異養建築
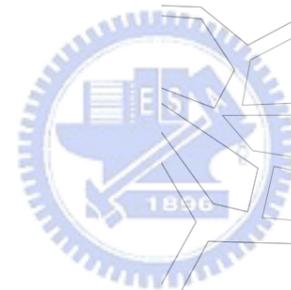## Heterotrophic Architecture

Chia-Ching Lien 06-08 連家慶

異養建築
Heterotrophic Architecture

摘要

在生物界，生物採用有機物作為能量來源則稱為異養（heterotrophic）生物，
反之如果採用自然作為生長的能量，則為自養（autotrophic）。

那在建築上，異養建築（Heterotrophic Architecture）可以說是透過建築
以外的〝有機物〞來作為設計發想的背景，這〝有機物〞可以是 哲學、心理、
聲音，科學、藝術..等，透過這些非建築理論來重新思考建築的可能性是這篇設
計論文的主要目標。

在傳統建築設計，常透過建築理論作為設計的發想背景，像都市脈絡、環境、行
為活動..等，以讓建築產生了固定的模式、固定的組織、固定的構成，這讓建築
有了深厚的背景，相反的也讓建築失去了其他可能性的機會，本設計論文嘗試打
破這傳統的包袱，讓建築有更多可能性的機會，這些可能性的背後需要有理論作
為背景，可以運用其他非建築的理論來達成設計的邏輯推演，而產生新的構成方
式。

本設計論文分別透過三種不同的理論作為背景，1. 心理 （建築師的下一步）
2. 哲學（ 易經 ） 3. 藝術（ Golio romano ），在這些背景的支撐下，發展新的
設計可能性。

本設計論文包含了我在交通大學建築研究所設計組 2006年~2008年這兩年
的設計、媒材實驗、參與研究案的成果

關鍵字：建築、設計、壓縮、重組、哲學、易經、藝術

Abstract

In the biosphere, the biology obtains food from organic material as energy is called heterotrophic organism. Otherwise
if it makes it`s own food naturally as energy is called autotrophic organism. Then in the Architecture. The idea of the
design of the heterotrophic architecture would be shown that is on the bas of " organic materials ", for example,
Psychology, Psychology, Sound, Science, Art and soon, is out of the construction. The essential target of this design thesis
 is by the un-architectural theories to re-think possibility of the architecture.

In the traditional architectural design, people gets associated with the architectural theory as the background of the
design. Like the Urban context, the environment, the action etc, it makes architecture cause the fixed pattern, the fixed
organization, the fixed constitution, This makes the deep influence of the architecture. On the other hand , it makes the
less chance of possible opportunities. Be hind these possibilities, it needs theories to support and it could use other
un-architectural theories to achieve the logic of design. Therefore, it produces the new constitution.

Get through this design thesis, there are three kinds of different theories as background, 1. Psychology (the architect`s
next step) 2. Philosophy (I-Ching) 3. Art (Golio romano).

It promotes the new possibility of design under these theories supporting.

This design thesis contains my design, Media Experiment, and the achievement of being participating in the research in
the NCTU institute of Architecture in 2006-2008

Keyword: Architecture , Design , Compression , Recombinant , Philosophy , I-Ching , Art

Content

Attend project

**The project:** Dimension compression
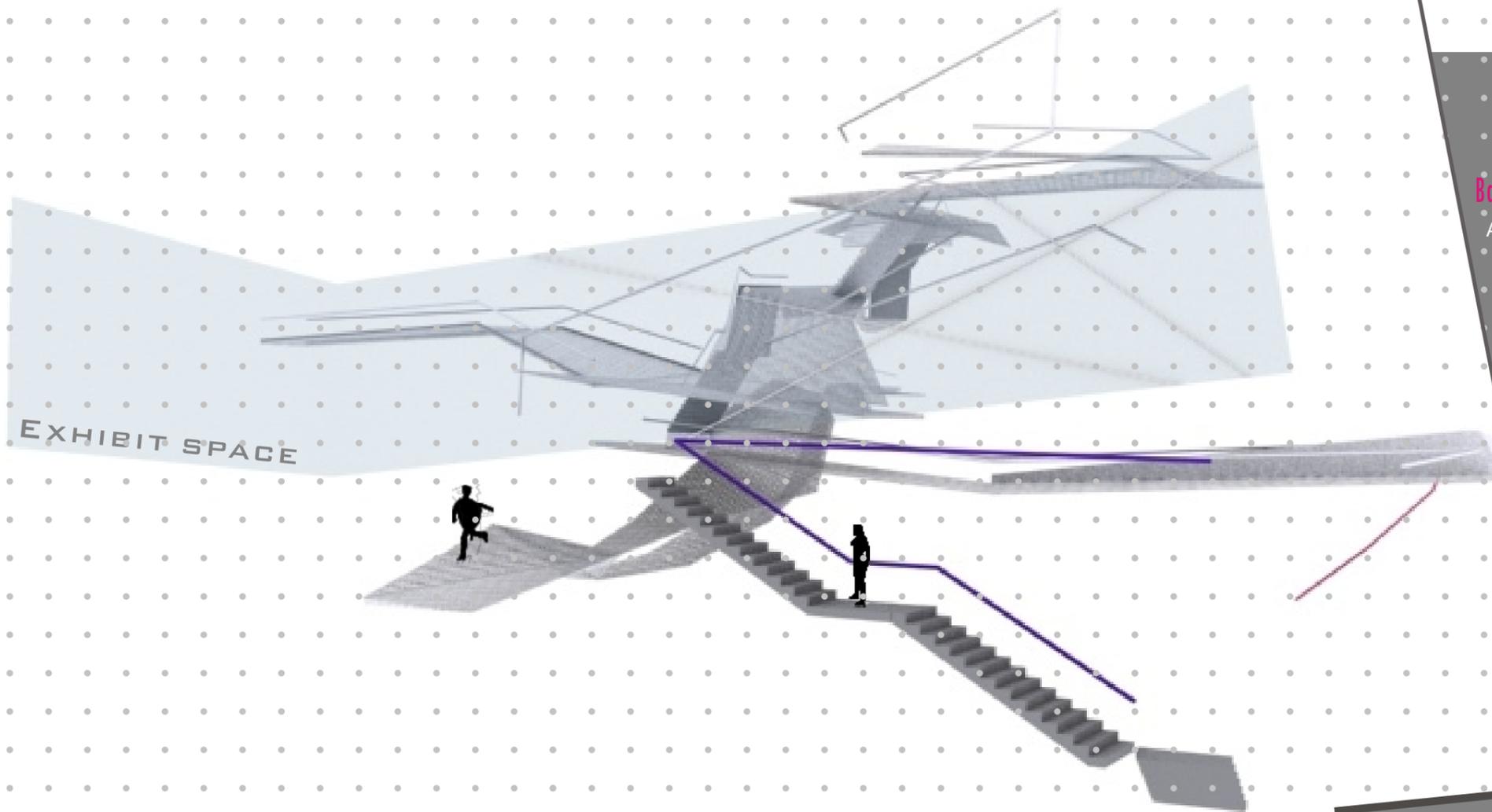
Back to the future: digital thinking learning from history

Analyzing one great architecture in history, from pre-historical to early-21 century, via its thorough concepts possibly (but not necessarily) involving functional/pro-grammatic, constructional, artistic, historical, philosophical, social/cultural, and scientific/technological characteristics. Think about Pantheon, Baroque, Forbidden city, La Familia, and even Toyo Ito's Media center.
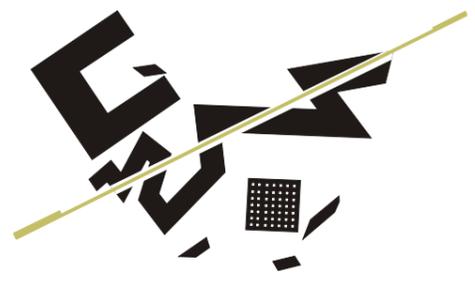
Re-exploring the great concepts of the architecture you are learning by digital thinking and digital technology

EXHIBIT SPACE

In berlin
Jewish Museum
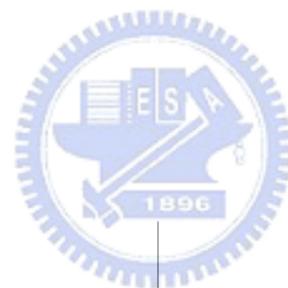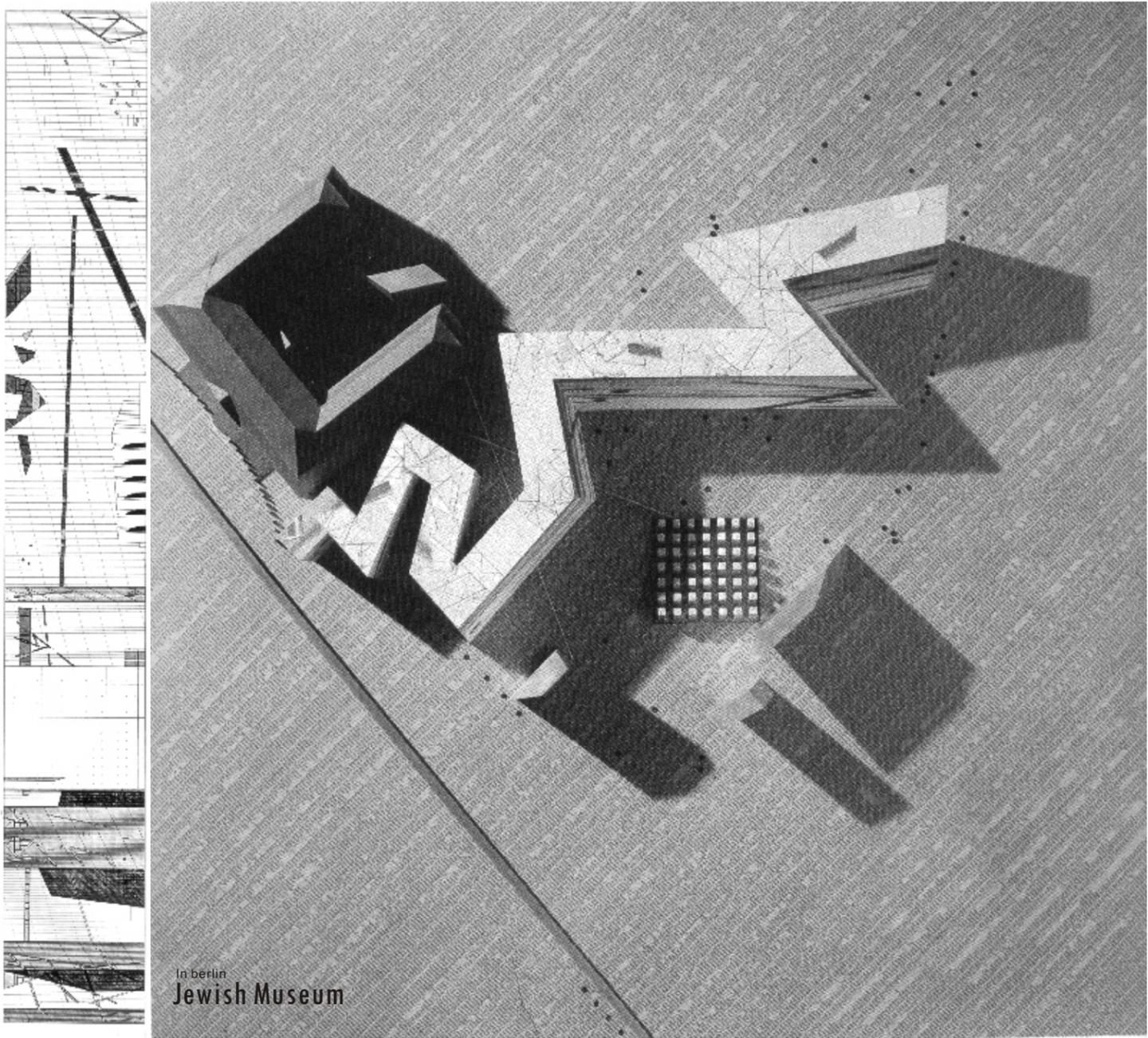
Research Architect: Daniel Libeskind
Jüdisches Museum Berlin
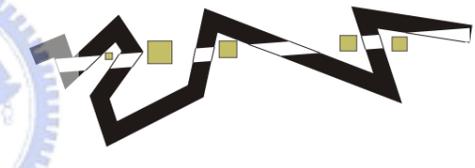
Character

實空間

虛空間

Develop
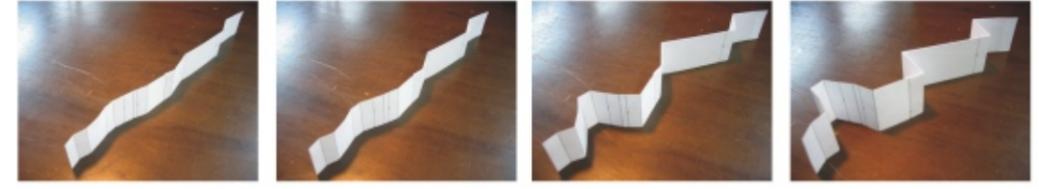
折

Character

Area
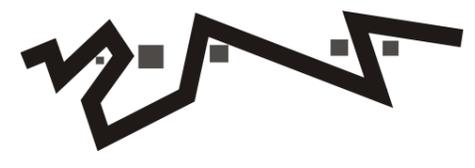
Join
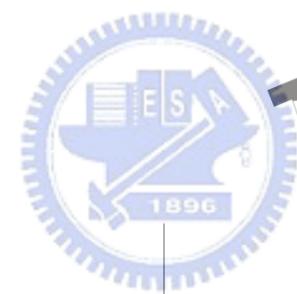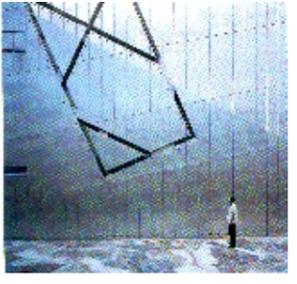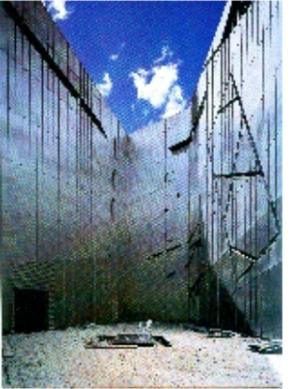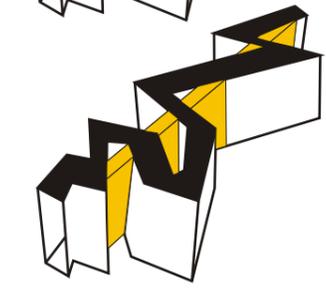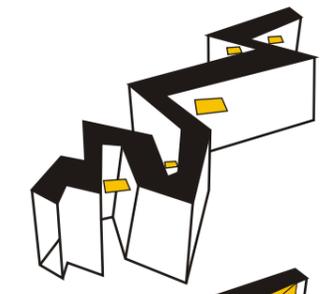
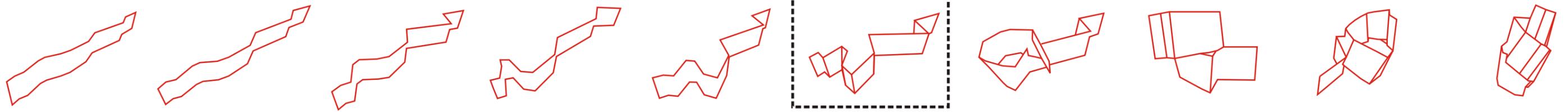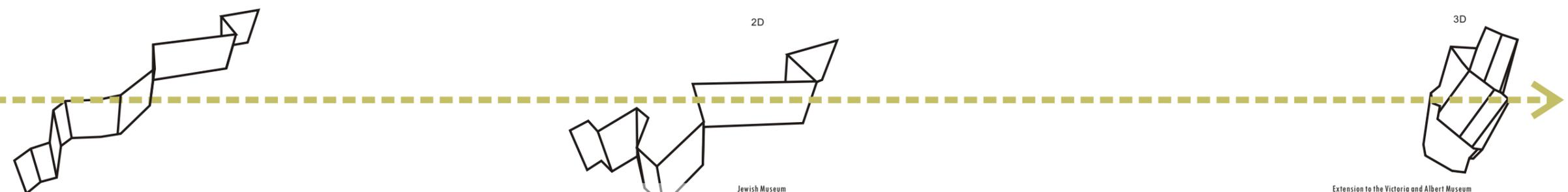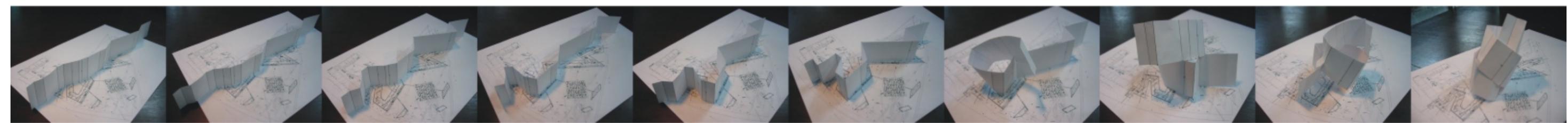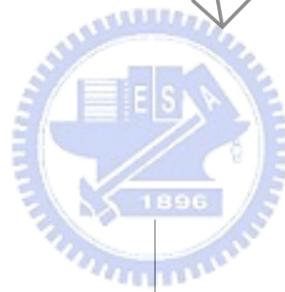# Concept Develop

直線　　　　　　　　　　　　　　折線　　　　　　　　　　　　　　　　　　　　　　　曲線
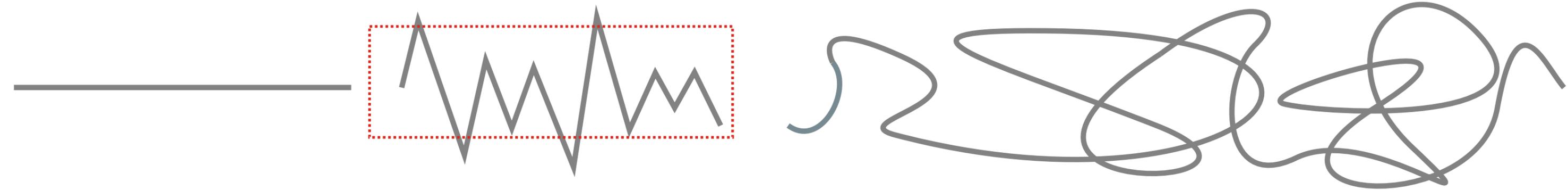
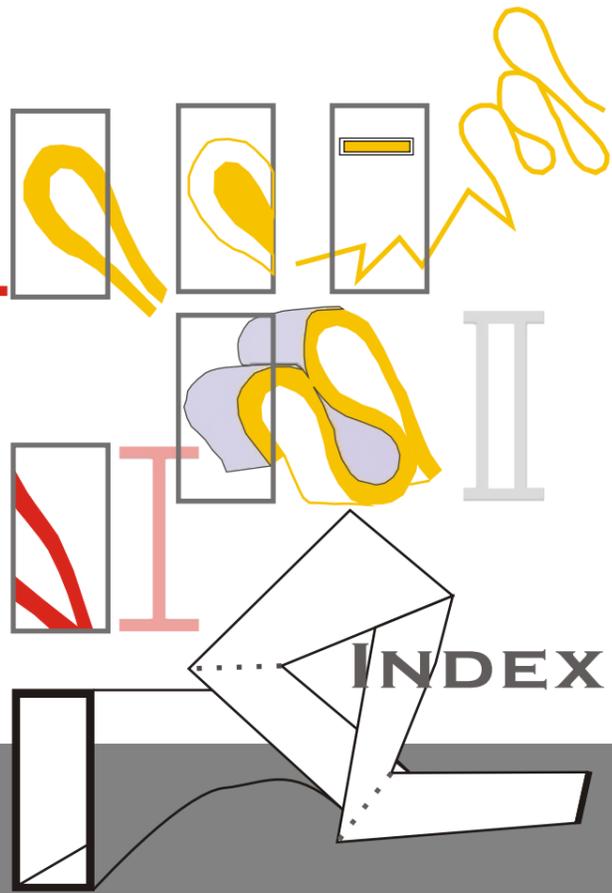## Develop

當直線要演變至曲線，透過節點的增加而形成折線再繼續增加而趨近於曲線的過程

Compression

2D　　　　　　　　　　　　　　　　　　　　　　　　　　　3D

Jewish Museum　　　　　　　　　　　　　　　Extension to the Victoria and Albert Museum
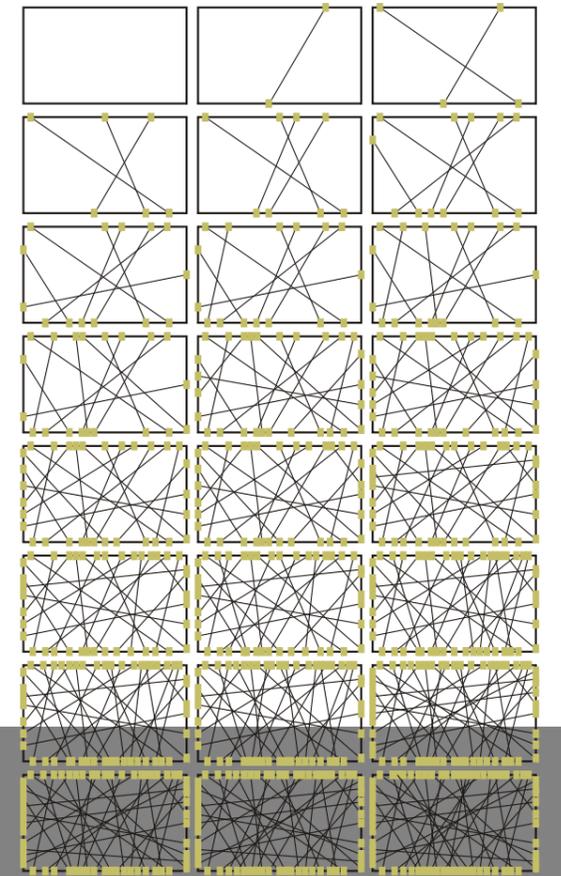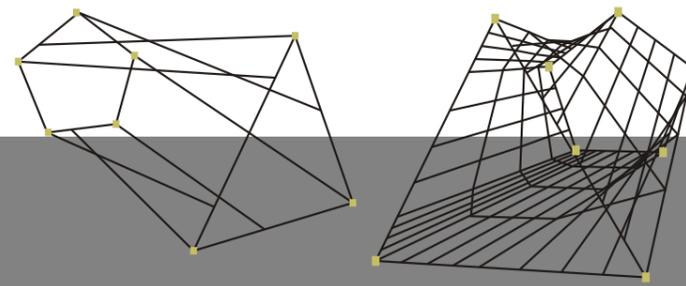
在李伯斯金的設計發展上，可以看到他在設計思考上的轉變，試圖從2D的〝折〞轉變至3D的〝折〞

Concept Develop

INDEX
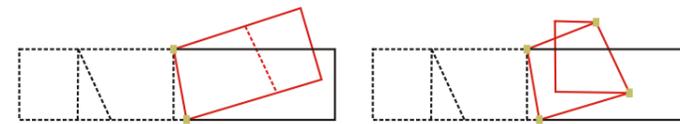
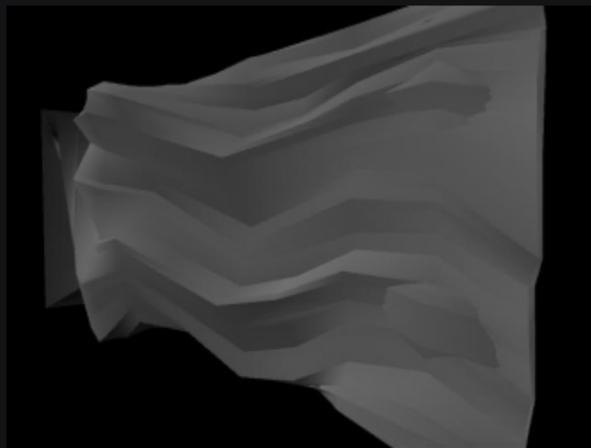## Principle

Triangle to Pentangle

當直面要轉變成曲面中，每增加一條結線與兩個節點可趨近於曲面，而形成空間壓縮

Dimension compression
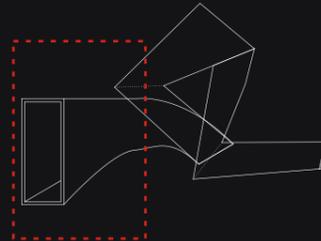
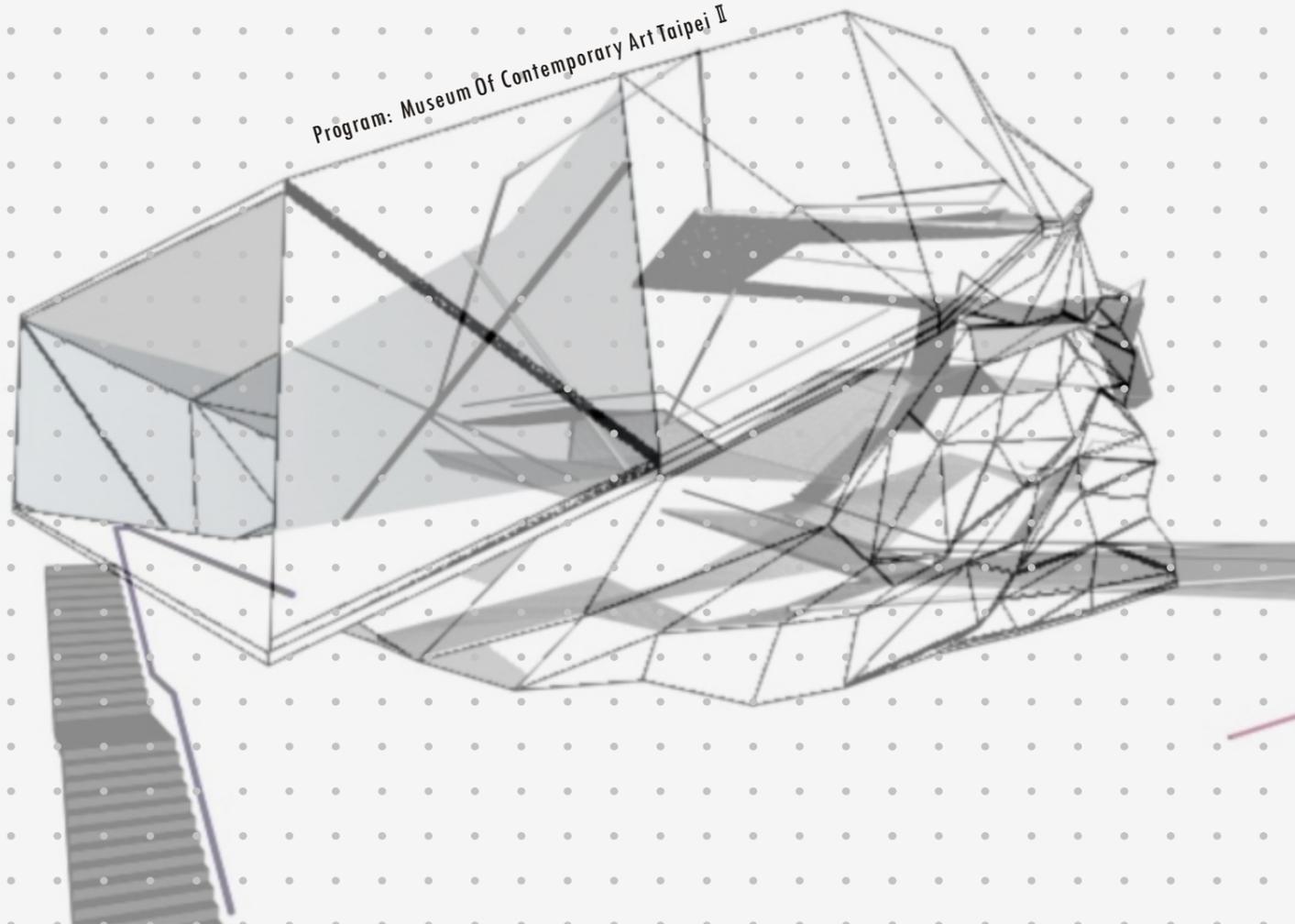Research Architect: Daniel Libeskind

Principle

Compression

從方形的空間開始,節點的增加
使空間越折越小,壓縮空間

From the square shape spatial start, the node
increases causes the spatial booklet to be smaller,
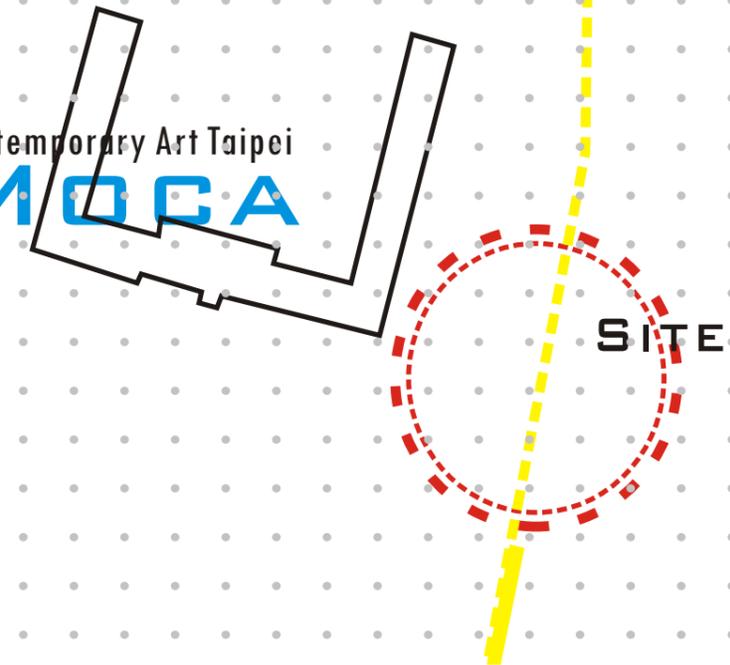compression space.
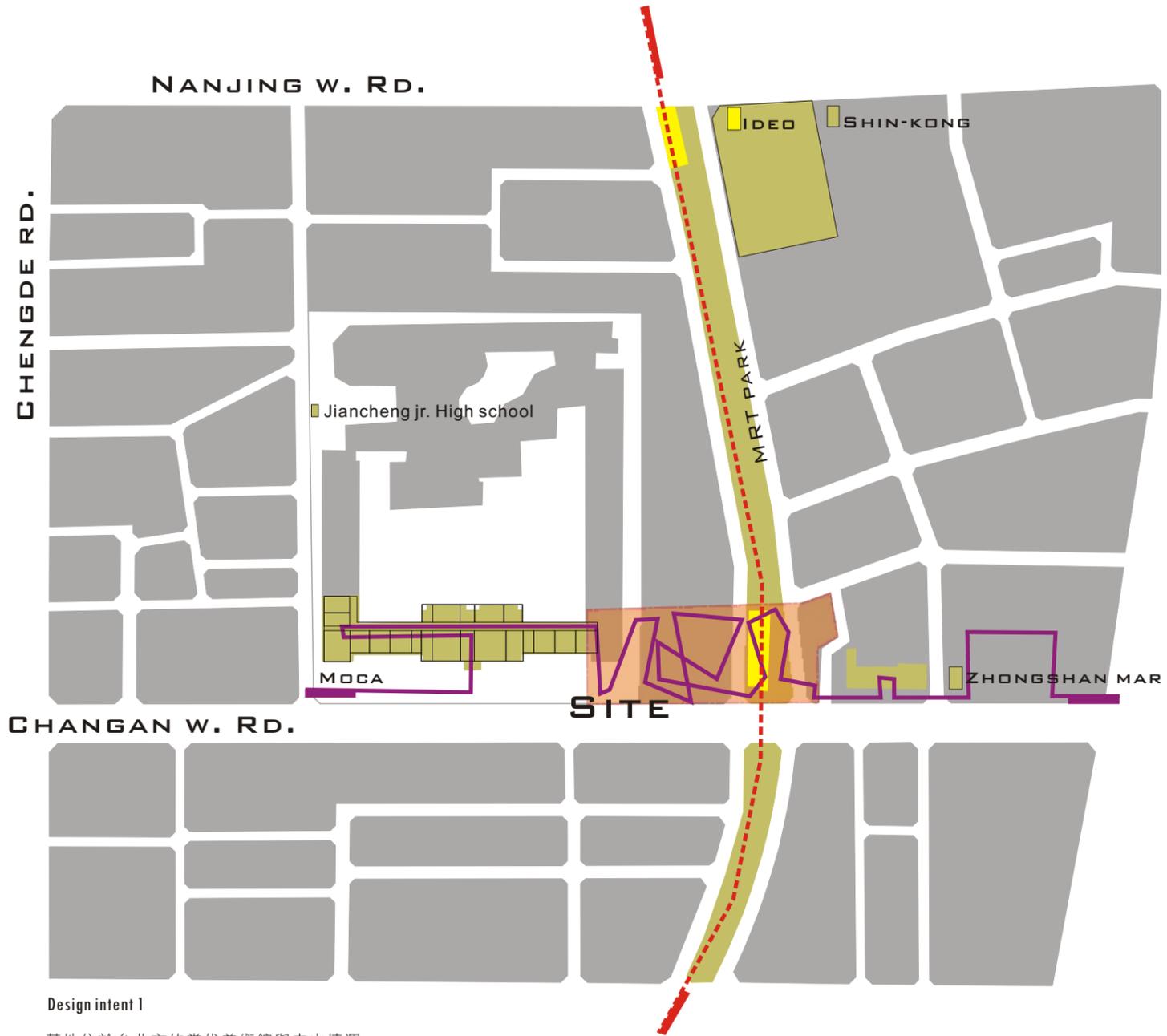
Program: Museum Of Contemporary Art Taipei II

Site Analysis

Museum Of Contemporary Art Taipei

MOCA

Site

Site Analysis

NANJING W. RD.

CHENGDE RD.

IDEO SHIN-KONG

Jiancheng jr. High school

MRT PARK

MOCA

ZHONGSHAN MAR

SITE

CHANGAN W. RD.
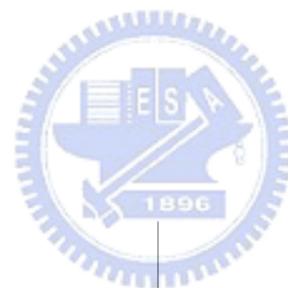
Design intent 1

基地位於台北市的當代美術館與中山捷運
站線帶中間，連結當代美術館與捷運線帶
加強當代美術館與捷運線帶的連結性

Design intent
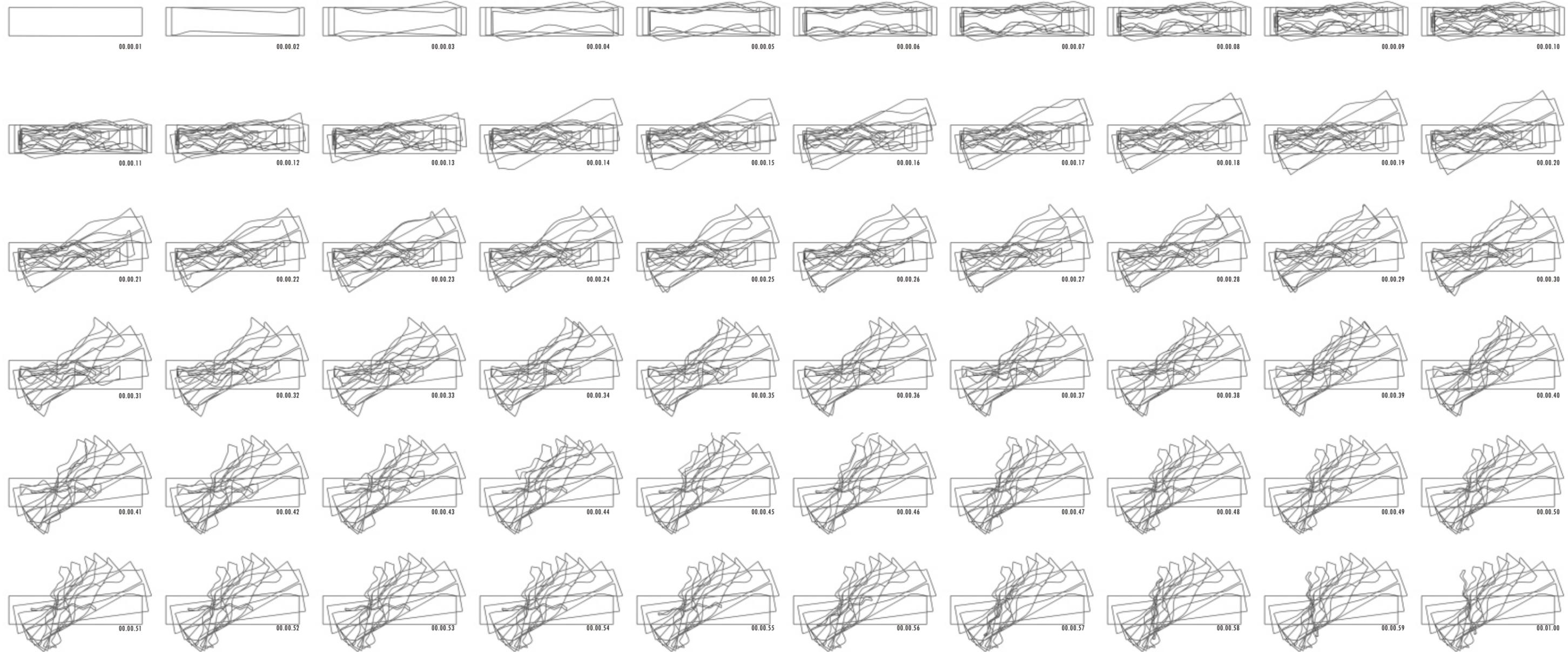

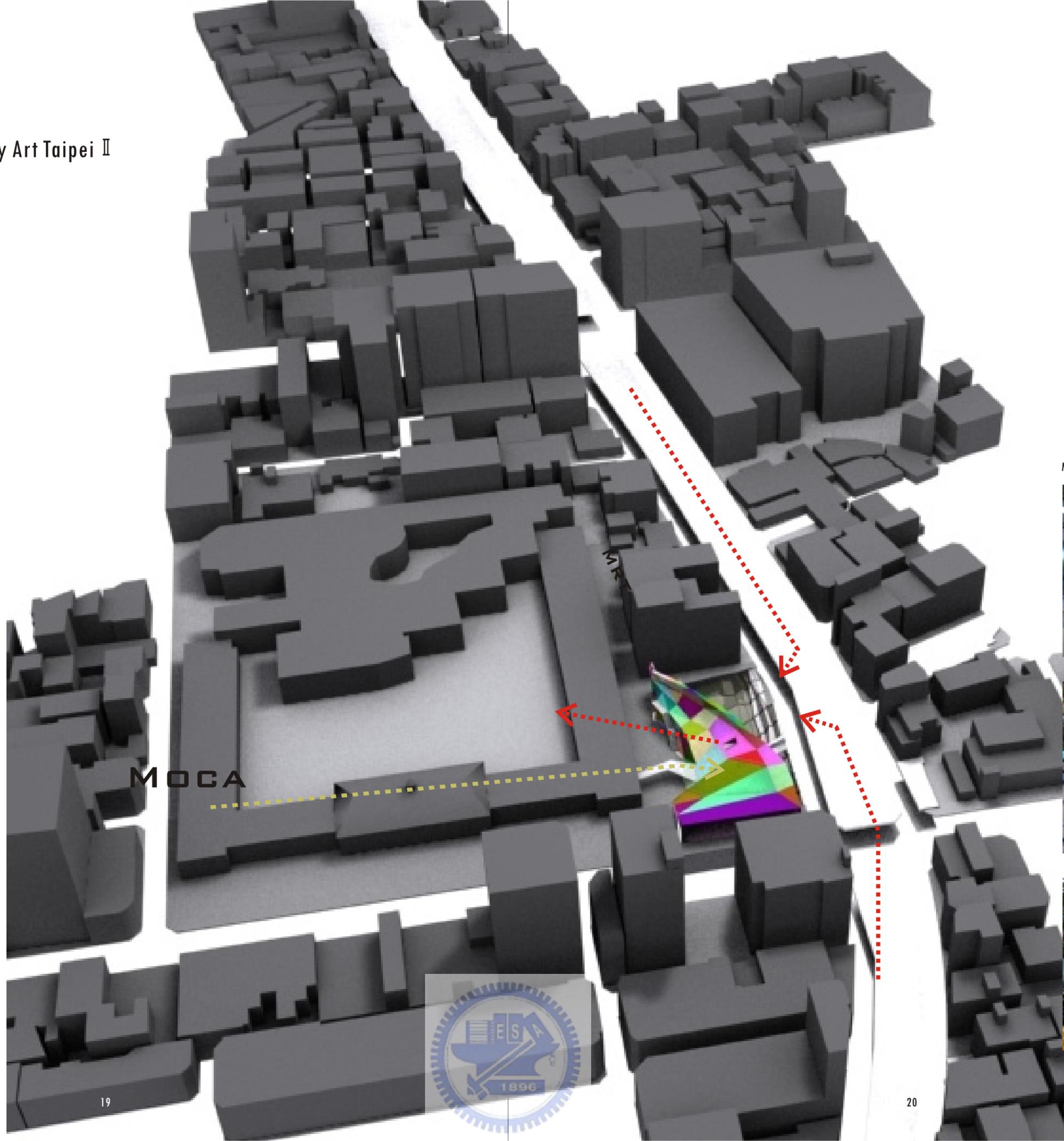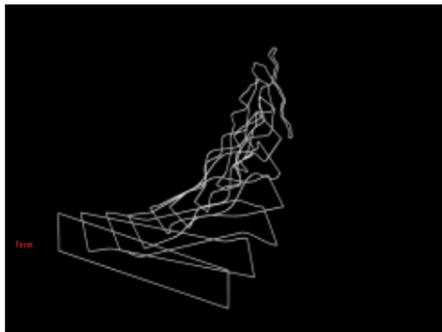Design intent 2

在當代美術館前，長安西路鄰接面有固定尺寸的立面比例，延續這立面比例，作為空間變形的開始
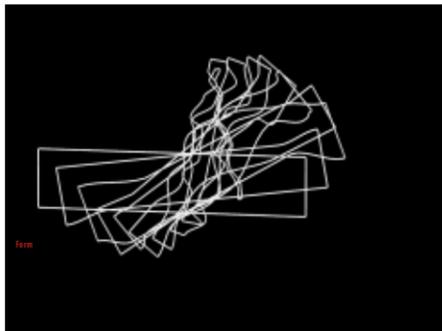
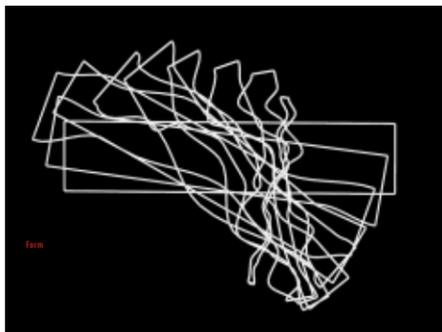# Design Algorithm

00.00.01	00.00.02	00.00.03	00.00.04	00.00.05	00.00.06	00.00.07	00.00.08	00.00.09	00.00.10
00.00.11	00.00.12	00.00.13	00.00.14	00.00.15	00.00.16	00.00.17	00.00.18	00.00.19	00.00.20
00.00.21	00.00.22	00.00.23	00.00.24	00.00.25	00.00.26	00.00.27	00.00.28	00.00.29	00.00.30
00.00.31	00.00.32	00.00.33	00.00.34	00.00.35	00.00.36	00.00.37	00.00.38	00.00.39	00.00.40
00.00.41	00.00.42	00.00.43	00.00.44	00.00.45	00.00.46	00.00.47	00.00.48	00.00.49	00.00.50
00.00.51	00.00.52	00.00.53	00.00.54	00.00.55	00.00.56	00.00.57	00.00.58	00.00.59	00.01.00

Museum Of Contemporary Art Taipei Ⅱ

Final Form

MRT Green Park

MRT

MOCA

19

20

CHANGAN W. RD.
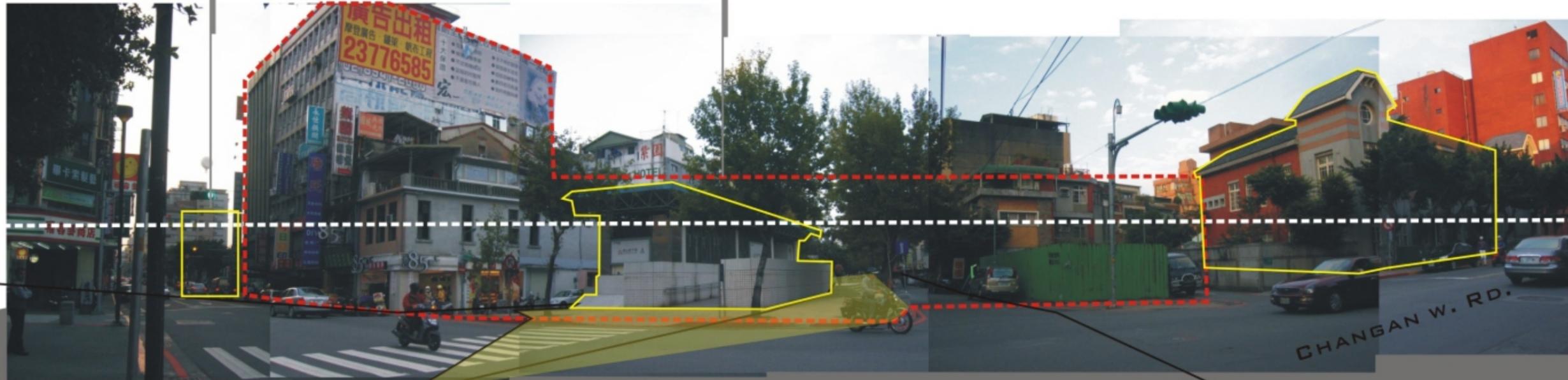
Site Existing

基地與 MRT 綠帶公園連結關係

MRT

Moca Ⅱ

Route

Entrance

Stage

Coffee shop

Store

Service

Rock climbing

Climbing space

Open space

Coffee shop

Store

MRT park

---

climbing space

Develop concept

實

虛
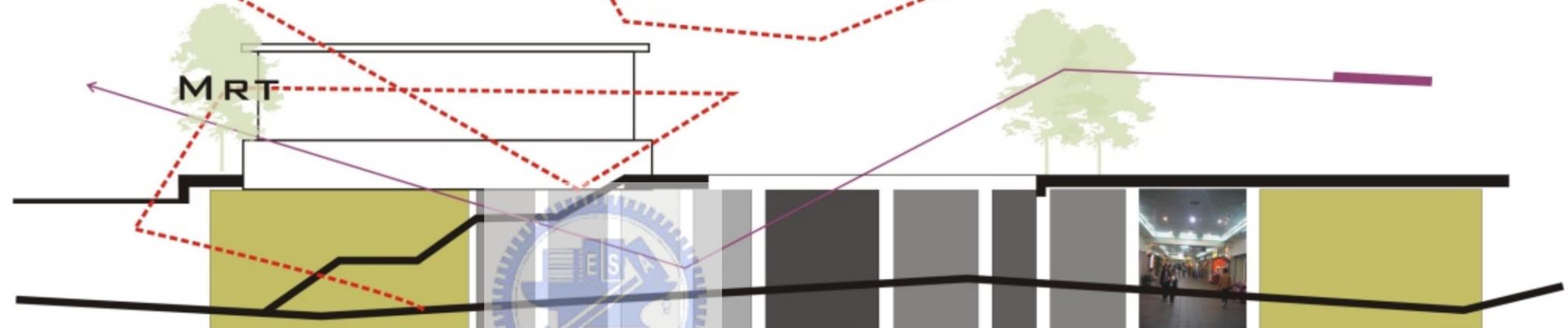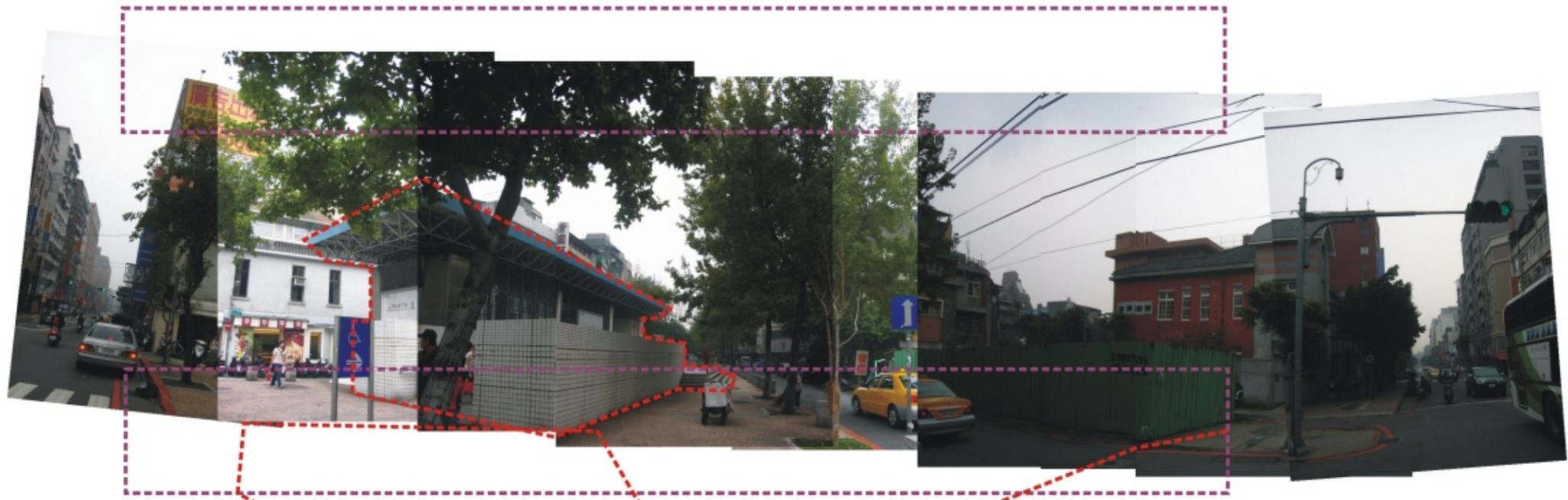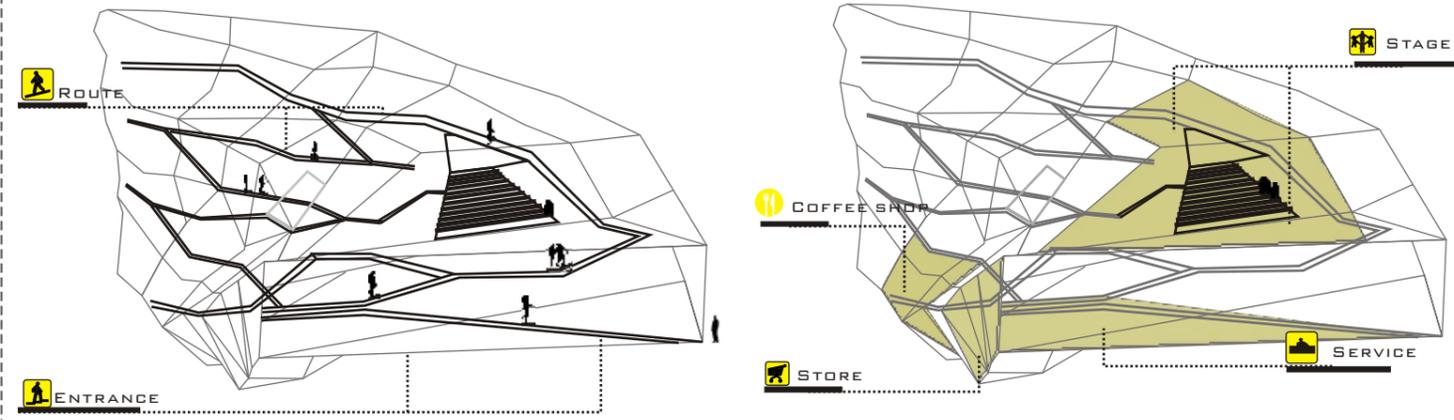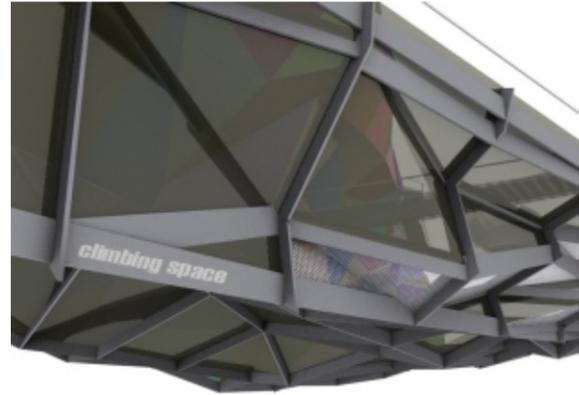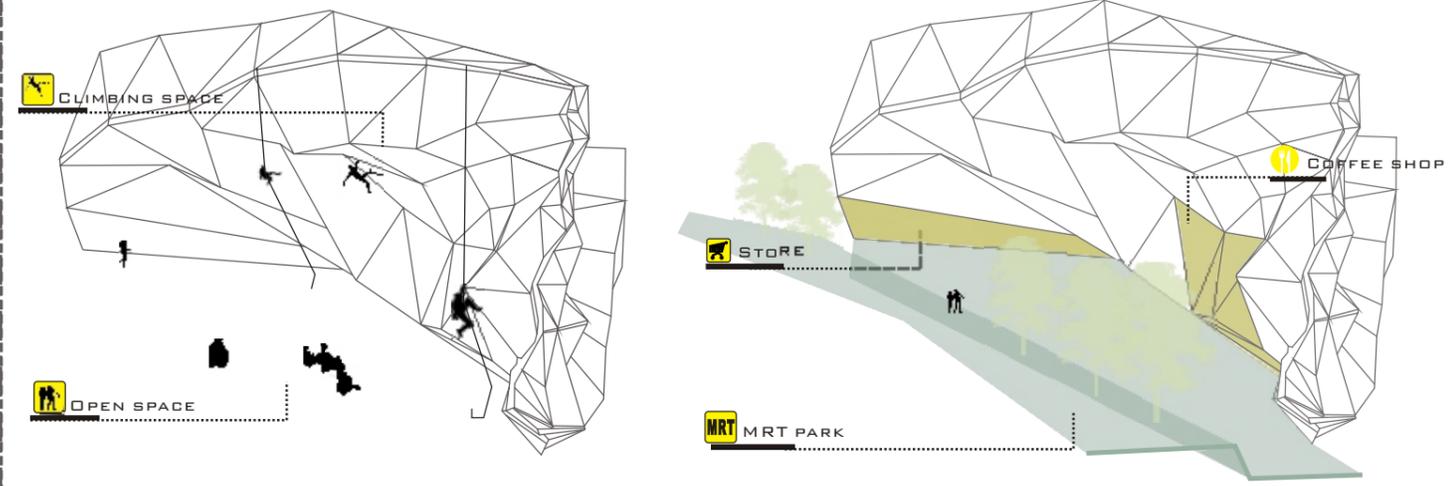
延續當代美術館的展覽功，作為副場館，連結捷運綠帶空間，
讓捷運地下人行道可透過此場館得到光線的引入。複合藝術展
覽與休閒生活

將斷面在電腦運算中做連結動作

Space Exploded

01

02

03

04

05

06

07

Path

Space

01 open space
02 exhibit path
03 structure wall
04 structure wall
05 open space
06 Rock climbing wall
07 MOCA II

▪ SECTION DIAGRAM

G.L

G.L

04

01

02

MOCA

MRT

03

06

07

05

08

MRT
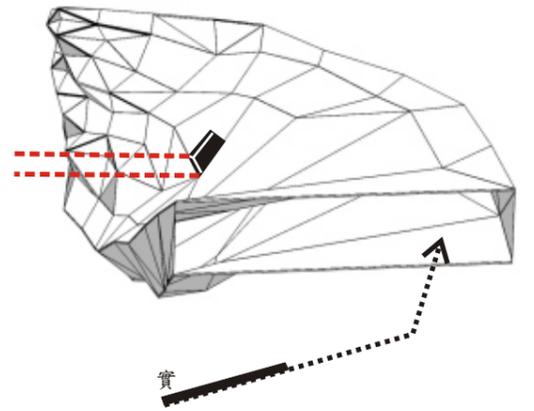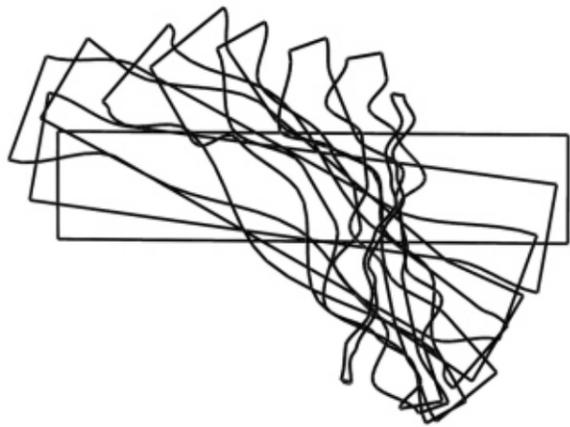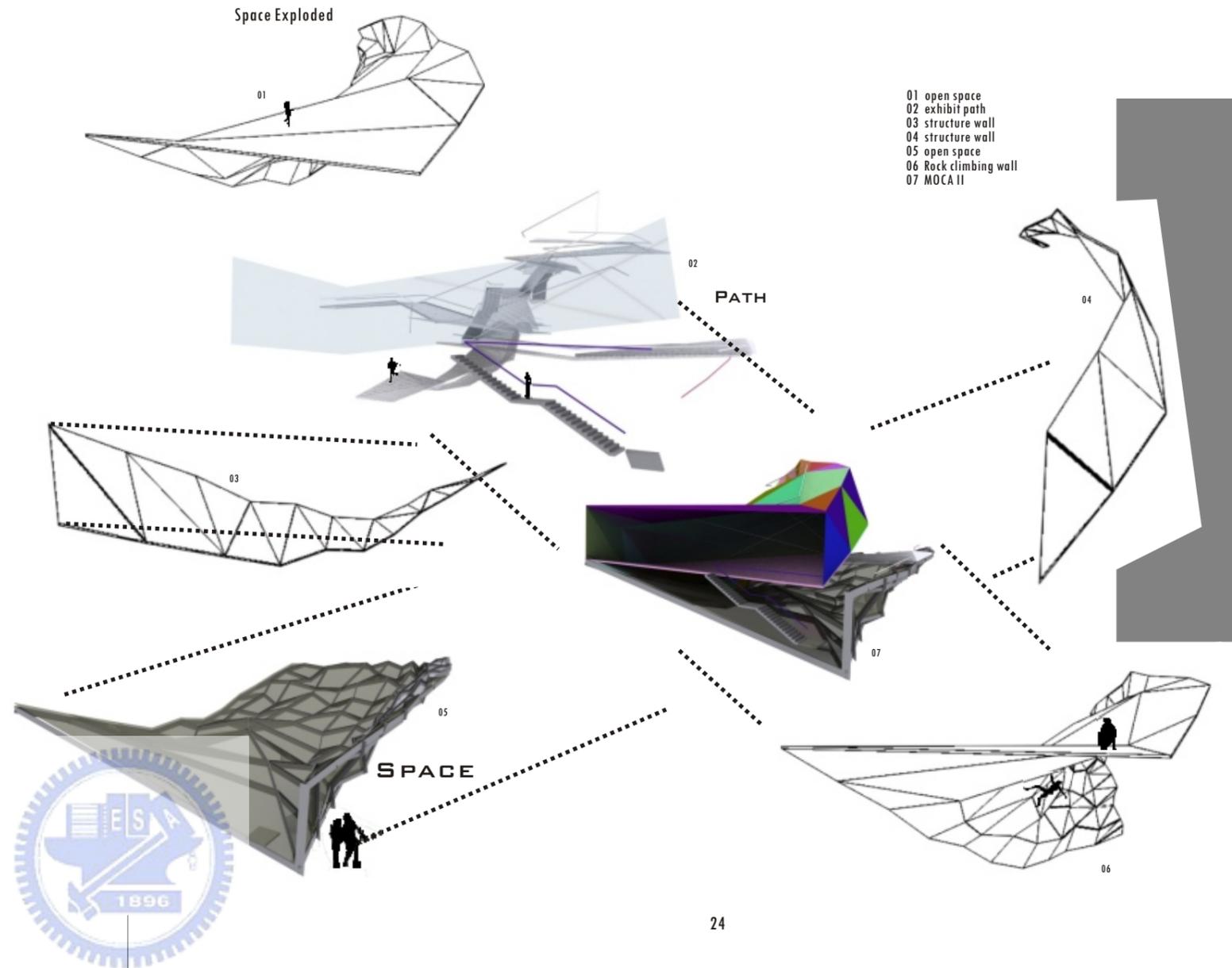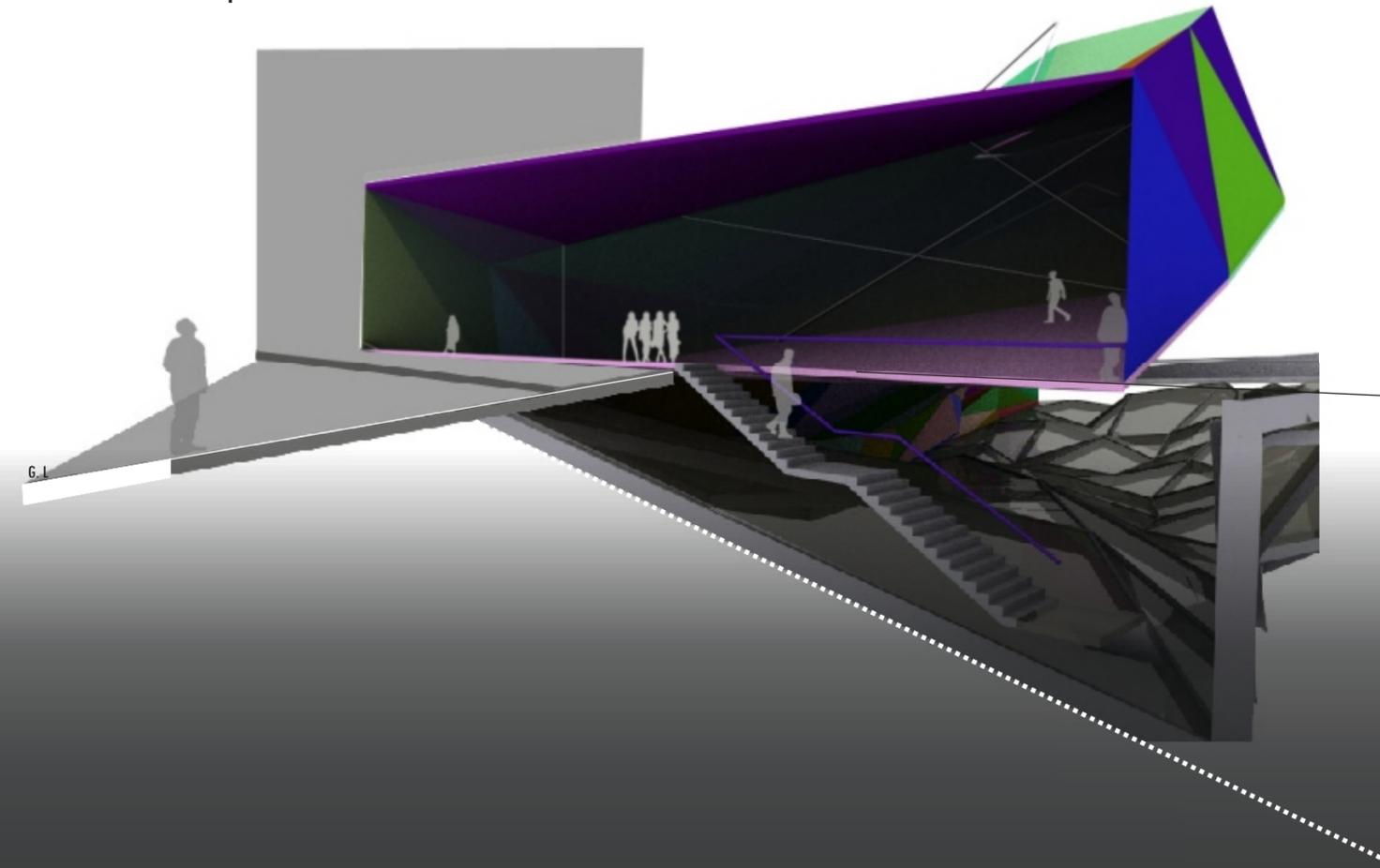
Exhibit space

美術館入口，延續都市立面尺寸

空間主體數位化斷面連結

實體為展覽空間　虛空間為開放空間

Research Architect: Daniel Libeskind
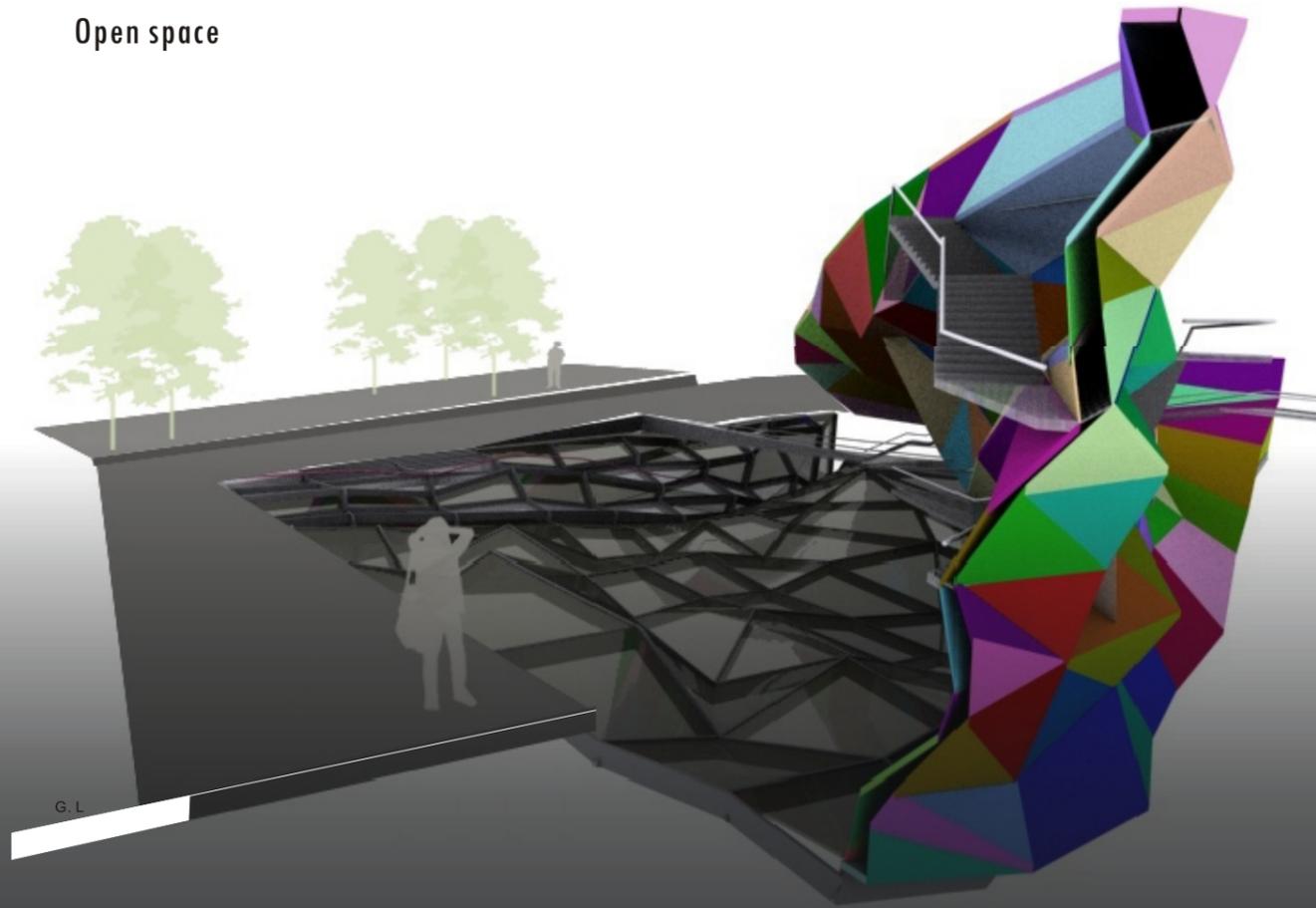
Dimension compression-Museum Of Contemporary Art Taipei

01 entrance vestibule
02 MRT greenbelt park
03 underground passage
04 MOCA I
05 exhibit space
06 lecture theatre
07 open space
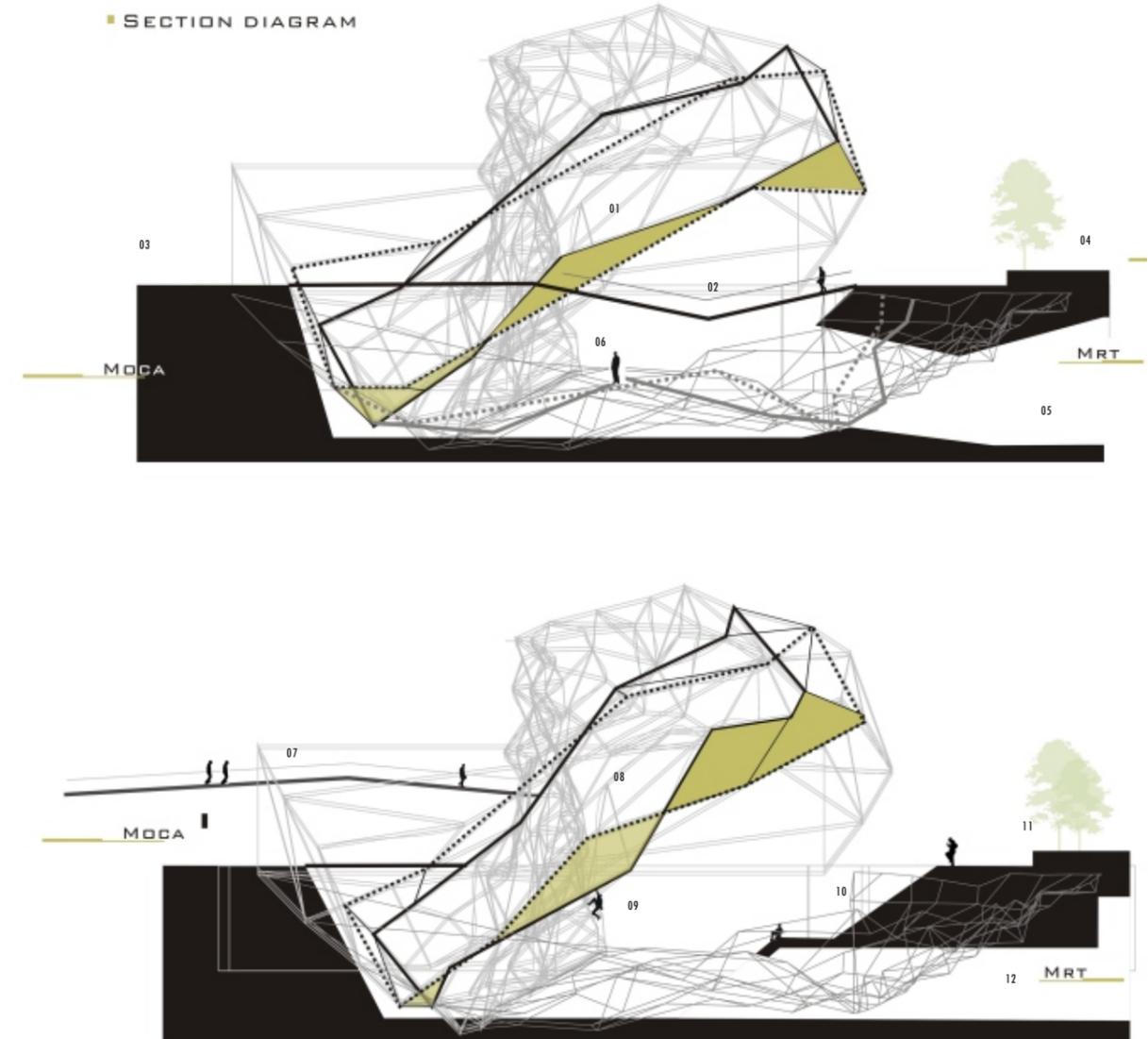08 underground passage

25

26

Open space

G.L.

Open space

開放空間連結綠帶公園與捷運地下道
空間形體由方型越折越小到最後形成牆與開放空間
攀岩牆面形成開放空間主要焦點

Research Architect: Daniel Libeskind

Dimension compression-Museum Of Contemporary Art Taipei

Space Section

■ SECTION DIAGRAM

MOCA

MRT

MOCA

MRT

01 exhibit space
02 bridge
03 MOCA I
04 MRT greenbelt park
05 underground passage
06 open space
07 to MOCA I
08 exhibit space
09 Rock climbing
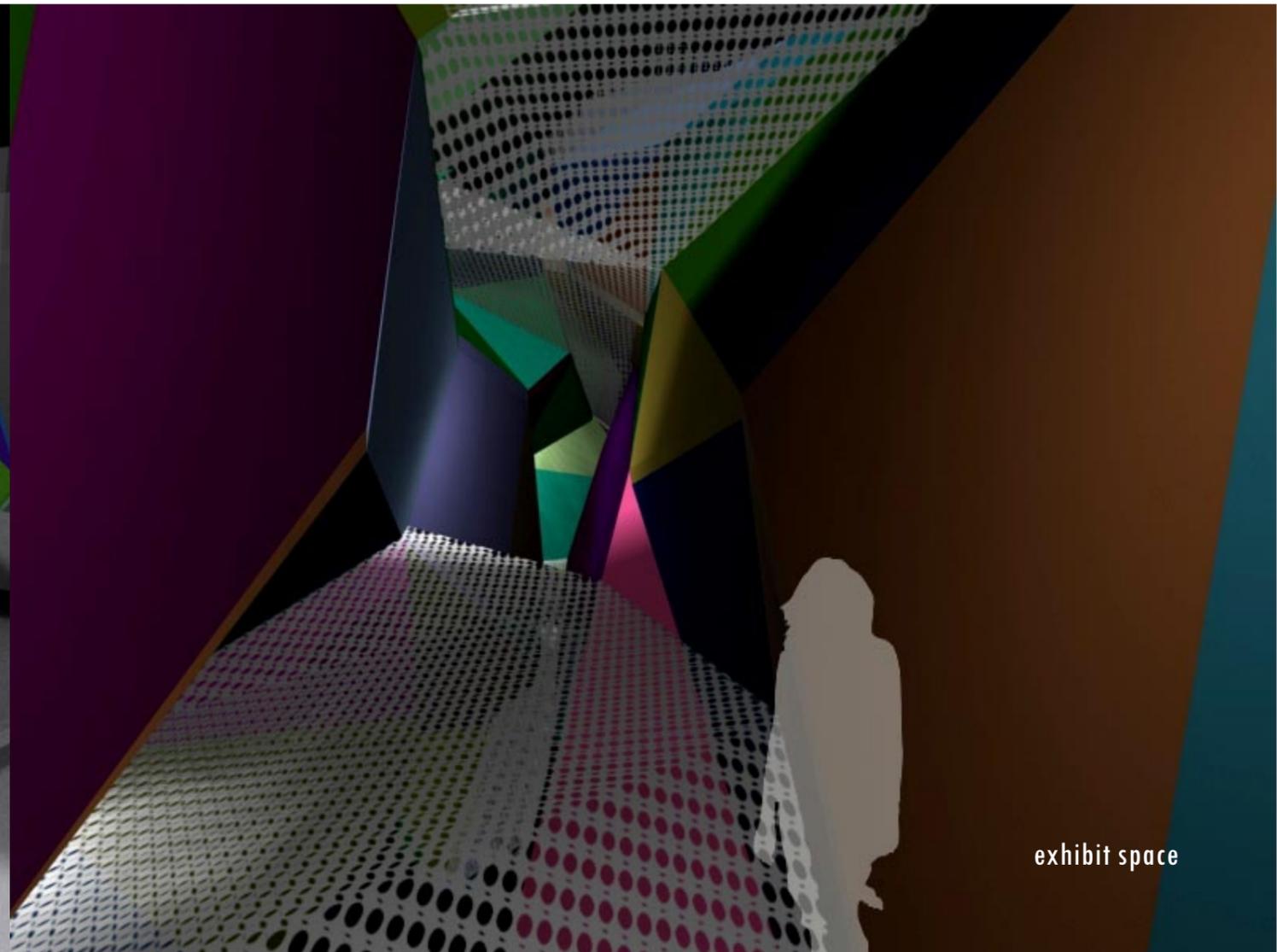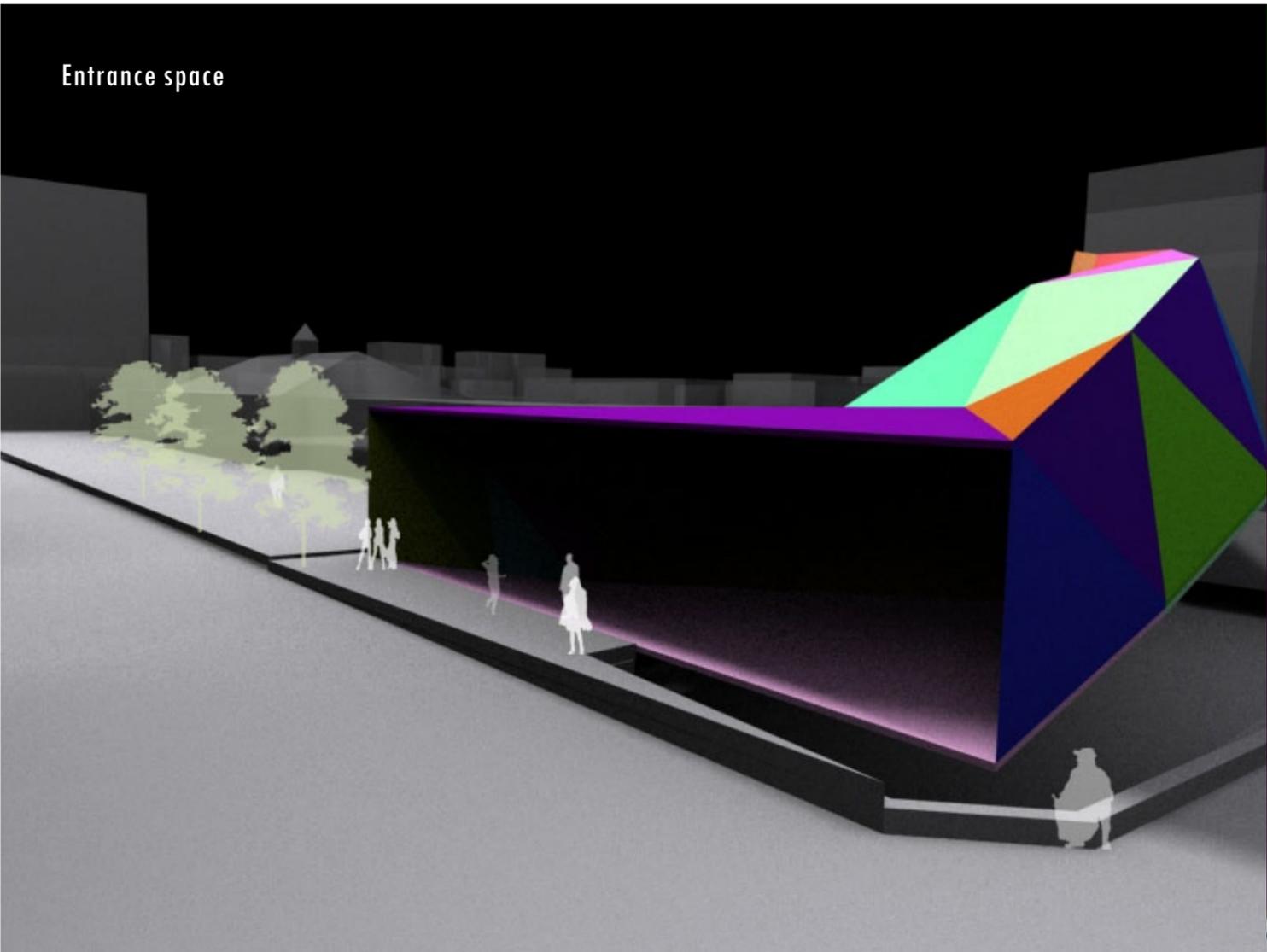10 open space
11 MRT greenbelt park
12 underground passage

Perspective

Entrance space

exhibit space

Imagination

exhibit space
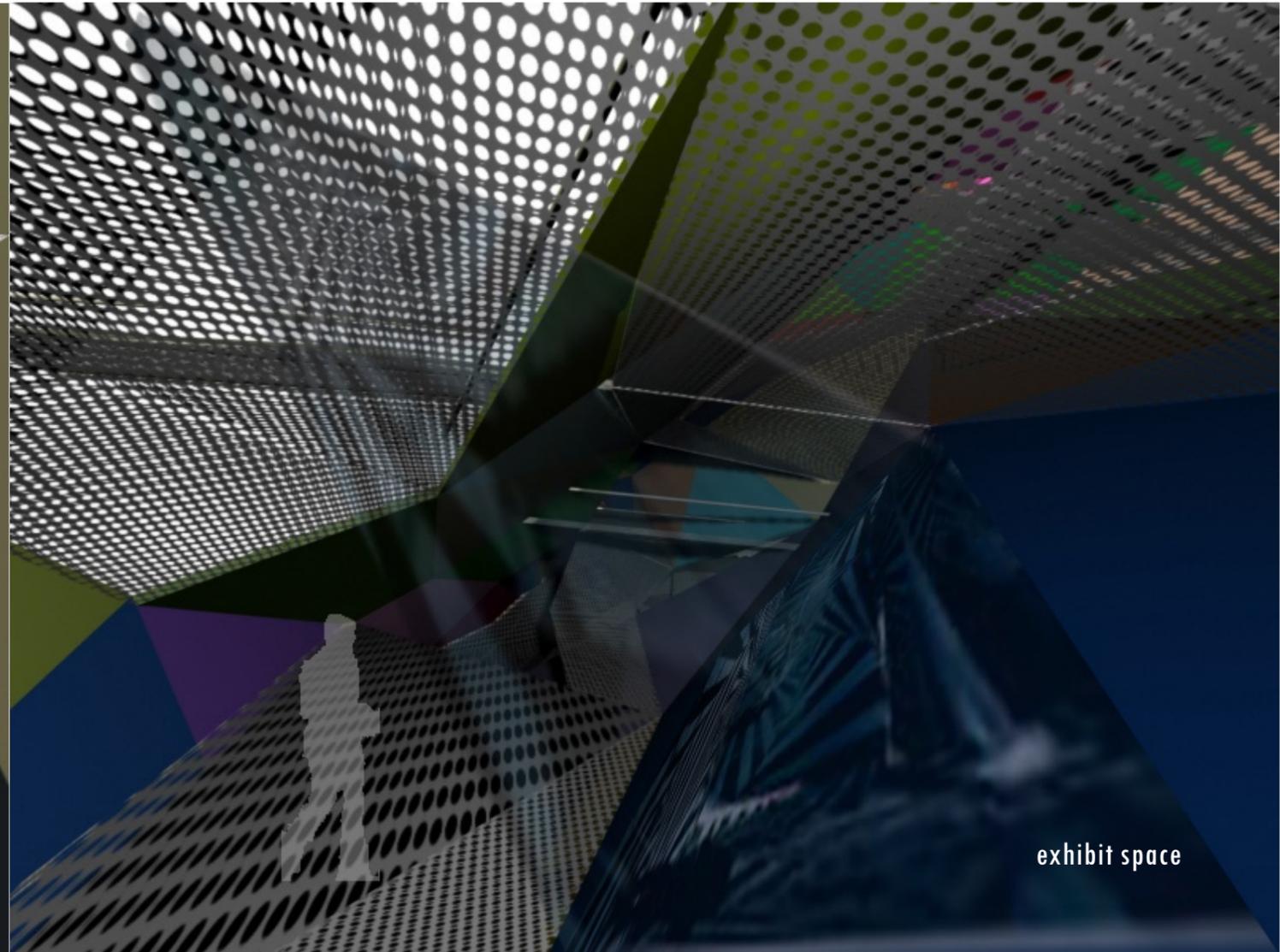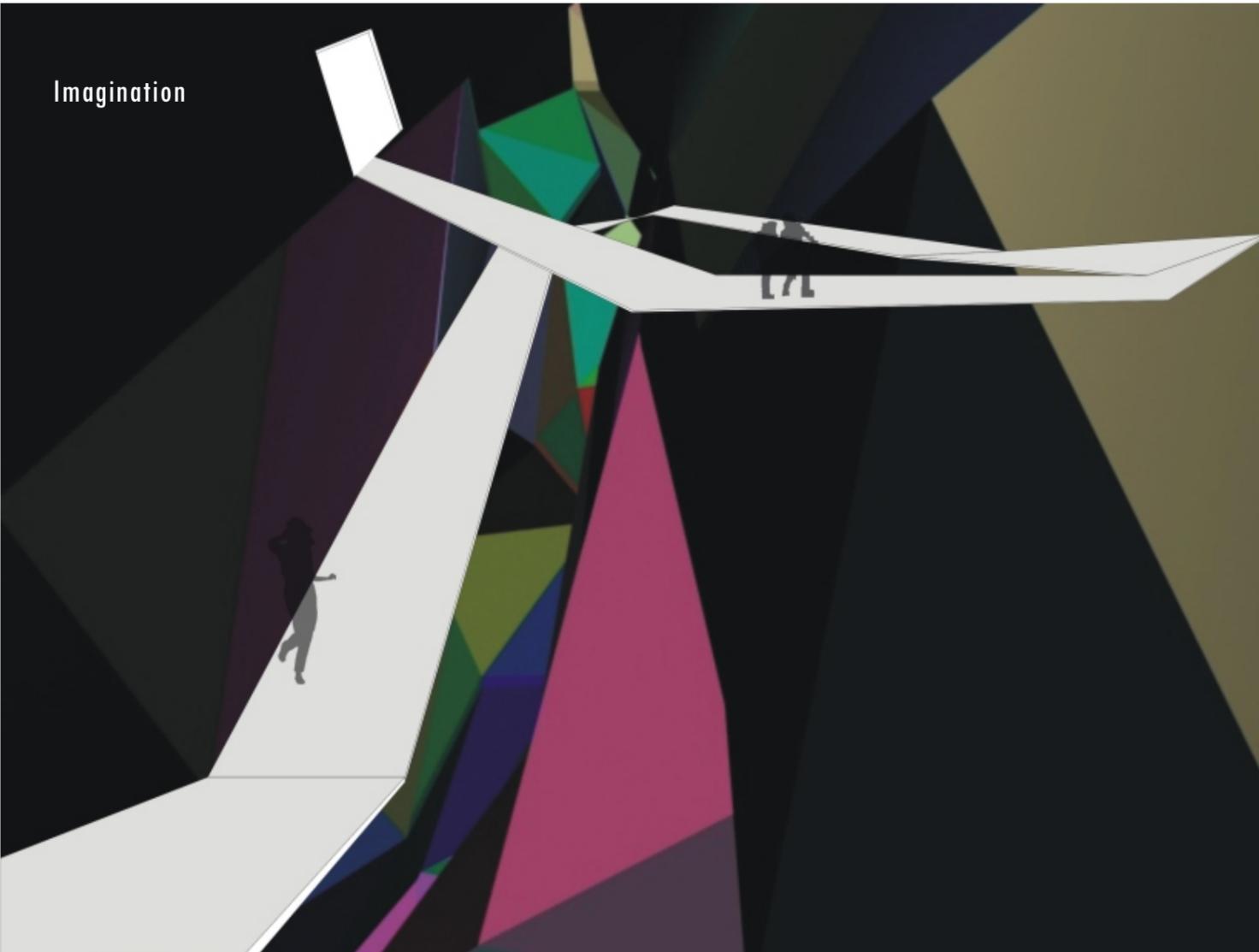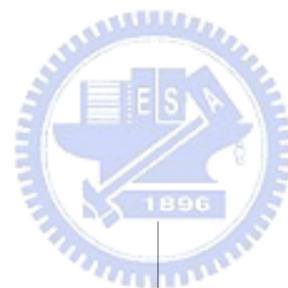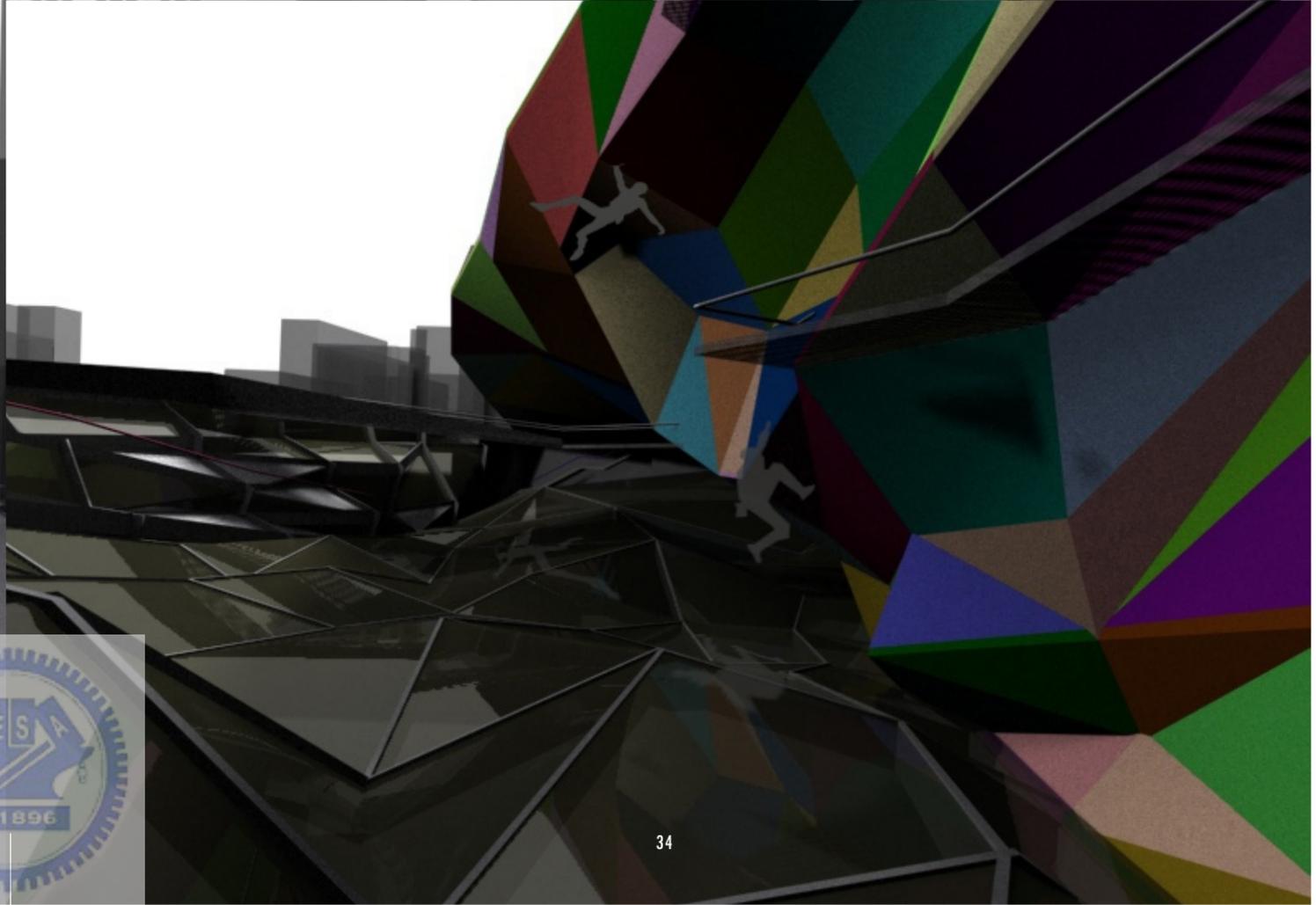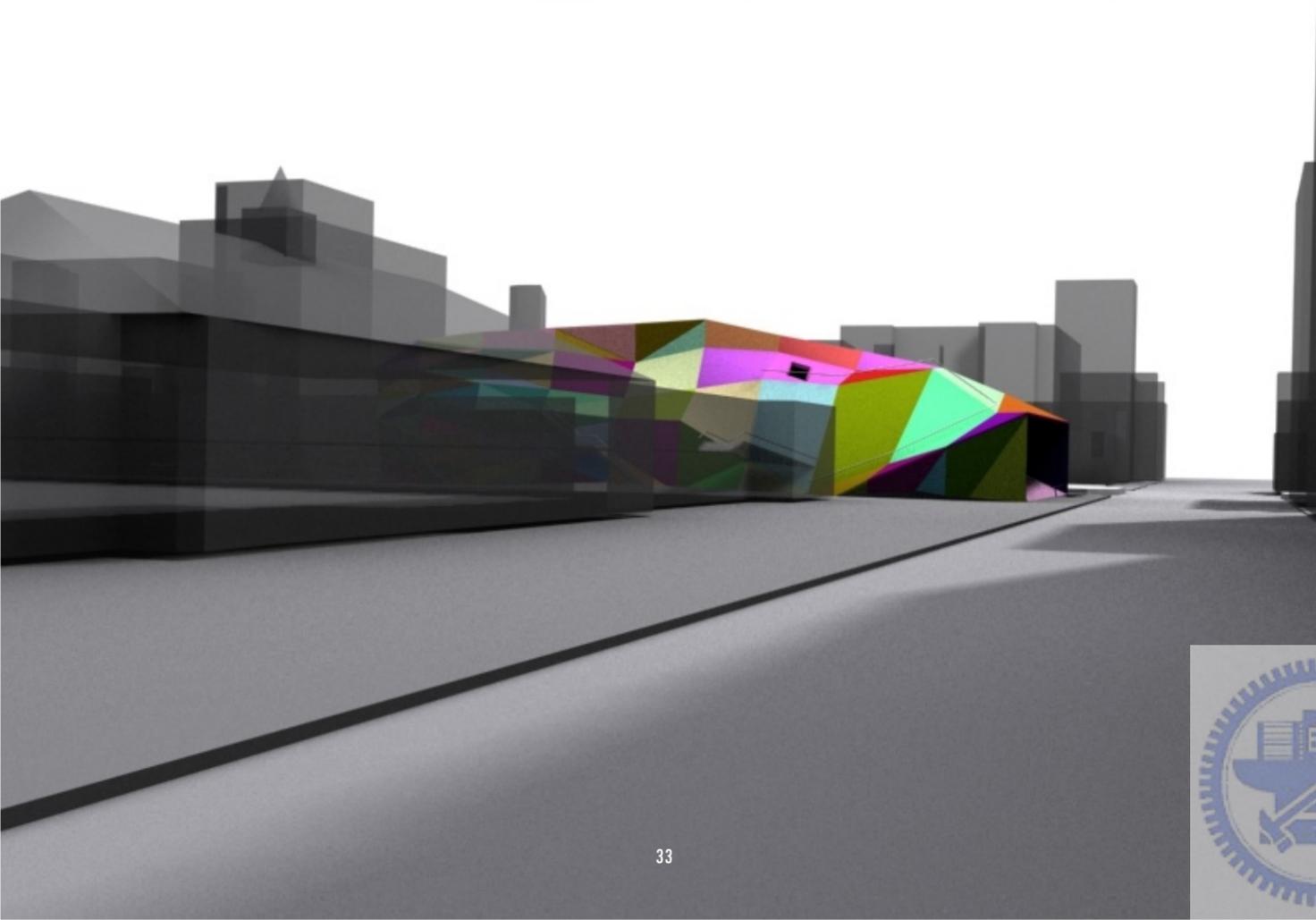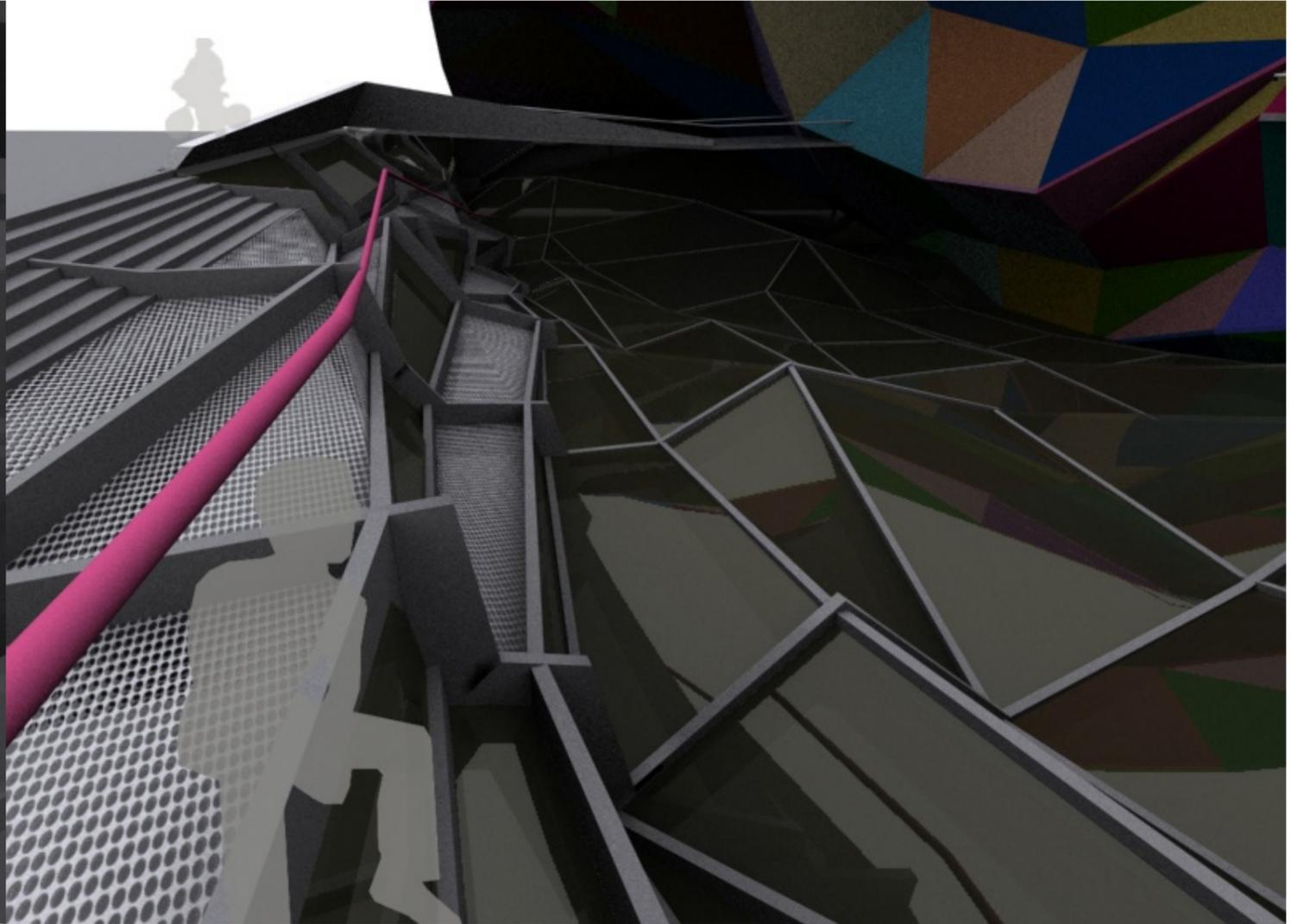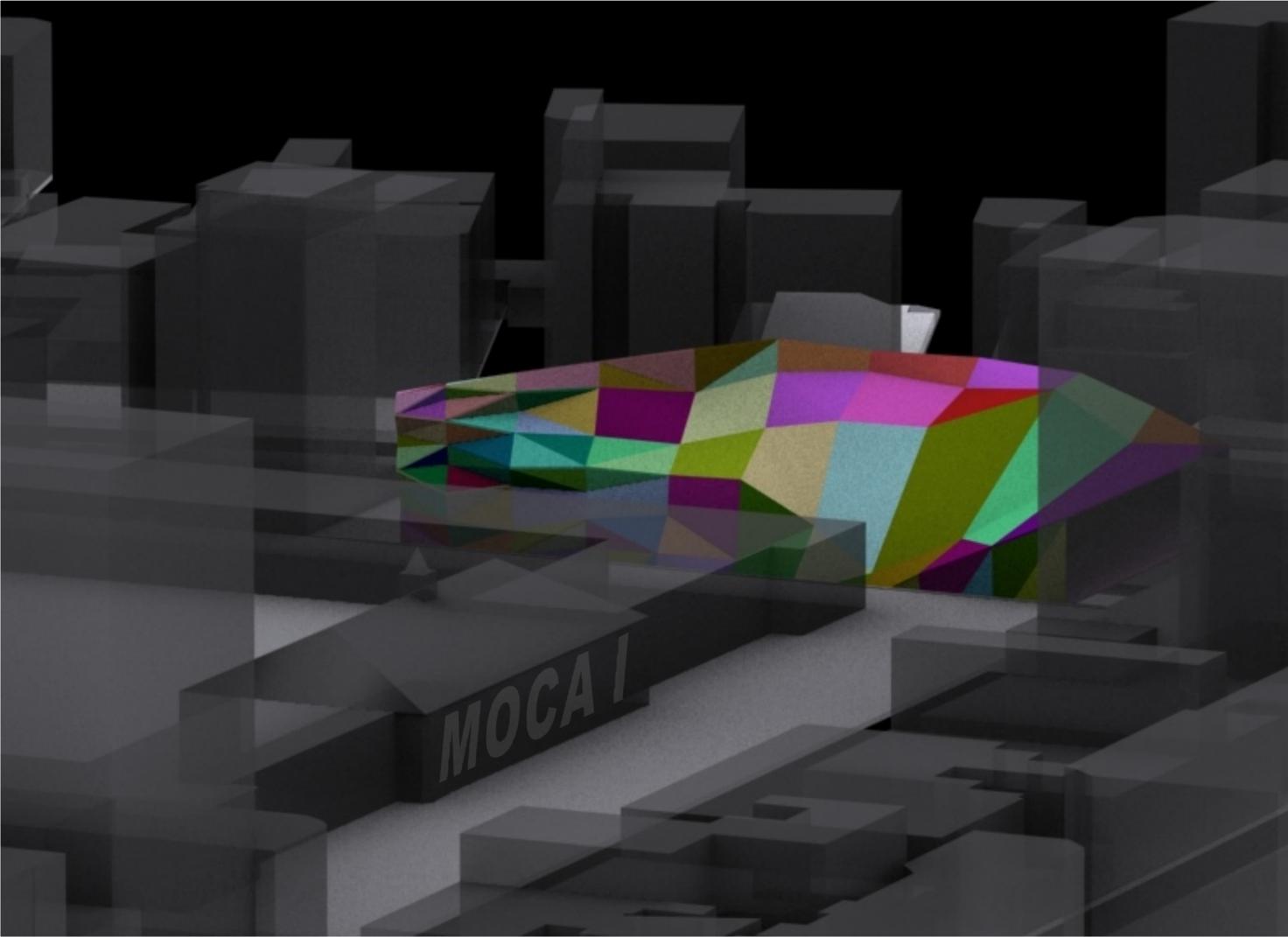
MOCA I

CAD/CAM Model

Dimension compression

Research Architect: Daniel Libeskind

MOCATaipei
Museum of Contemporary Art Taipei

MOCATaipei II
Museum of Contemporary Art Taipei
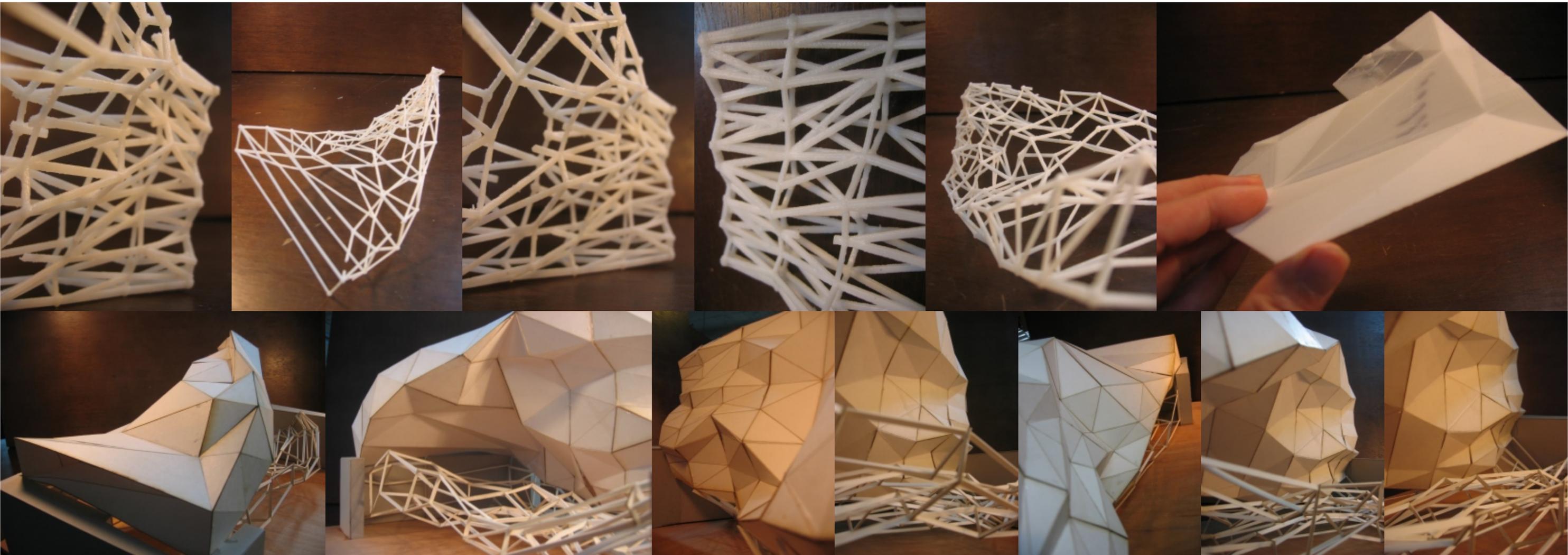
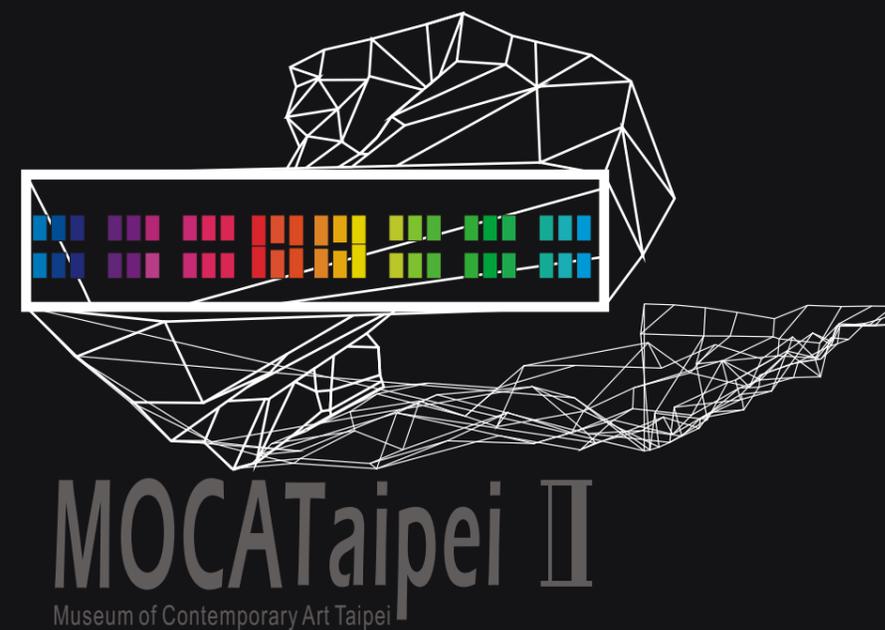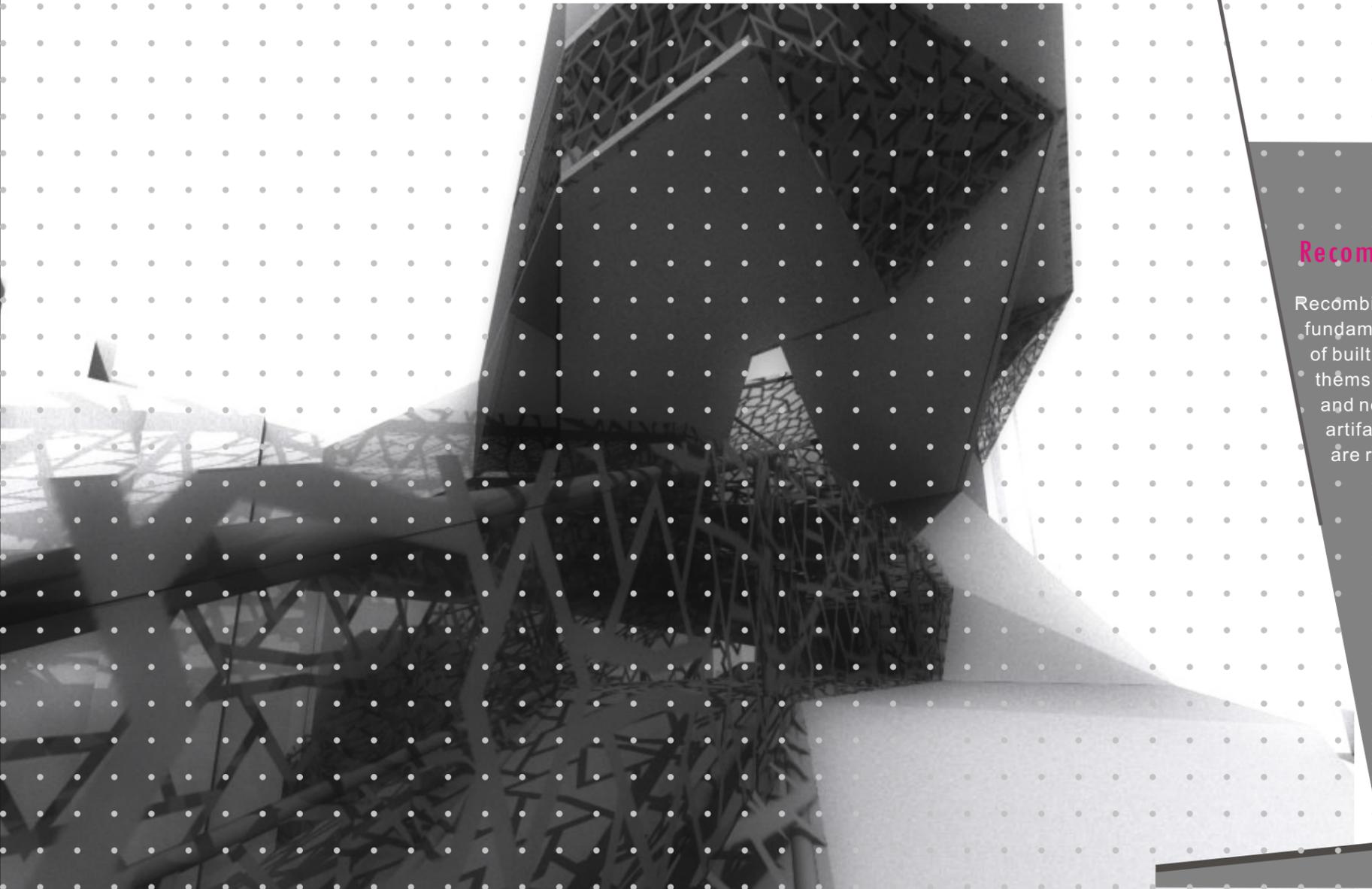2006 winter

Chia- Ching Lien

Professor Yu-Tung Liu

Professor Chun-Tei Tseng

The project: Recombinant Complexity- I CHING

Recombinant Complexity- I .CHING

Recombinant architecture is a radical re-questioning of the most fundamental programmatic assumptions about the logical affordances of built space. When both architecture and the bodies that inhabit it are themselves both organic and inorganic, when both are materially alive and not-alive, when the natures of both are understood as artificial and artifactual, the first premises of their interactions in space and over time are reopened.

易

乾 陽能之極，象徵父
震 陽能在下，象徵長男
坎 陽能在中，象徵中男
艮 陽能在上，象徵少男

坤 陰能之極，象徵母
巽 陰能在下，象徵長女
離 陰能在中，象徵中女
兌 陰能在上，象徵少女

本案企圖利用易經的〝太極生兩儀　兩儀生四象　四象生八卦　八卦生六十四卦〞來作為空間架構的基礎，再加上透過易經元素的〝洛書〞組合原則，重組建築空間機能彼此間對應關係。將基地周遭作為影響建築的關鍵點，形成基地週遭關係與建築空間相生相剋的規則重組。使用易經〝複合卦〞與空間計劃彼此生成關係，本來〝單卦〞有它本身所表達的意義，〝複合卦〞的形成，是由兩個〝單卦〞所組成而產生另一個新的意義，對應於空間本身，而產生新的空間可能性。

The text of the I Ching is a set of predictions represented by a set of 64 abstract line arrangements called hexagrams(卦). Each hexagram is a figure composed of six stacked horizontal lines(爻), where each line is either Yang (an unbroken, or solid line), or Yin (broken, an open line with a gap in the center). With six such lines stacked from bottom to top there are 26 or 64 possible Combinations, and thus 64 hexagrams represented.

是故易有太極　是生兩儀

兩儀生四象　　四象生八卦

漸卦

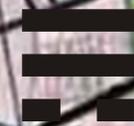《下艮上巽》

【漸變】

SKY　　LAND　　THUNDER　　THE WIND　　WATER　　FIRE　　MOUNTAIN　　A LAKE

乾　　坤　　震　　巽　　坎　　離　　艮　　兌

在易經中，構成的元素分別是 乾、坤、震、巽、坎、離、艮、兌八種，各個元素有
其特殊的象徵意義分別是 天、地、雷、風、水、火、山、澤，可從卦畫中閱讀出其
特殊象徵意義

PROGRAM
MUSEUM OF MODERN ART
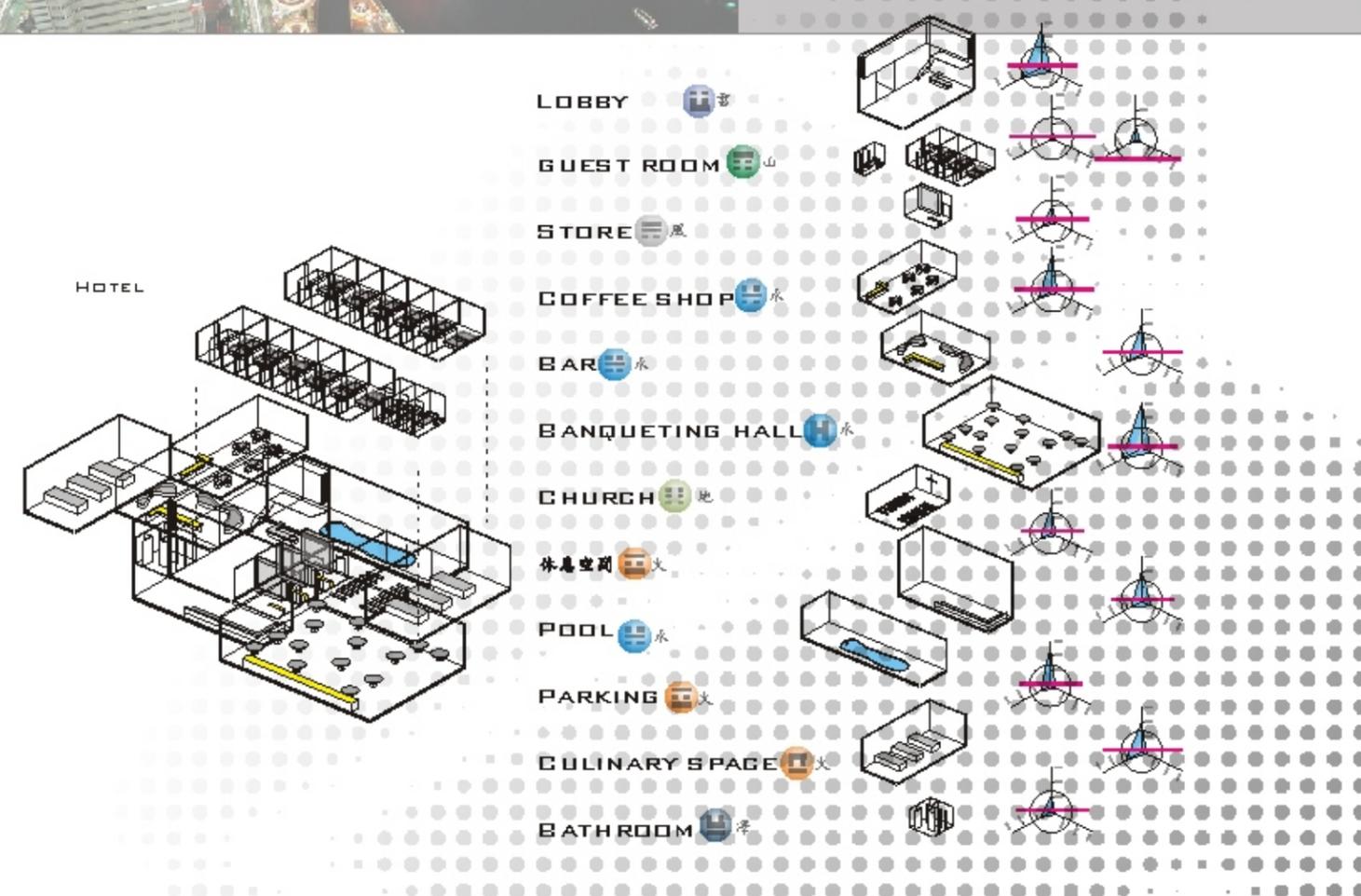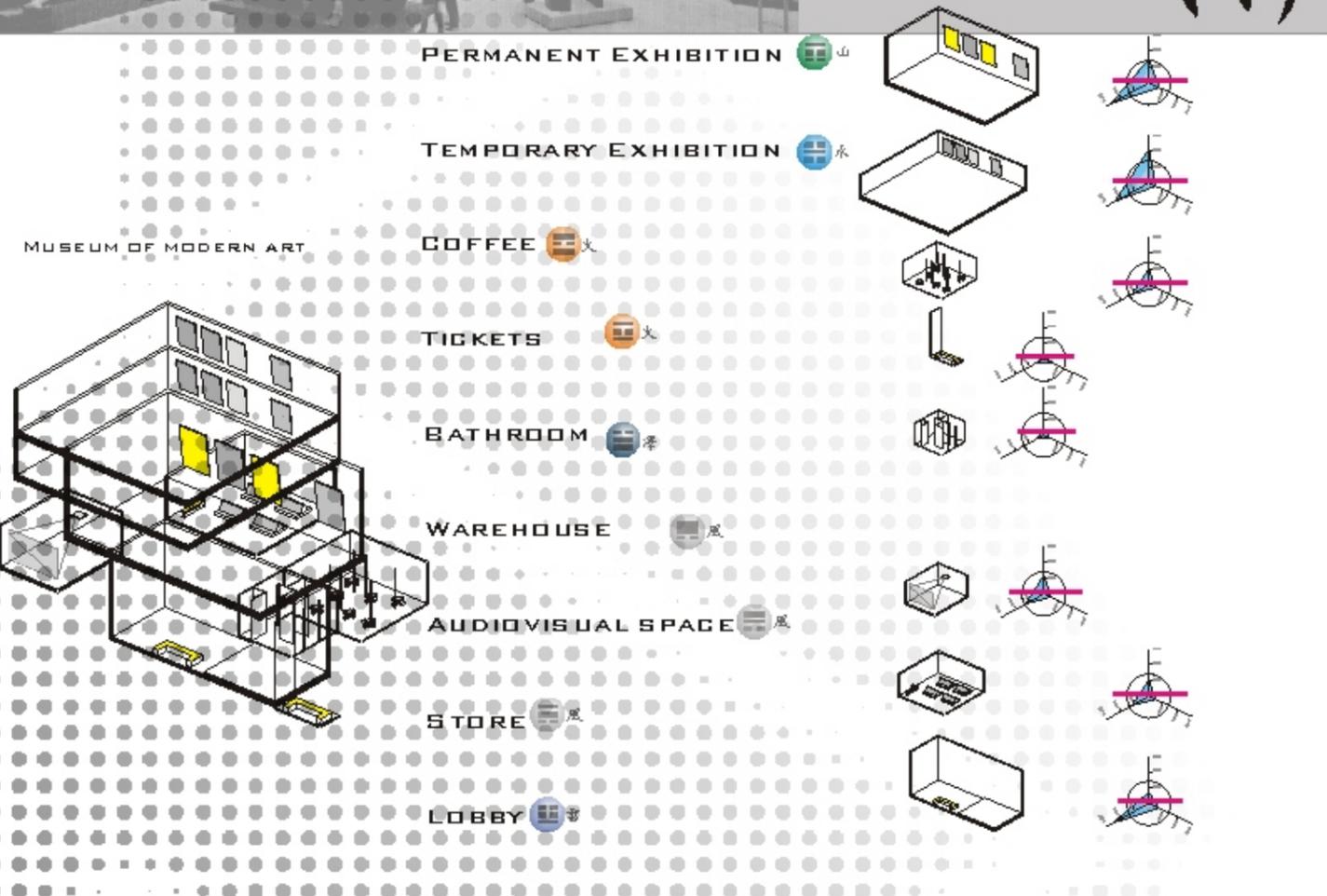HOTEL
ESLITE BOOKSTORE
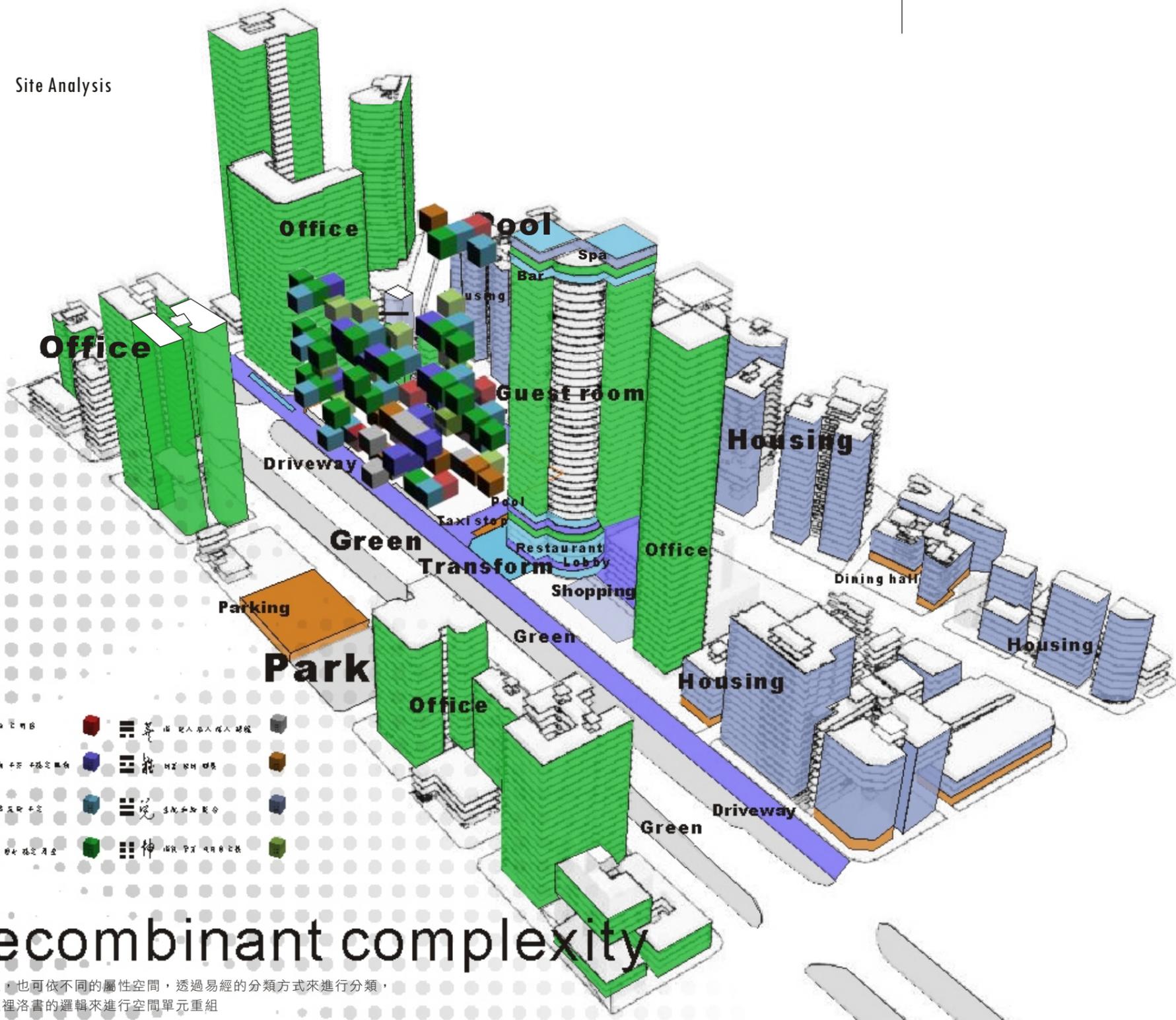STARBUCKS COFFEE
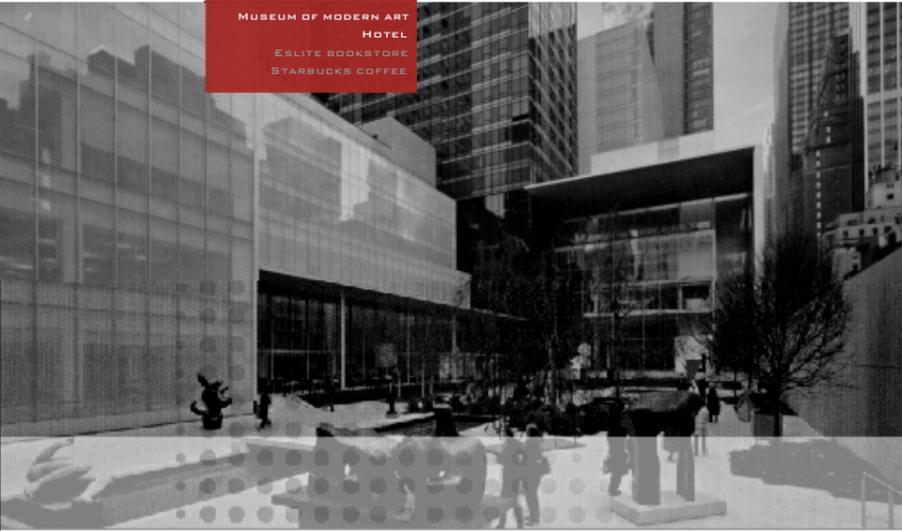
MUSEUM OF MODERN ART

美術

YOKOHAMA HOTEL

旅館

MUSEUM OF MODERN ART

PERMANENT EXHIBITION 山

TEMPORARY EXHIBITION 永

COFFEE 火

TICKETS 火

BATHROOM 澤

WAREHOUSE 風

AUDIOVISUAL SPACE 風

STORE 風

LOBBY 雷

HOTEL

LOBBY 雷

GUEST ROOM 山

STORE 風

COFFEE SHOP 永

BAR 永

BANQUETING HALL 永

CHURCH 地

休息空間 火

POOL 永

PARKING 火

CULINARY SPACE 火

BATHROOM 澤

在易經的元素中依不同的特性有不同的分類，空間也有其空間的屬性，將易經與空間的屬性重新對應與分類

Site Analysis

Office

ool

Spa

Bar

using

Office

Guest room

Housing

Driveway

Pool

Taxi stop

Green

Transform

Restaurant Lobby

Office

Green

Shopping

Dining hall

Parking

Green

Park

Office

Housing

Housing

Driveway

Green
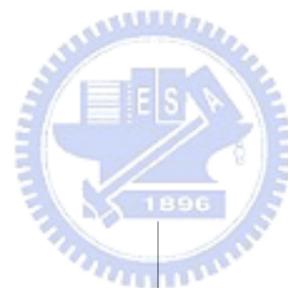
Recombinant complexity

在基地上，也可依不同的屬性空間，透過易經的分類方式來進行分類，
再依易經裡洛書的邏輯來進行空間單元重組
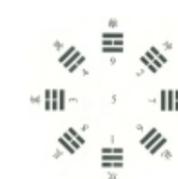
Development
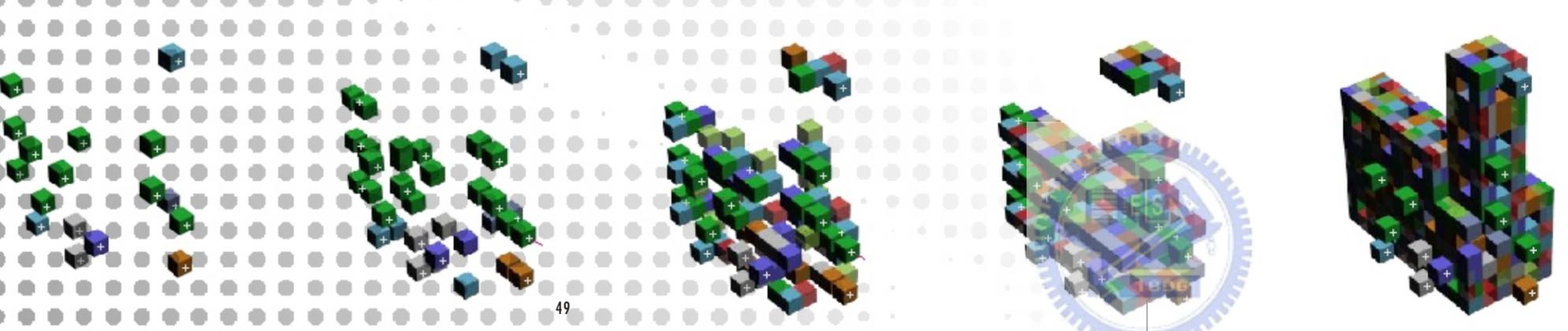
Constitute Rule

後天八卦

戴九履一　左三右七　二四為肩　六八為足　五其中

4	9	2
3	5	7
8	1	6

4	9	2
3	5	7
8	1	6

2 D

Beginning

Beginning

3 D

Beginning

Final

解

Recombinant complexity

Development

Complex

Evolution result

Assortment   Connection

Design develop

益

Space path

Pool
Exhibition
Exhibition
Exhibition
Public space
Guest room
Exhibition
cafe
Banqu
Tickets
Moma Entrance

Exhibition
Pool
cafe
Exhibition
Exhibition
Exhibition
Exhibition
Guest room
Exhibition
Tickets
Banqueting hall
Store
Audiovisual Space
Exhibition
Hotel Entrance
Open area

Section 1

Pool
café
Store
Exhibition
Exhibition
Audiovisual Space
Guest room
cafe
Exhibition
Lobby
Tickets
Open area
Moma entrance
53

Section 2

Pool
Store
Exhibition
Exhibition
Exhibition
Exhibition
Lobby
Open area

Entrance space
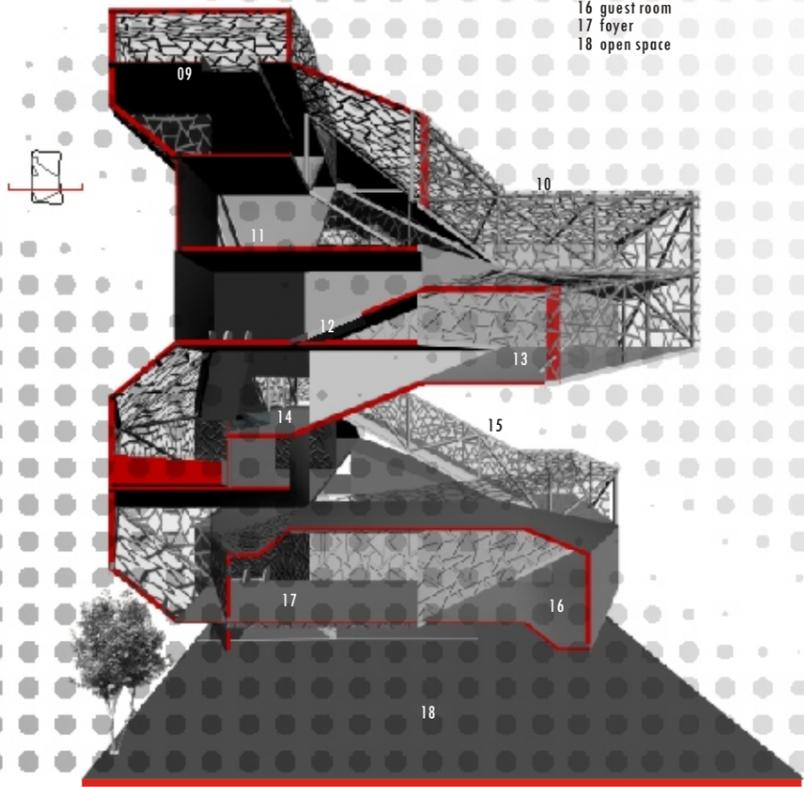
Exhibit space

Exhibit space
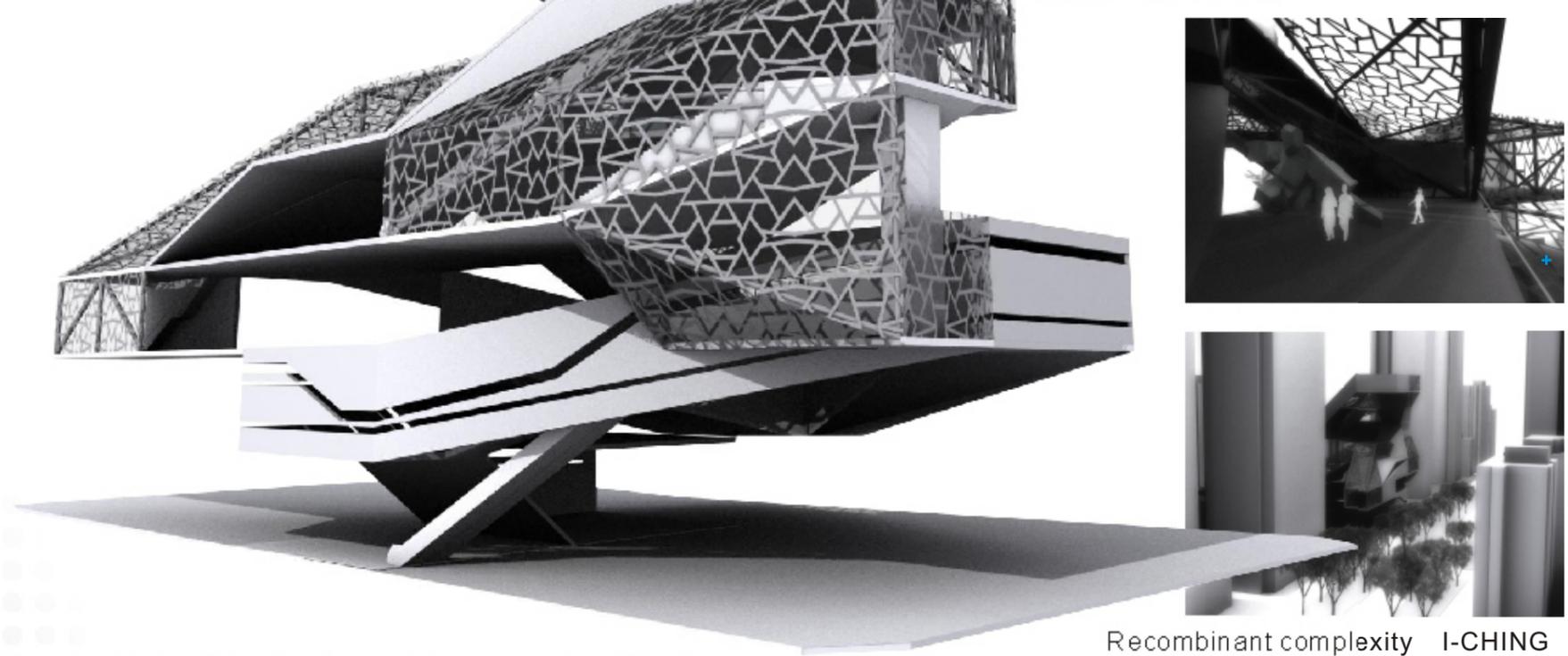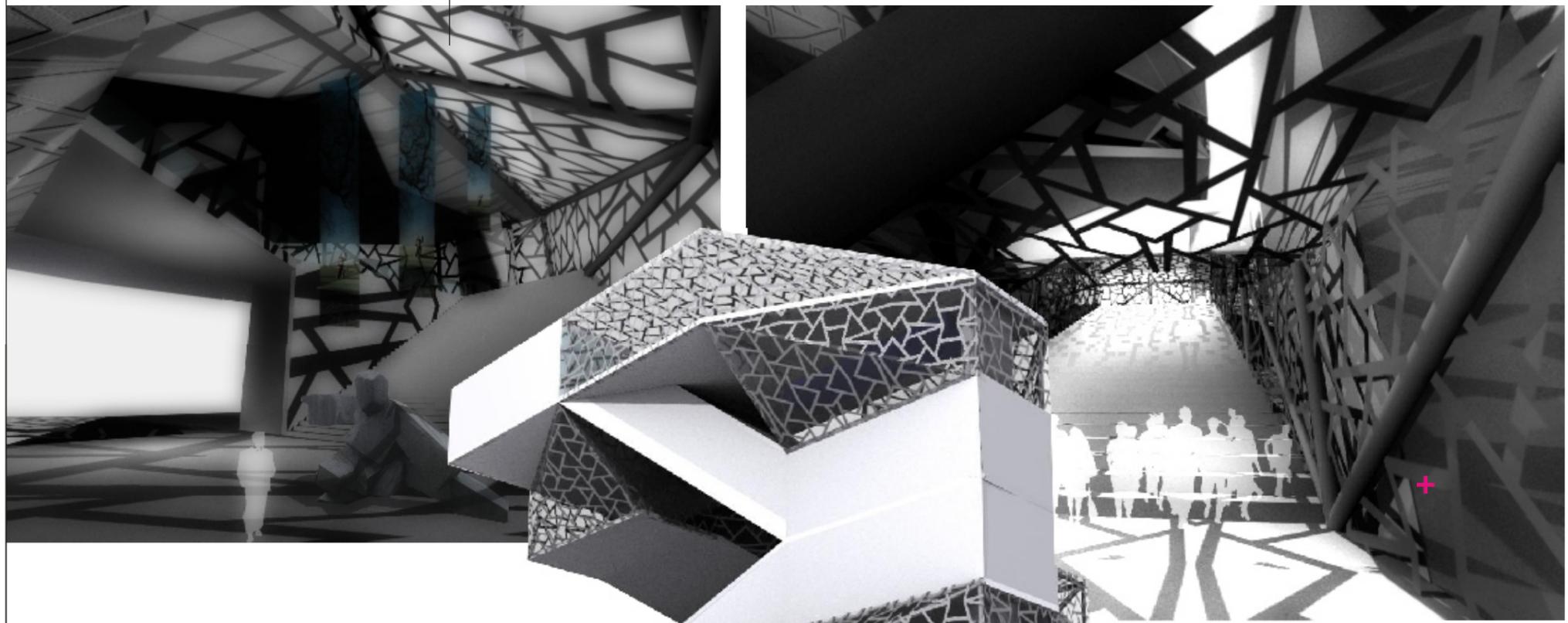54

Space section I

01 open space
02 Museum entrance
03 foyer
04 exhibit space
05 guest room
06 exhibit space
07 guest room
08 path
09 pool
10 exhibit space
11 guest room
12 exhibit space
13 exhibit space
14 exhibit space
15 lecture theatre
16 guest room
17 foyer
18 open space

Space section II
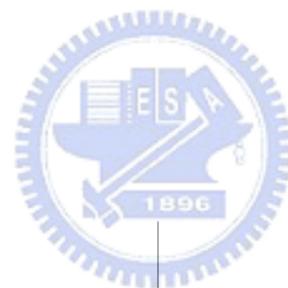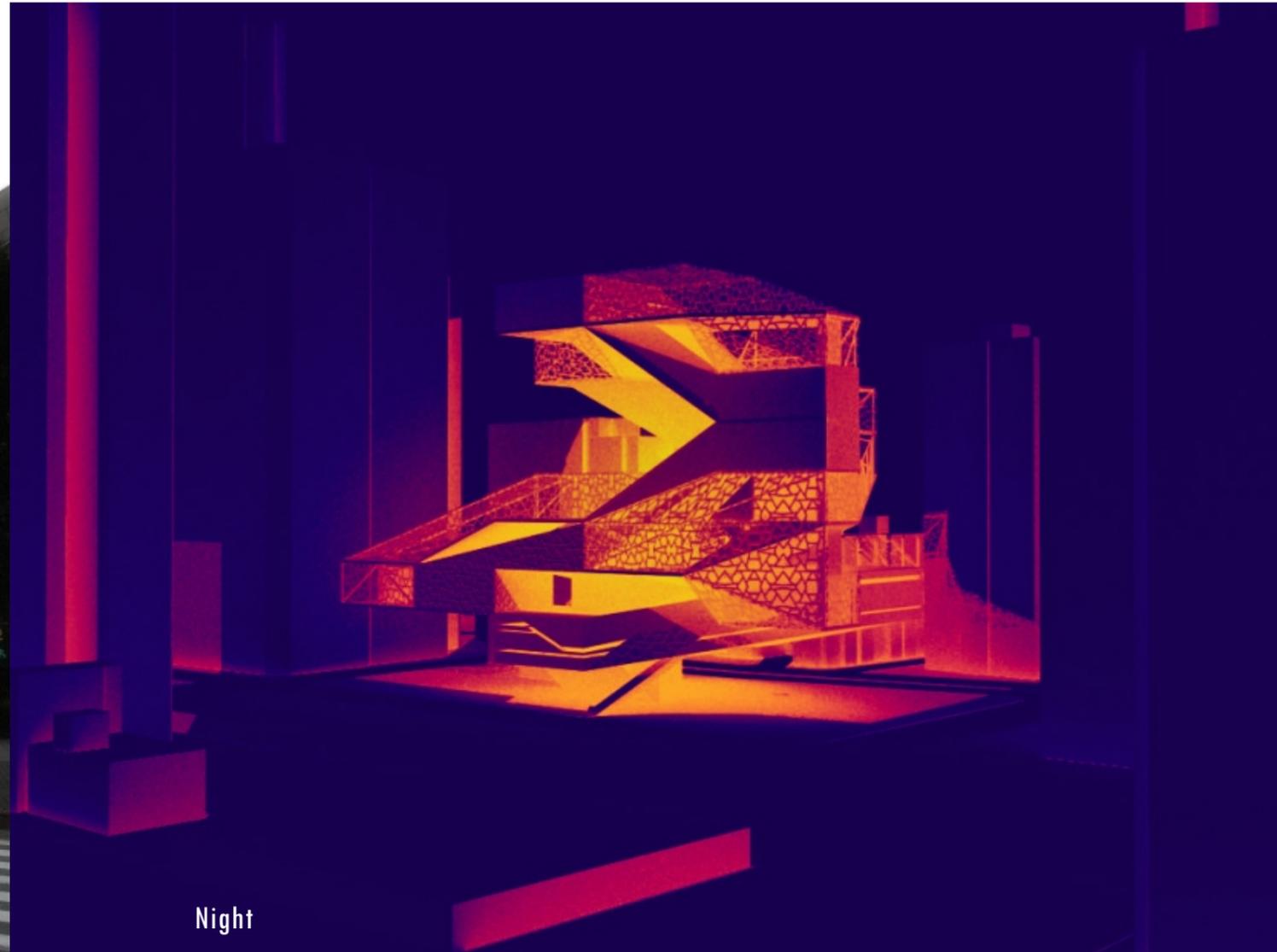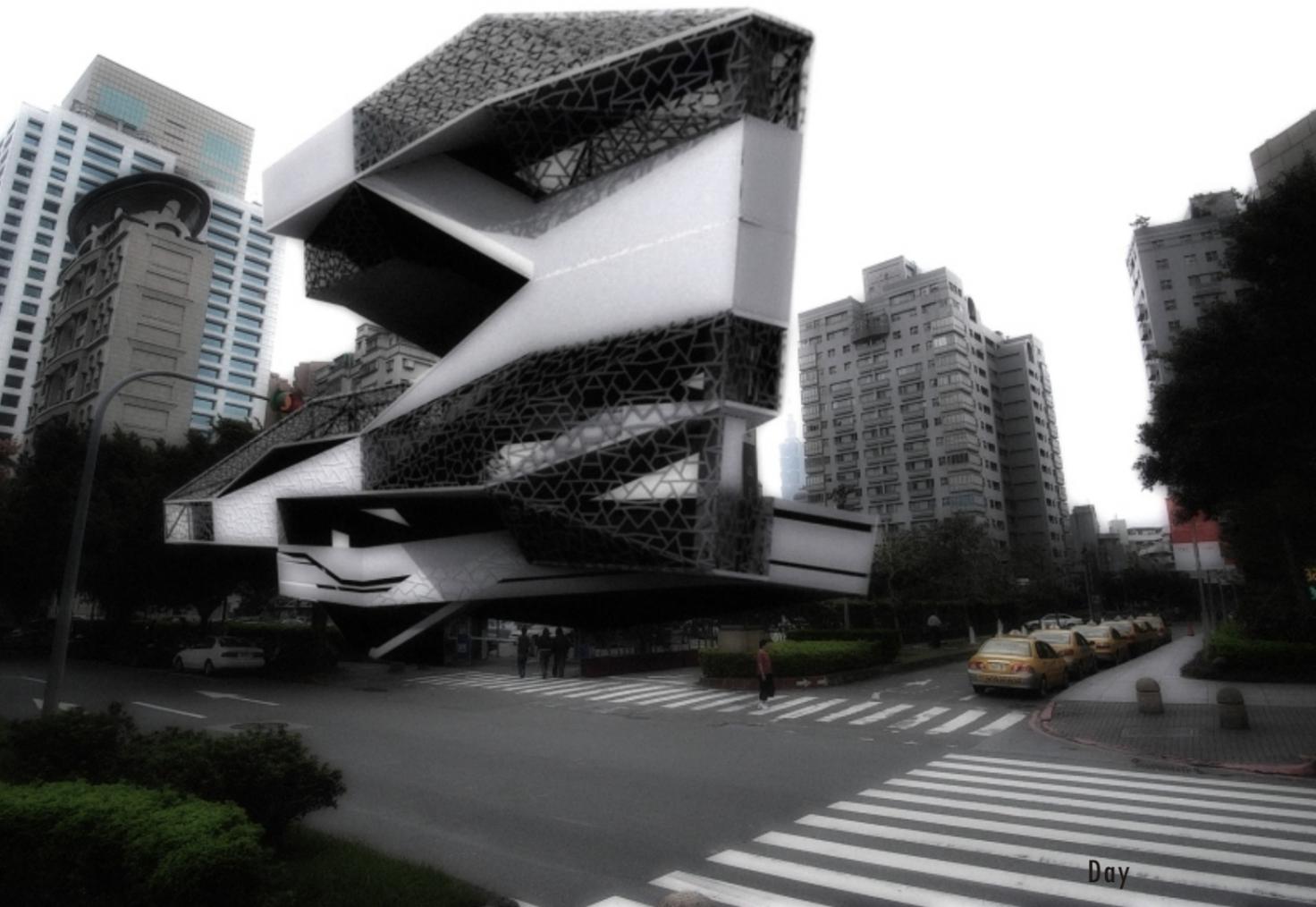

Recombinant complexity   I-CHING

I CHING

The hexagram diagram is conceptually subdivided into two three-line arrangements called trigrams(卦). There are 23, hence 8, possible trigrams. The traditional view was that the hexagrams were a later development and resulted from combining the two trigrams. However, in the earliest relevant archaeological evidence, groups of numerical symbols on many Western Zhou bronzes and a very few Shang oracle bones, such groups already usually appear in sets of six. A few have been found in sets of three numbers, but these are somewhat later. Note also that these numerical sets greatly predate the groups of broken and unbroken lines, leading modern scholars to doubt the mythical early attributions of the hexagram system.
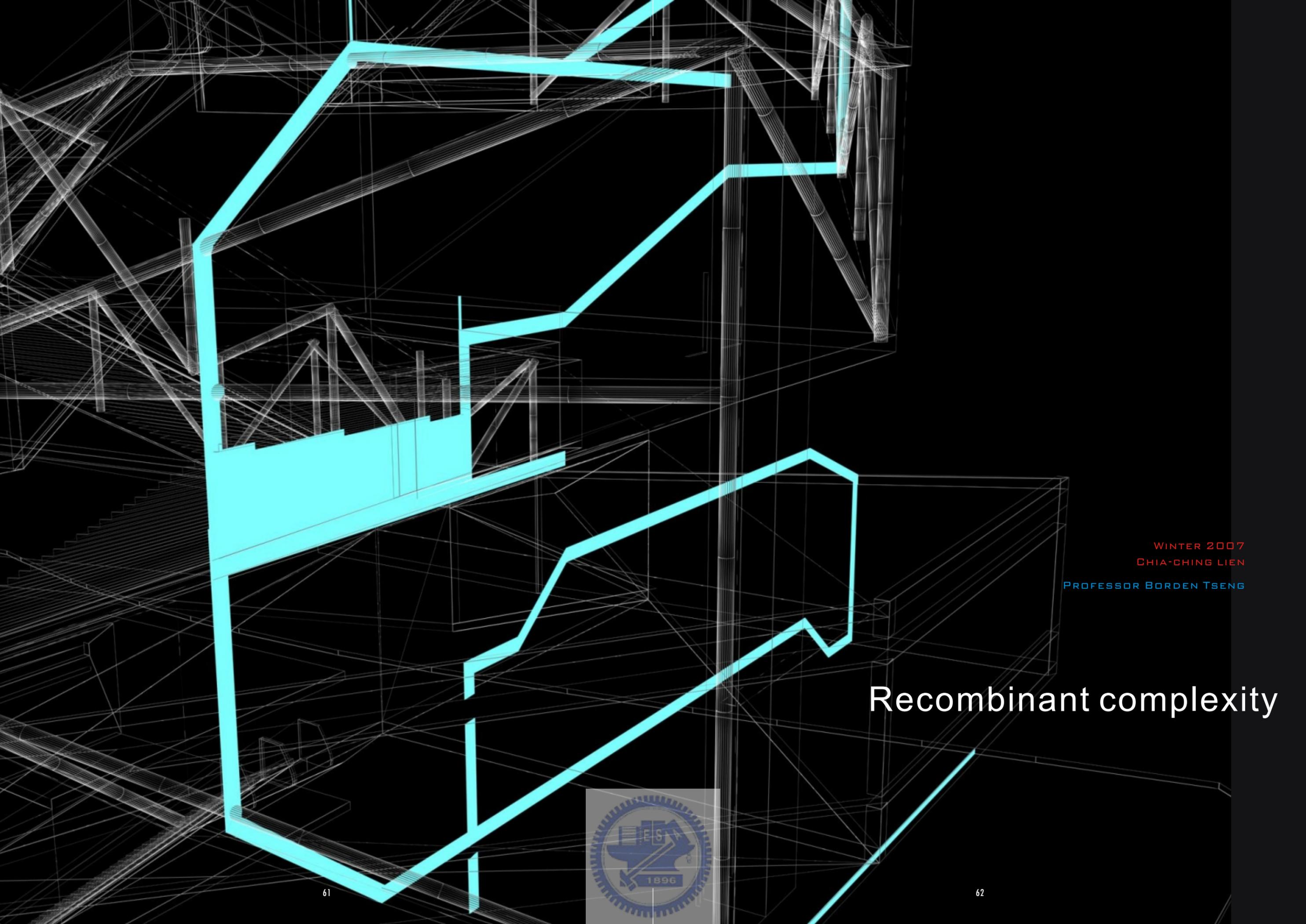
CONCEPT

易

Perspective

Day

Night

Recombinant Complexity- I CHING

Recombinant complexity