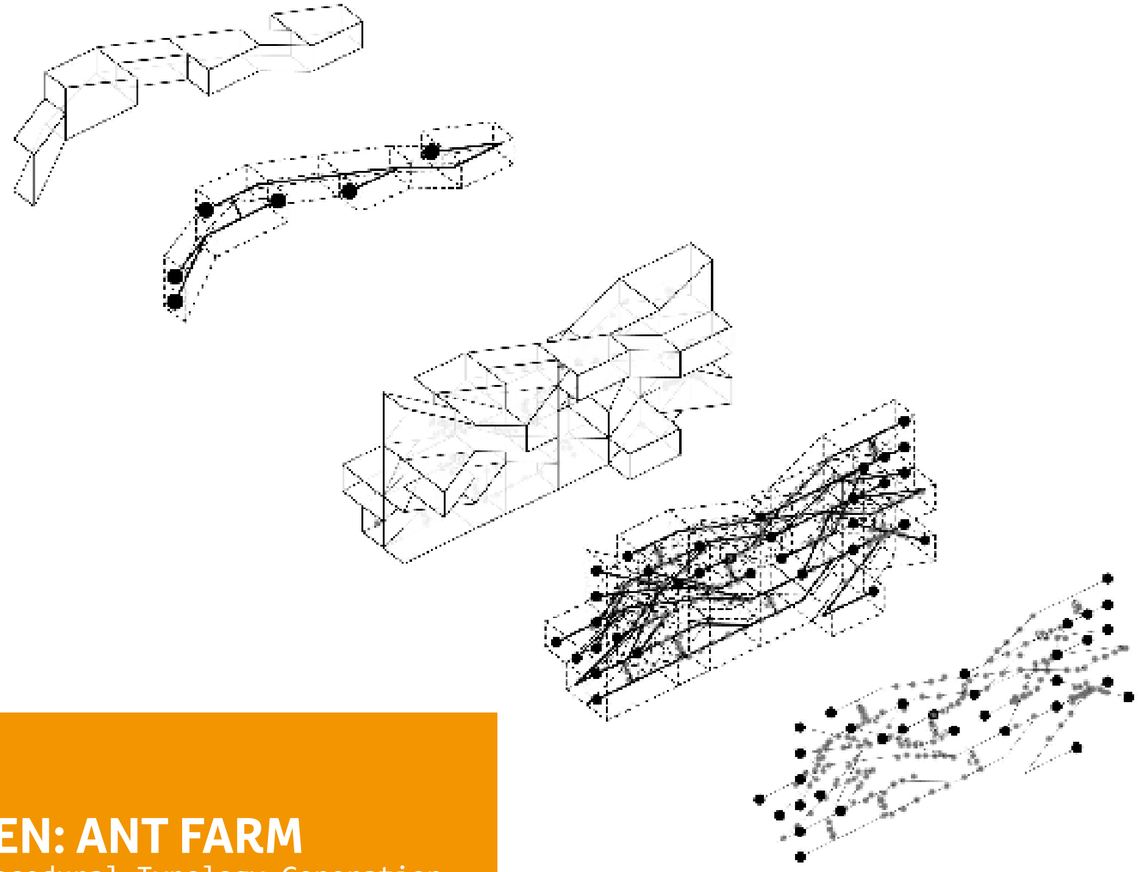
Screenshot from MAX/MSP project

This mechanism reveals a new perspective of sonification and audio immersion - a new practice beyond material and visual content.

In such a future, architects will be able to create space for all sensory groups.



>>>>Watch "GAP+" on Vimeo



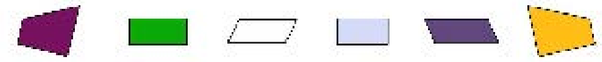
GEN: ANT FARM

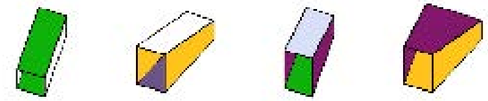
Procedural Typology Generation

USC ARCH 605B
Instructor: Doris Sung
Revit, Grasshopper

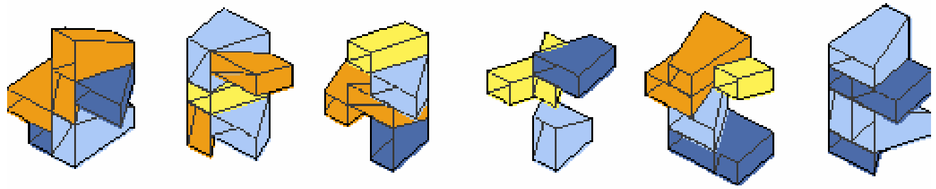
ALGORITHM CUSTOMIZING
PRE-FABRICATED PANEL

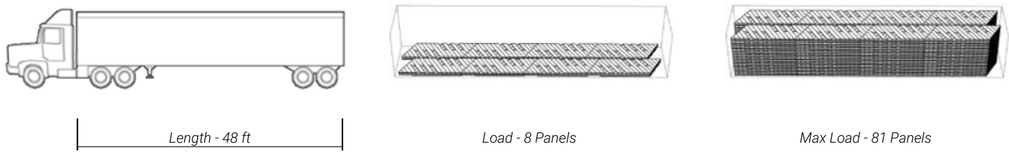
6 Basic Panels
4 Type & Branches
Infinite Choices



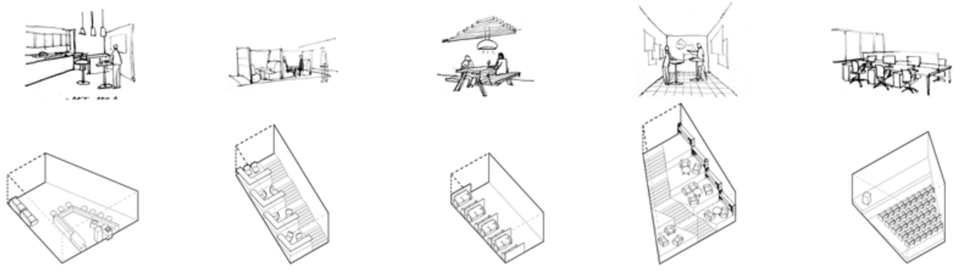


TYPE A TYPE B TYPE C TYPE D





Length - 48 ft *Load - 8 Panels* *Max Load - 81 Panels*



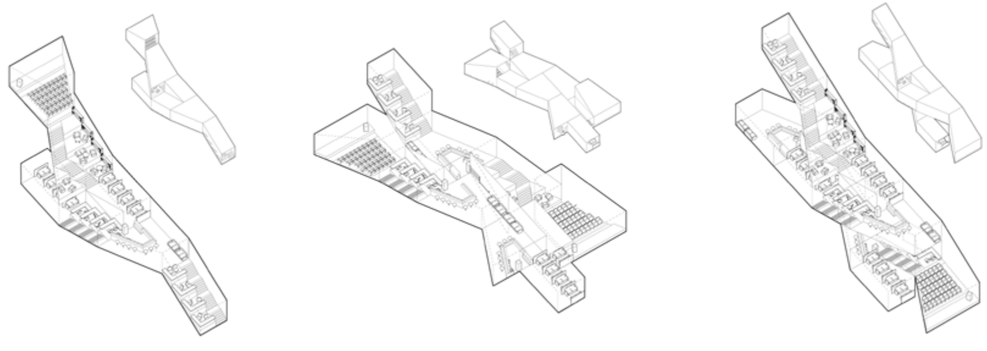
Brached Bar

Stair Workplace

Single Room

Co-working Stair

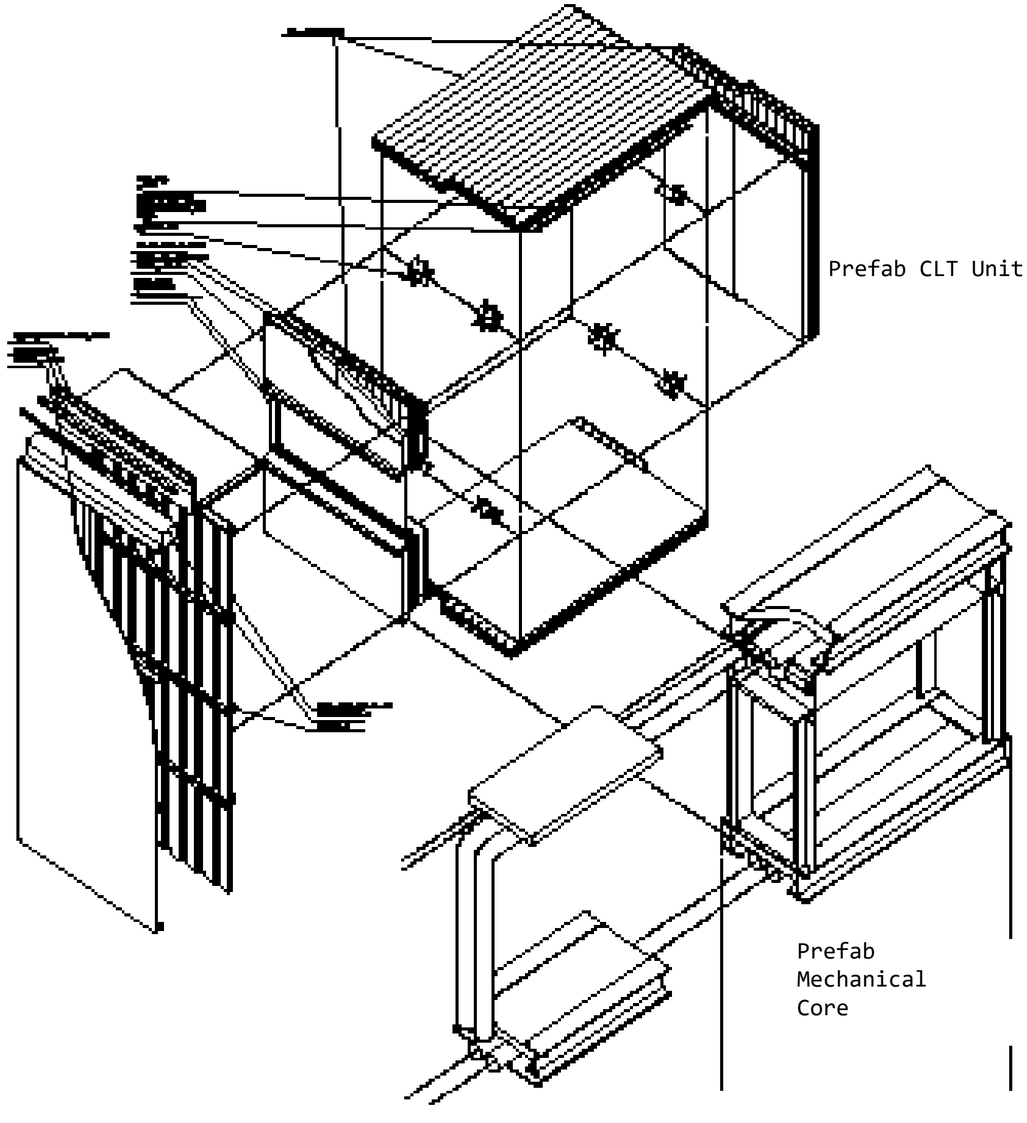
Auditorium

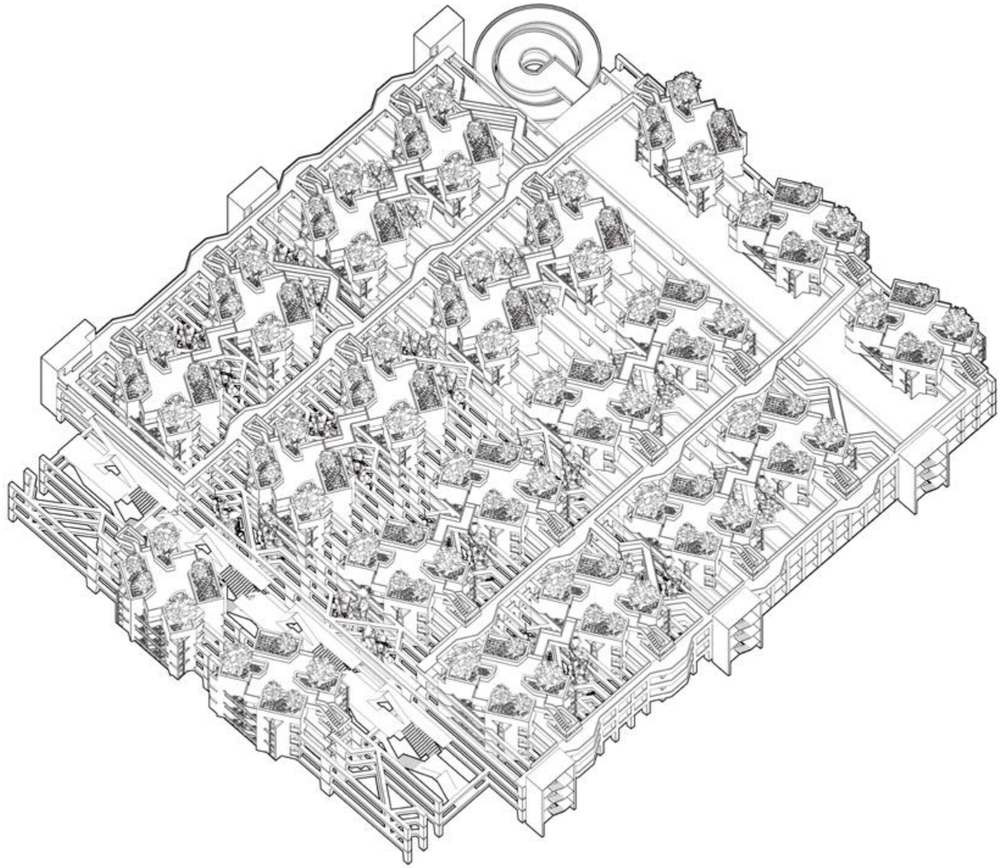


Solution 1

Solution 2

Solution 3

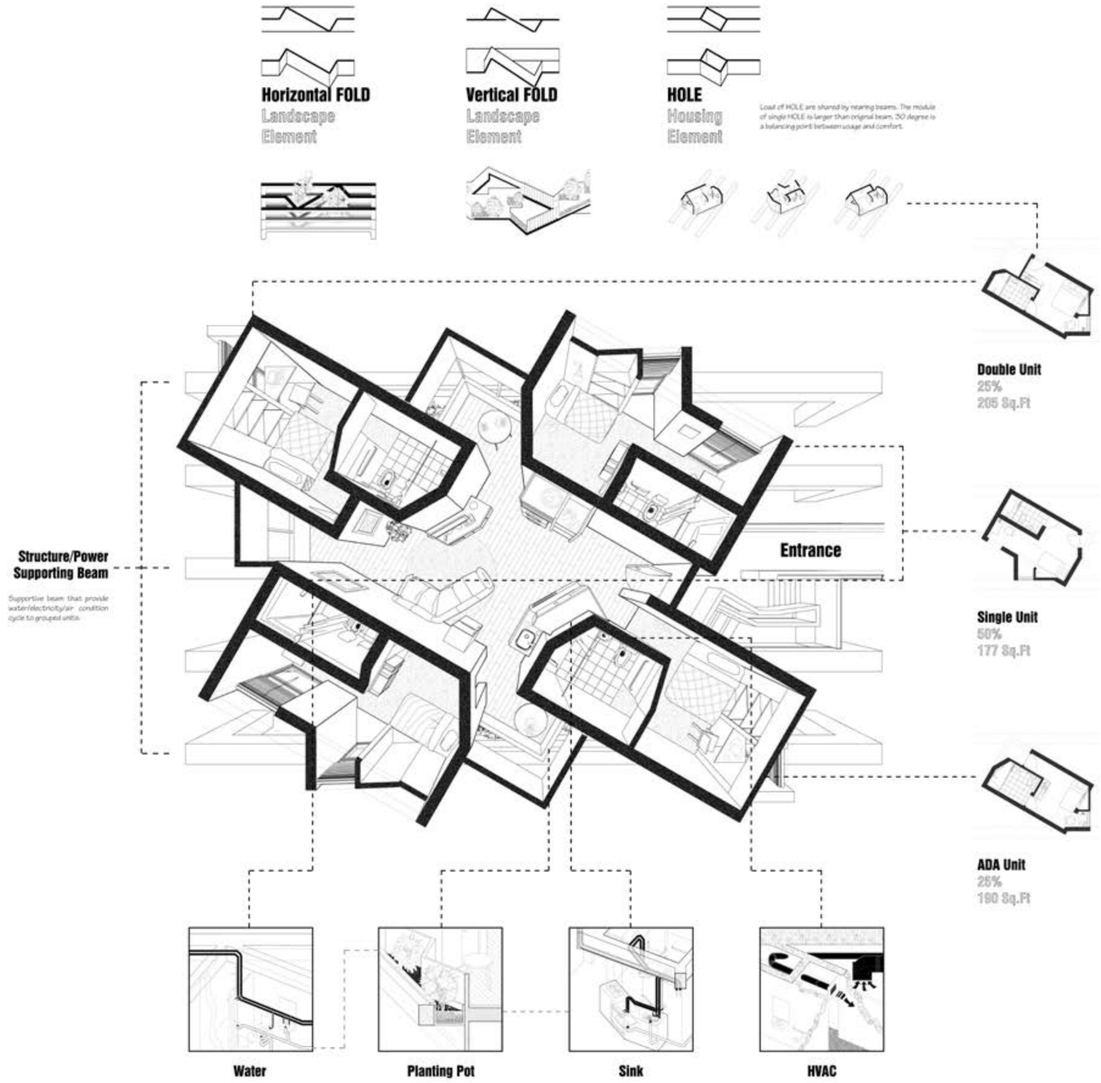


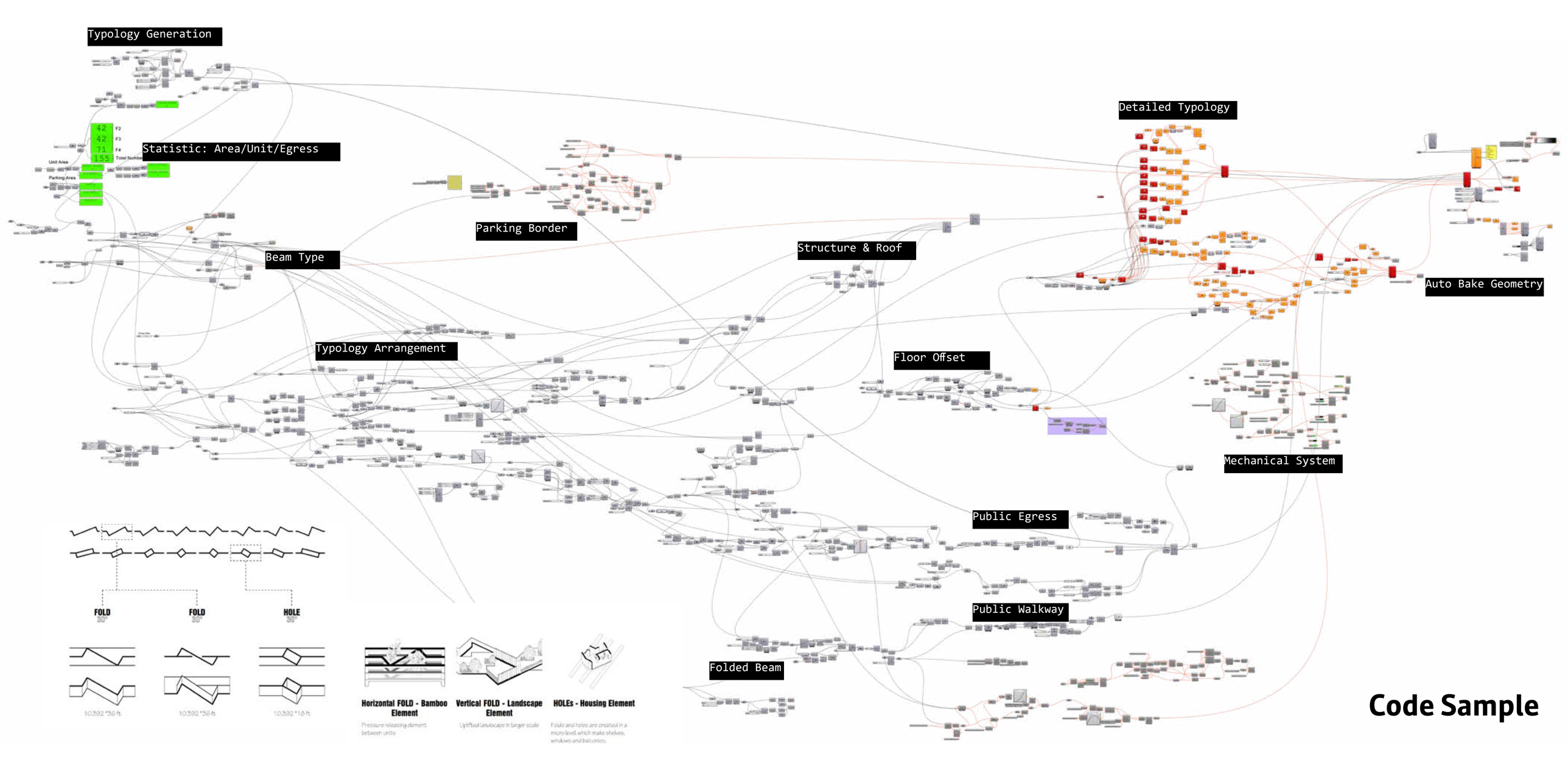


GEN: FOLDs, HOLEs

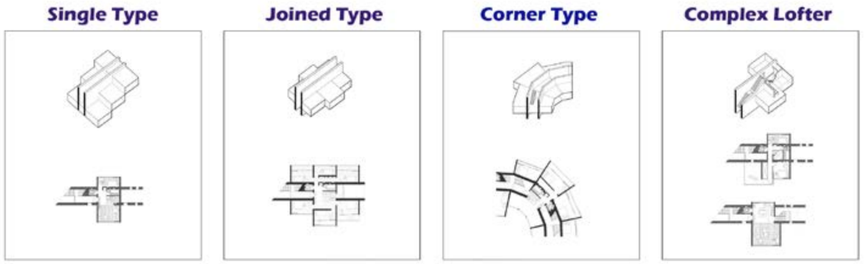
Full-Procedural Architecture Generation

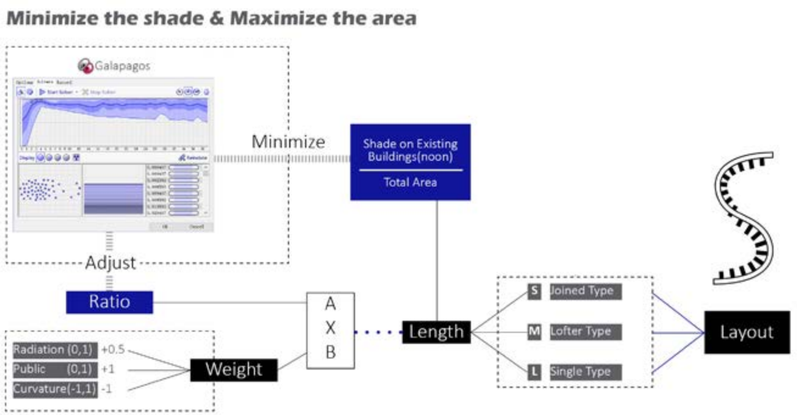
USC ARCH 605A
2019
Grasshopper




Typology Generation
Statistic: Area/Unit/Egress
Parking Border
Beam Type
Structure & Roof
Detailed Typology
Auto Bake Geometry
Typology Arrangement
Floor Offset
Mechanical System
Public Egress
Public Walkway
Folded Beam
FOLD
FOLD
HOLE
Horizontal FOLD - Bamboo Element
Vertical FOLD - Landscape Element
HOLEs - Housing Element

Code Sample





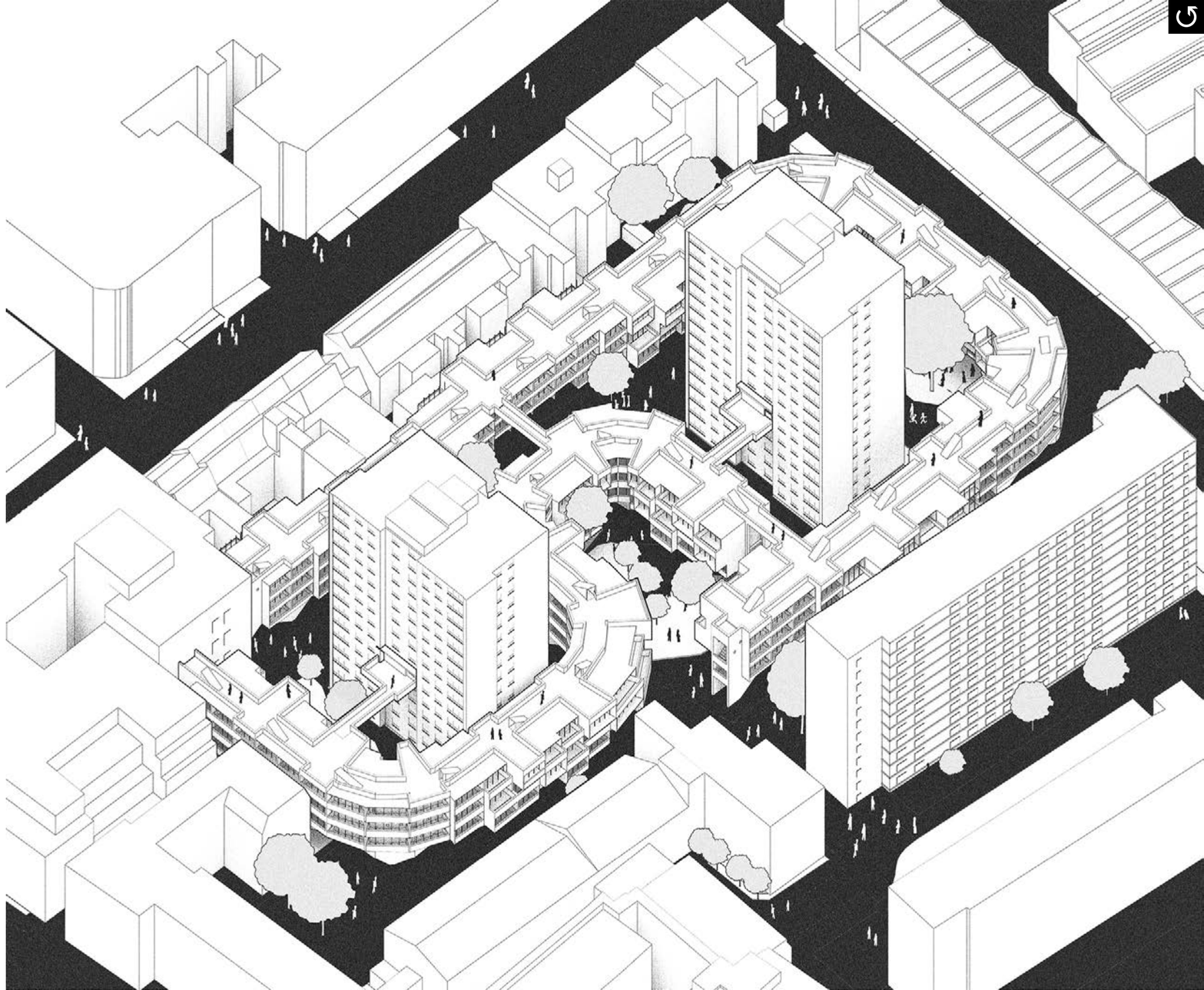
GEN: SHARE THE WALL

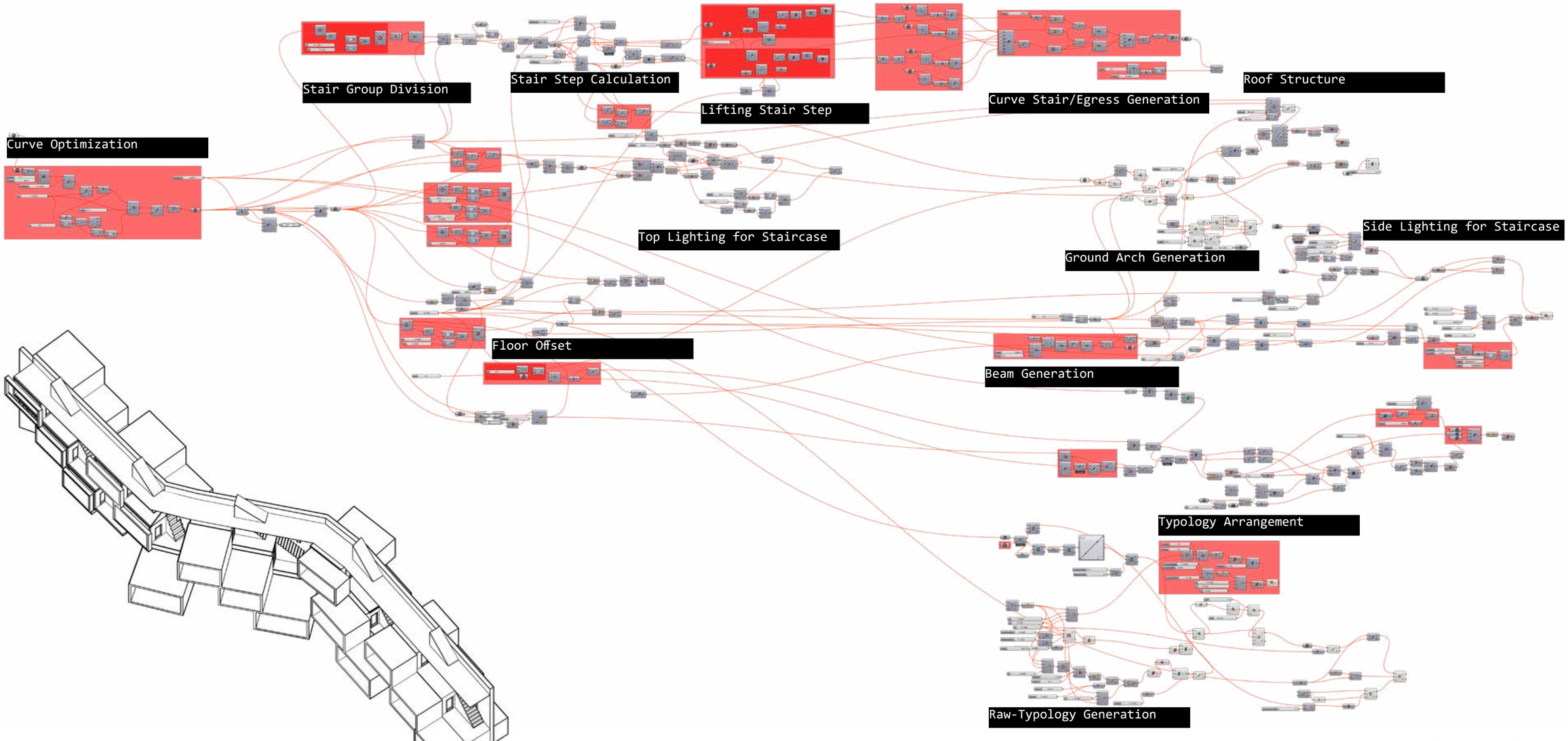
Full-Procedural Architecture Generation

CAFA International Studio

2018

Grasshopper




Curve Optimization
Stair Group Division
Stair Step Calculation
Lifting Stair Step
Curve Stair/Egress Generation
Roof Structure
Top Lighting for Staircase
Ground Arch Generation
Side Lighting for Staircase
Floor Offset
Beam Generation
Typology Arrangement
Raw-Typology Generation

Code Sample

Spatial Behavior

Birth
Spare Space
Outer units
low utilization
fulfilling idle spaces

Death
Limiting Density
Inner units
removing overcrowded space
maintaining density

Social Behavior

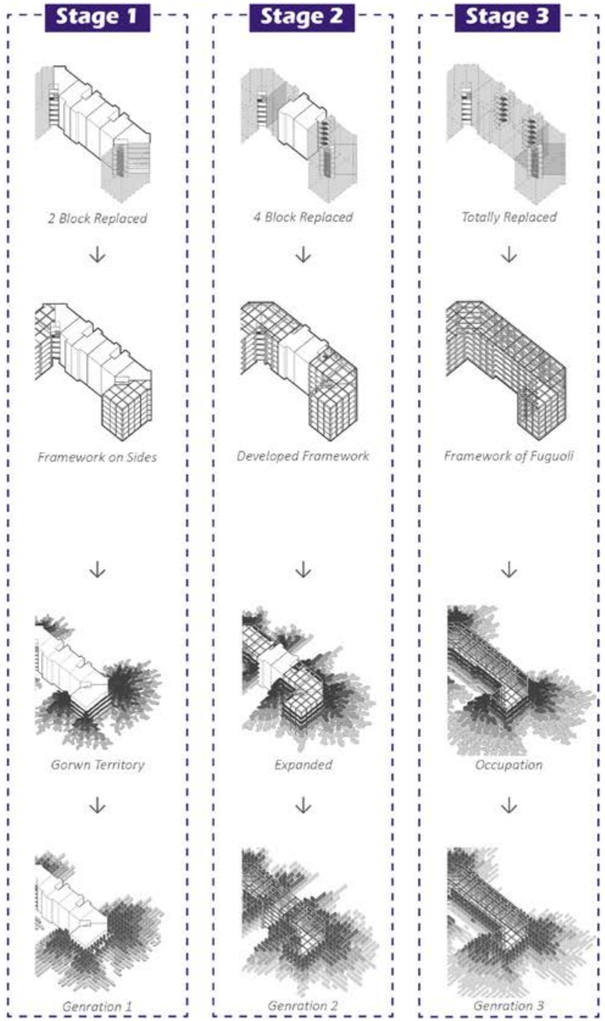
Attracting
Power of Capital
Higher density
Higher profit
Higher utilization

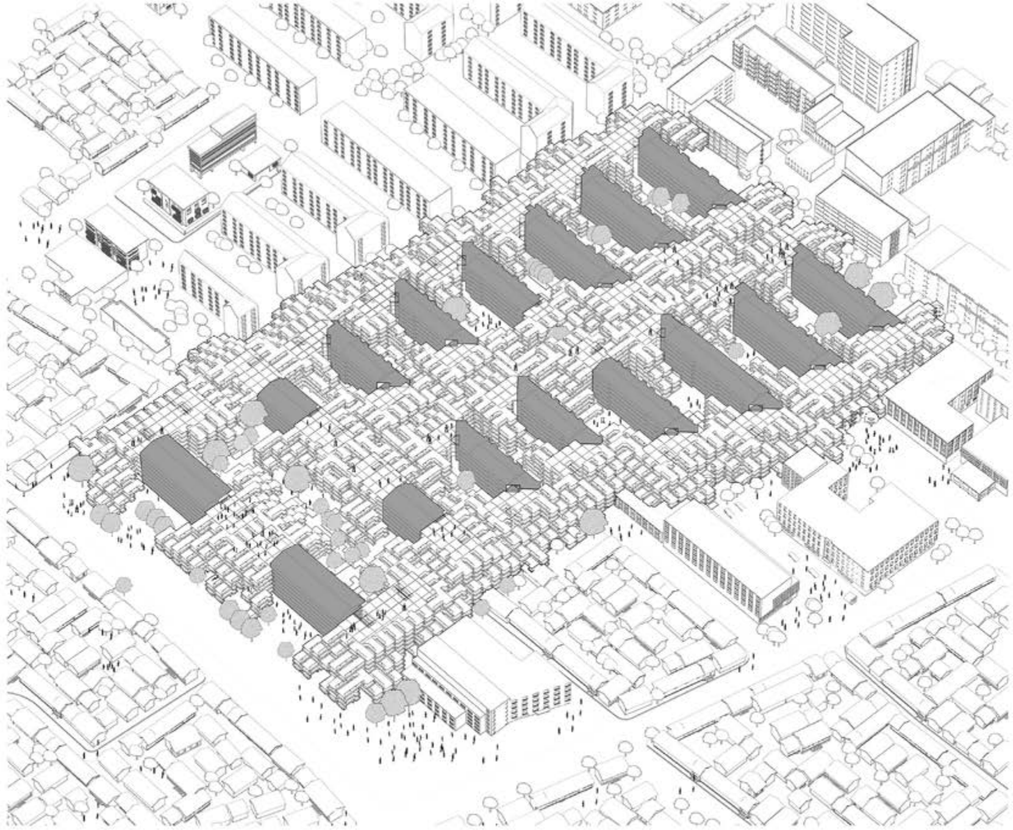
Repelling
Power of Persons
Lower density
Larger personal space
Better sunshine

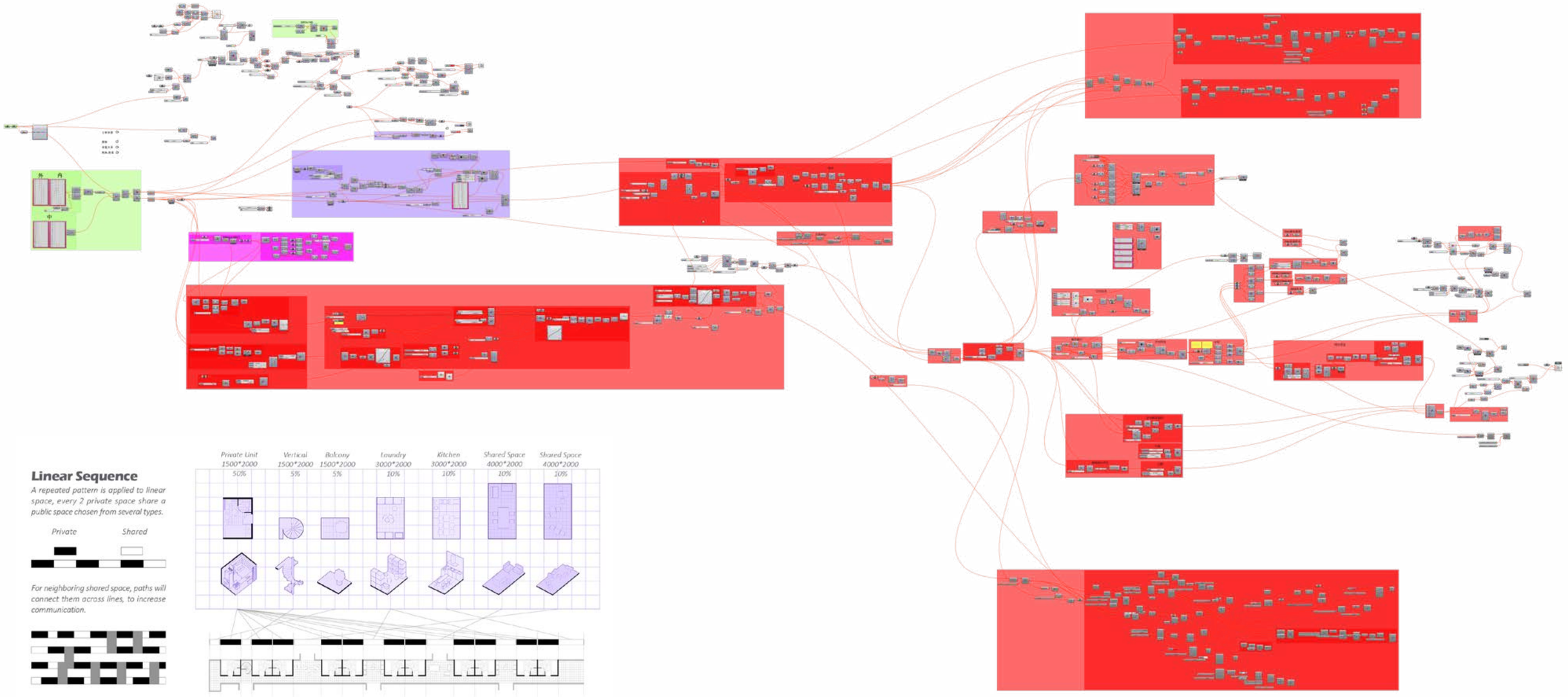
GEN: BIT EROSION

Full-Procedural Architecture Generation

CAFA International Studio
2017
Grasshopper







Linear Sequence

A repeated pattern is applied to linear space, every 2 private space share a public space chosen from several types.

Private *Shared*

For neighboring shared space, paths will connect them across lines, to increase communication.

Code Sample

2016
Bamboo

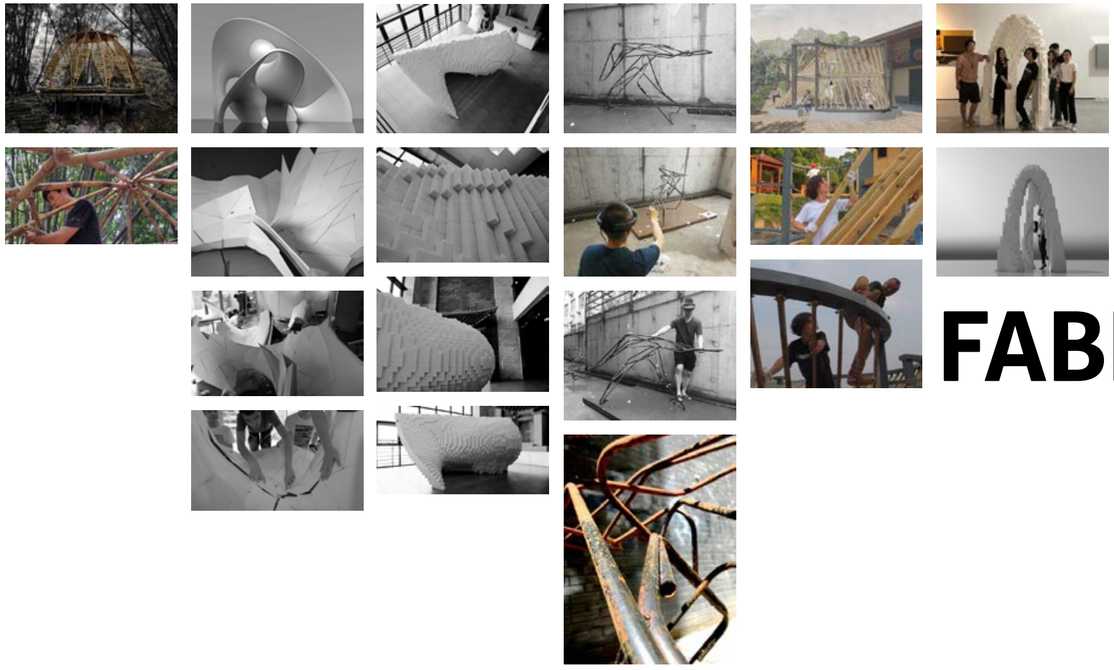
2017
Cardboard

2017
Foam

2018
Steel+AR

2018
Wood
+Tension

2018
Foam



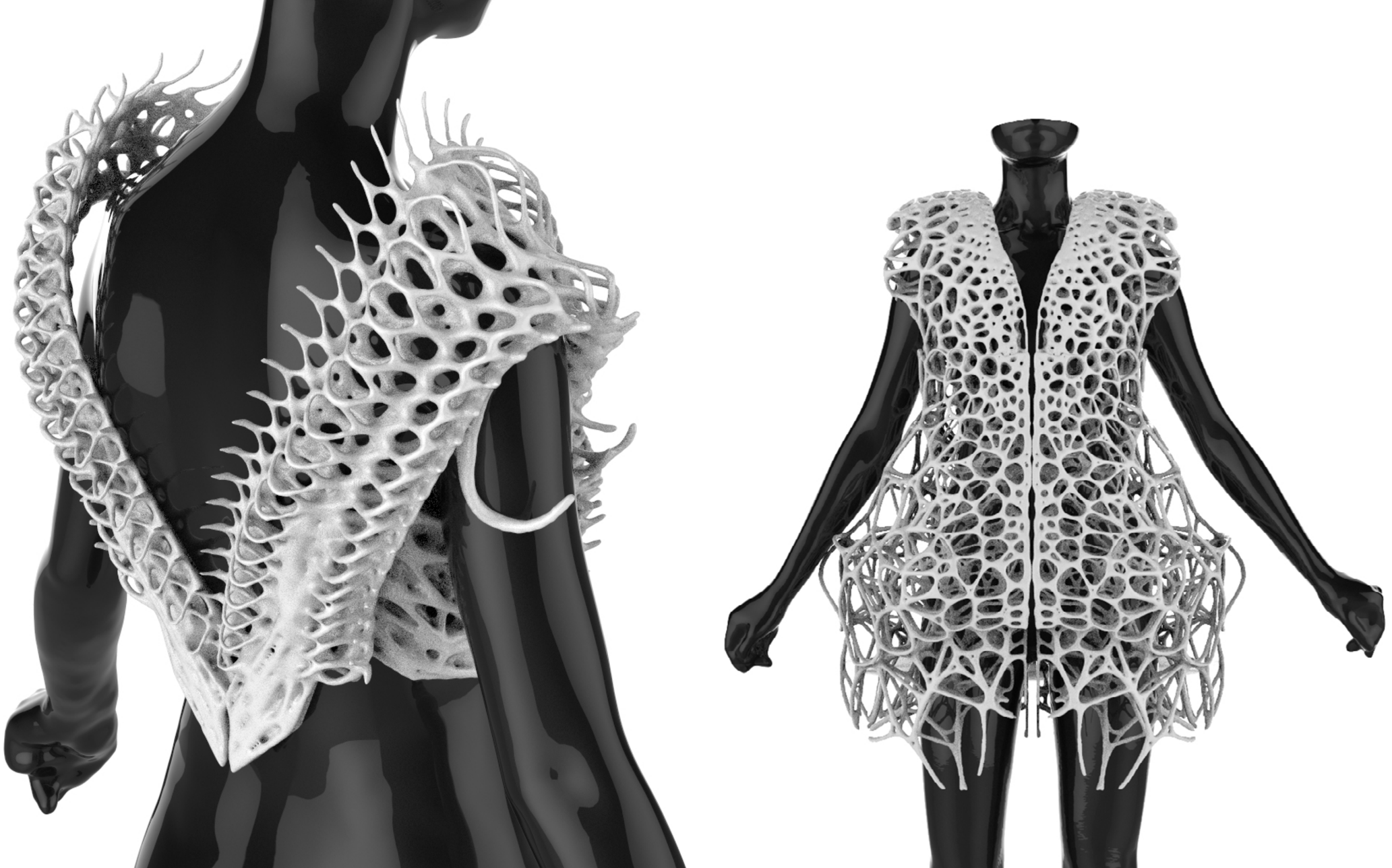
FABRICATIONS

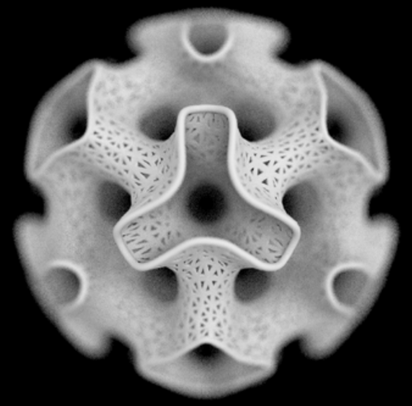
HIVE

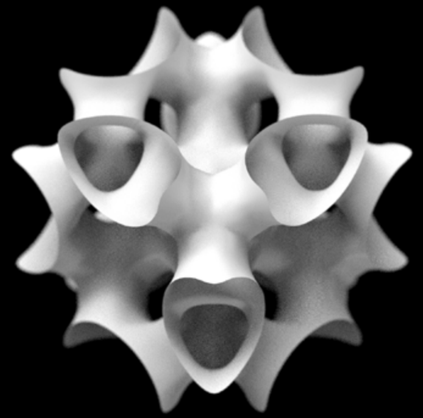
3D Printing Fashion

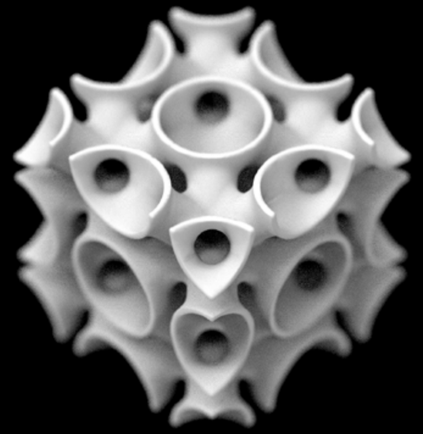
2017

Grasshopper



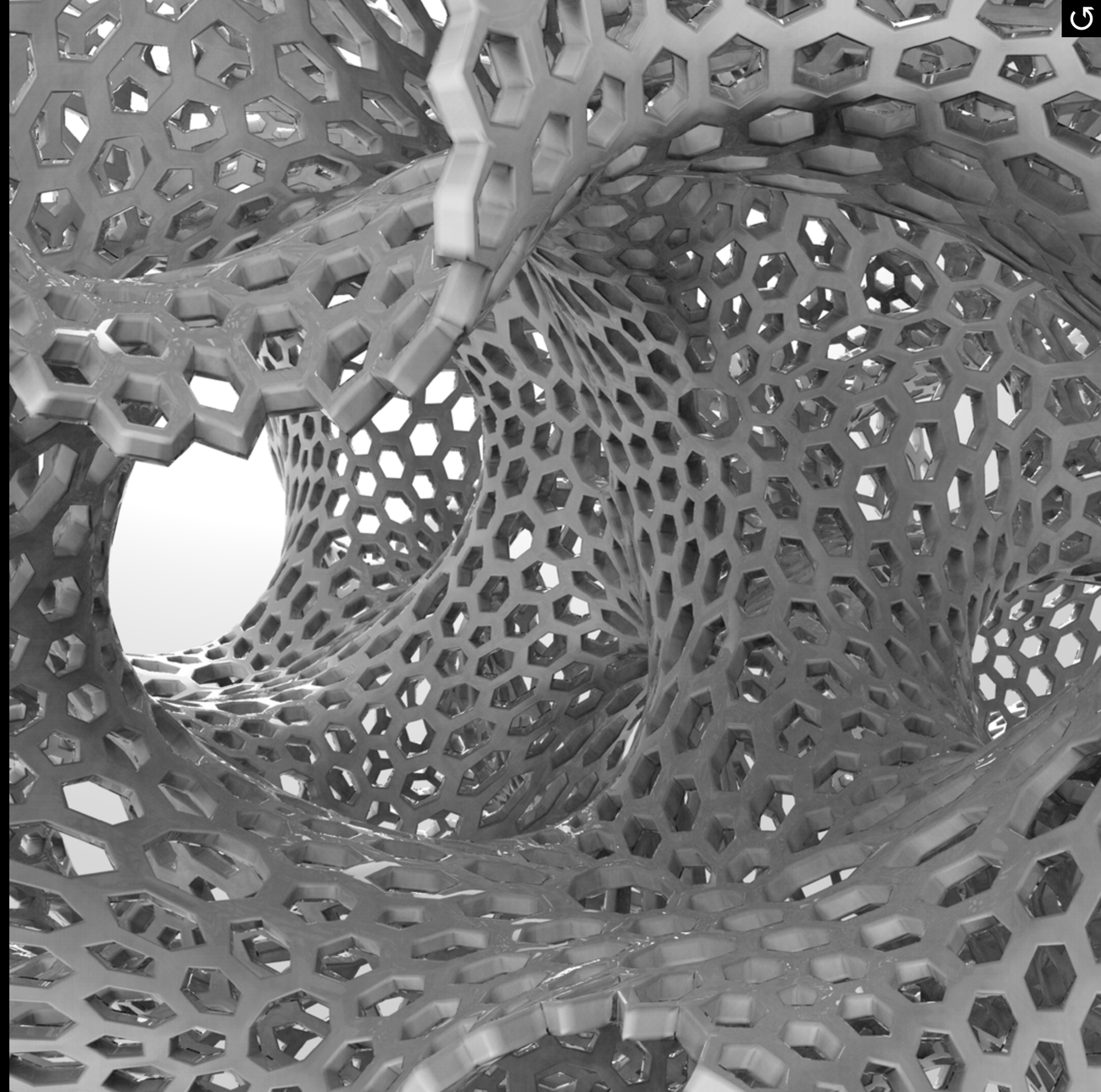


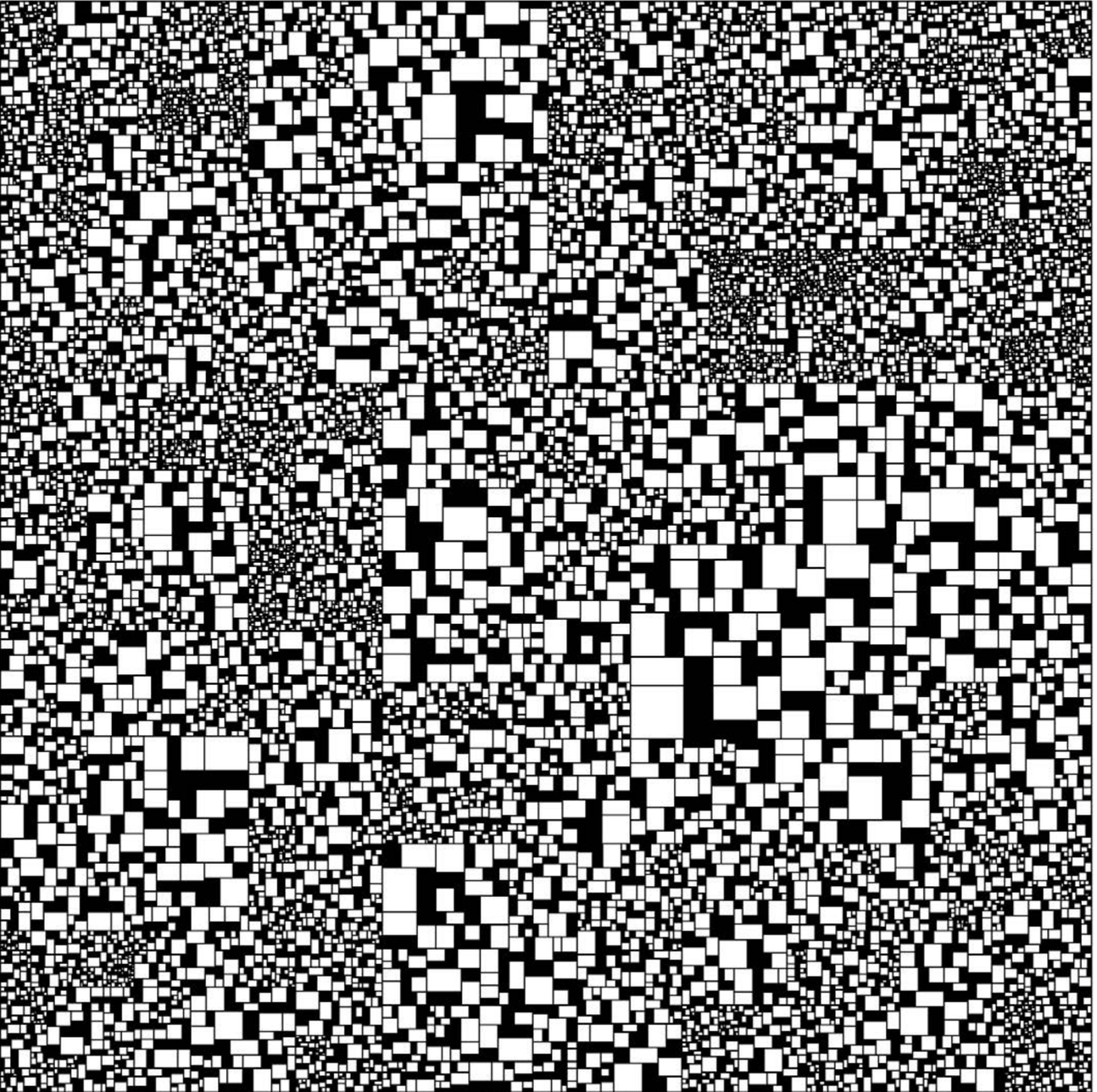


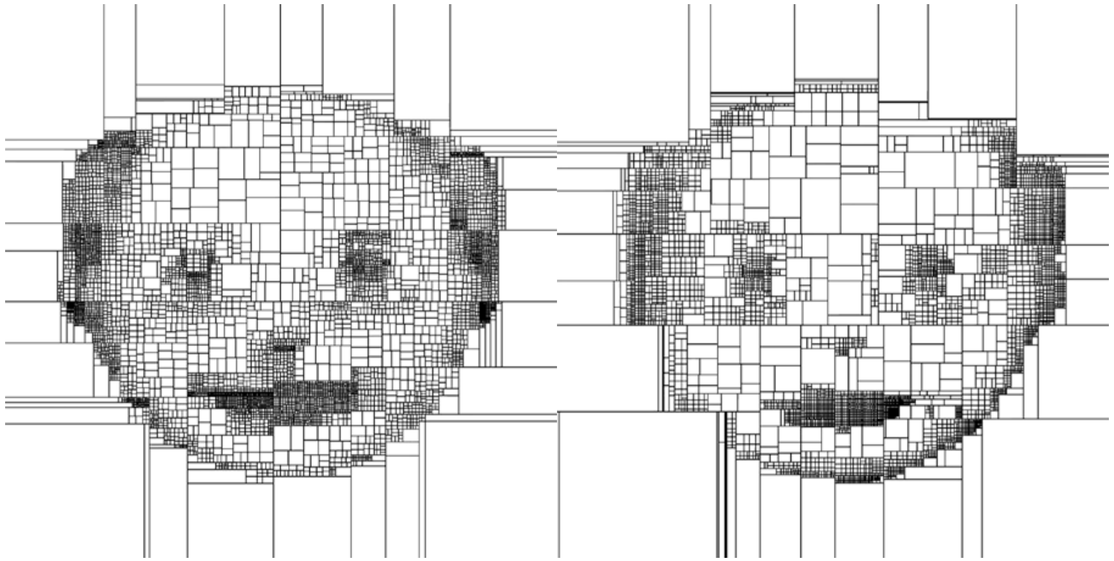


MINIMAL SURFACE RESEARCH

2015
Rhino
Grasshopper





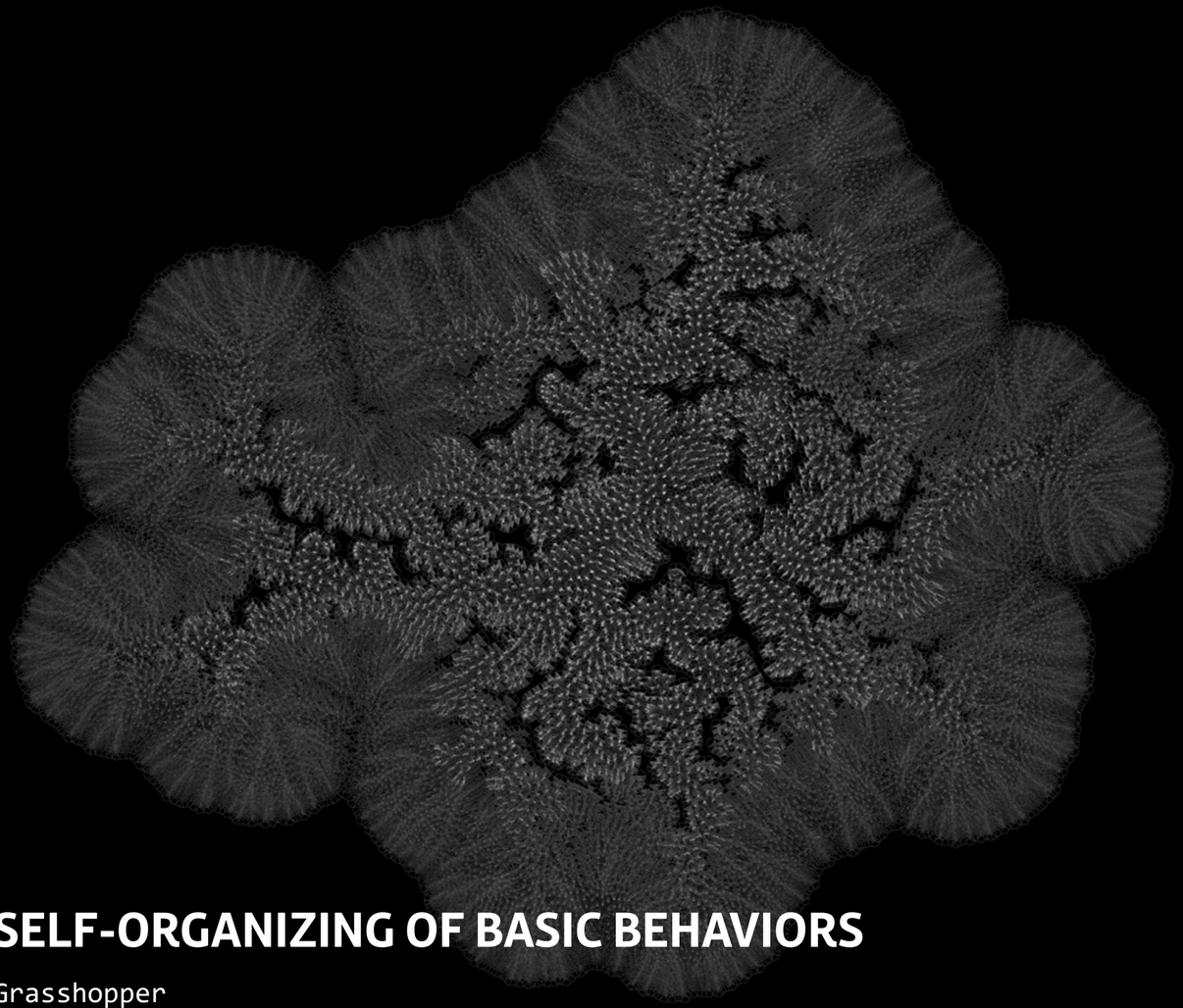


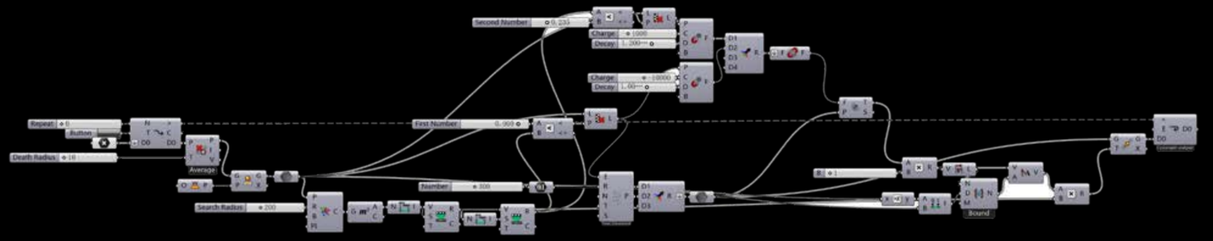
KD Tree Research

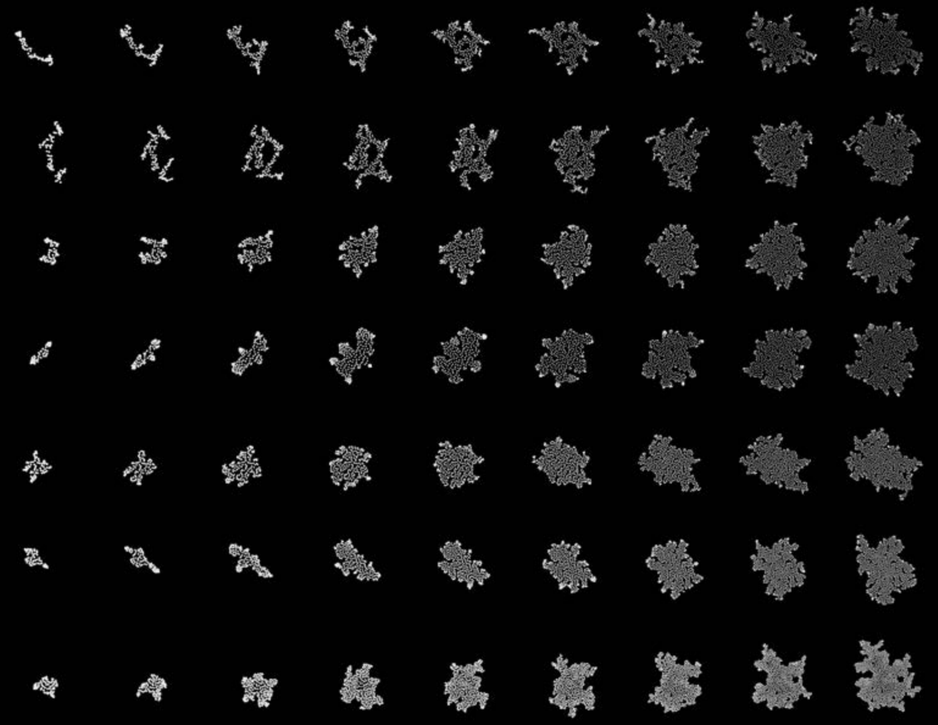
Grasshopper
2019

DIFFERENTIAL GROWTH RESEARCH

Grasshopper
2017

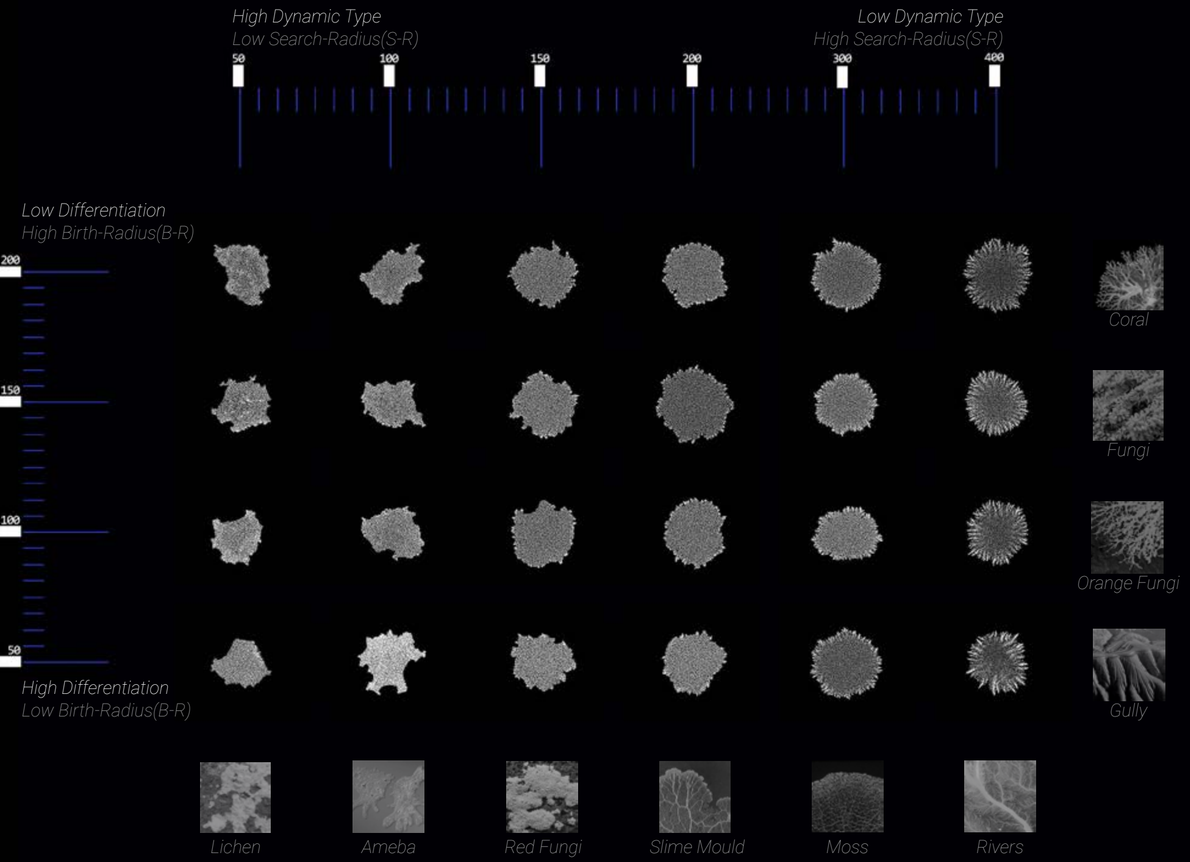


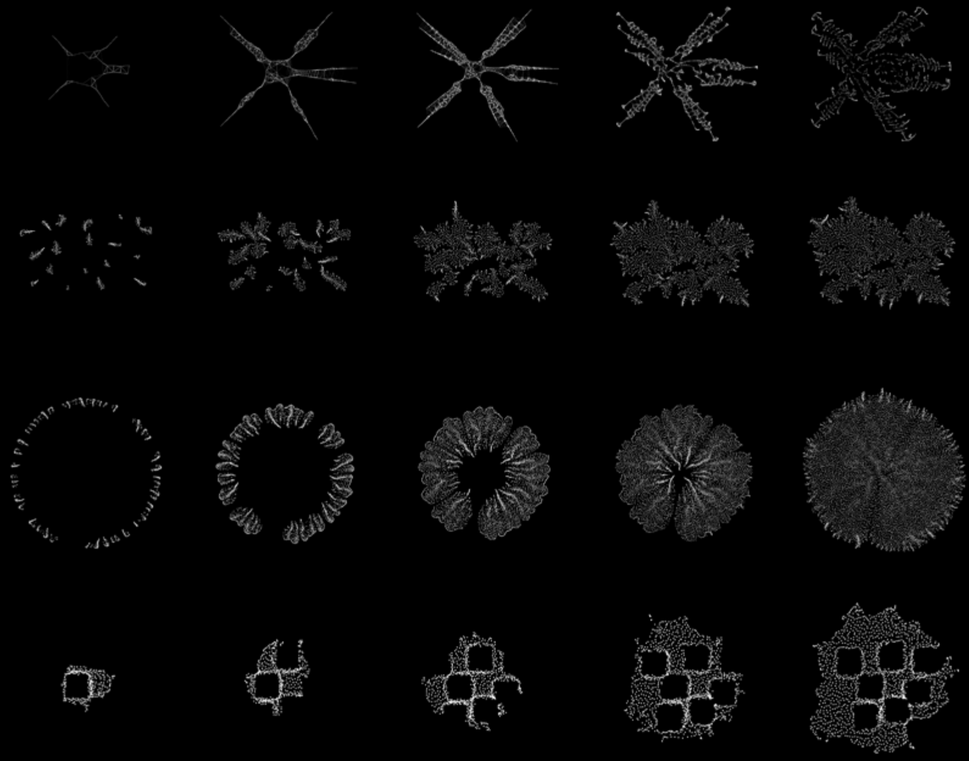


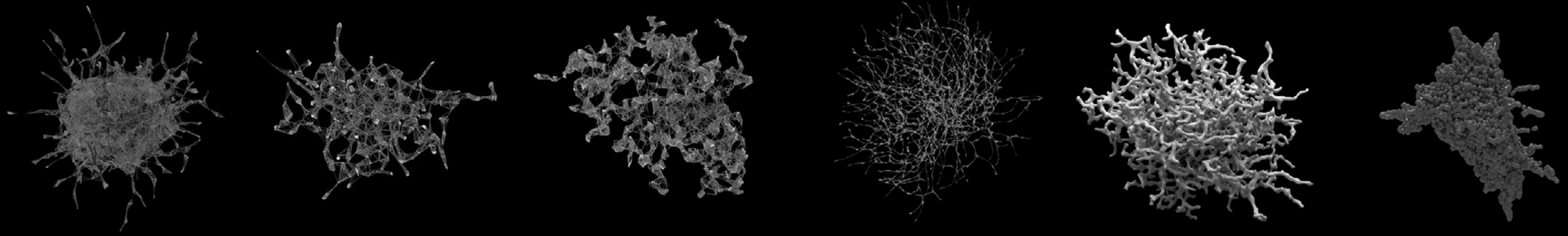


SELF-ORGANIZING OF BASIC BEHAVIORS

Grasshopper
2016


High Dynamic Type
Low Search-Radius(S-R)
Low Dynamic Type
High Search-Radius(S-R)
50
100
150
200
300
400
Low Differentiation
High Birth-Radius(B-R)
200
150
100
50
High Differentiation
Low Birth-Radius(B-R)
Coral
Fungi
Orange Fungi
Gully
Lichen
Ameba
Red Fungi
Slime Mould
Moss
Rivers





THANKS FOR READING

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Visualization Show Reels

http://uvnlab.com/archive/

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