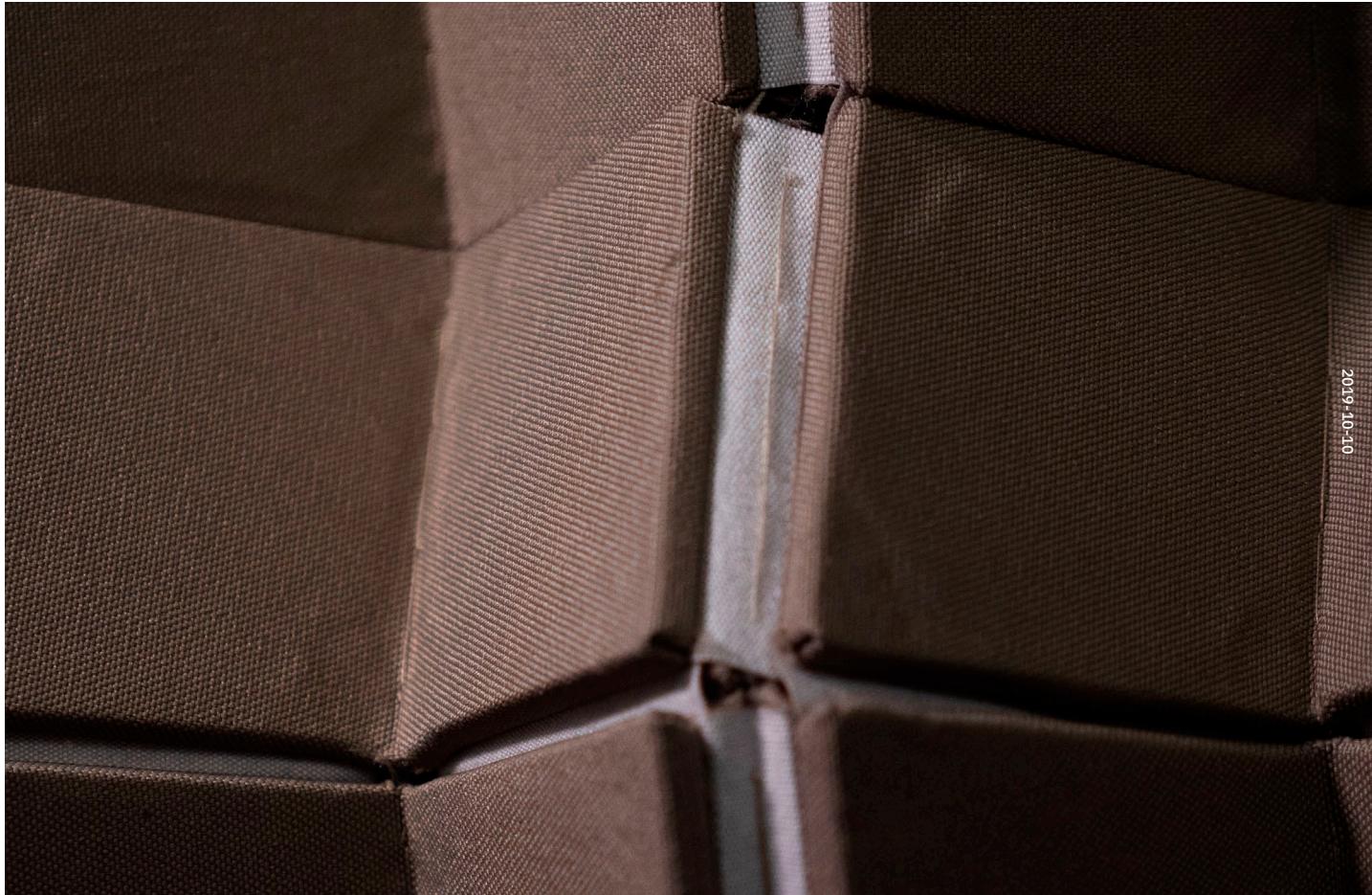


# WANDER

CALEB NG  
ARCHITECTURE & DESIGN  
SELECTED WORKS



2019-10-10



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ABOUT

# CALEB NG

## EDUCATION

MAY 2016 –  
SEPT 2019

### Singapore University of Technology and Design, Singapore

Bachelor of Science – Architecture and  
Sustainable Design

MAY 2017 –  
AUG 2017

### Zhejiang University, China

Asian Leadership Program – Summer Exchange

## EXTRA-CURRICULAR

2019

### SUTD Yearbook Committee

Designer

2017

### SUTD UROP: Robotics and Computing Design for Autistic Children

Designed teaching aids

2016 - 2017

### 5th Student Government

Director of Creative Media

caleb is a student of design. He studied architecture at the Singapore University of Technology of Design, and pursues his interest in graphic design and illustration.

calebnjw@outlook.com  
calebnjw.github.com  
in/calebnjw

#### WORK EXPERIENCE

MAY 2018 –  
AUG 2018 &  
JAN 2019

#### **Okashimo Art Private Limited, Singapore**

Architecture Intern and  
Part-Time Architectural Assistant

FEB 2014 –  
DEC 2015

#### **Singapore Police Force, Singapore**

Full-time National Service Operations  
Support Officer

#### TECHNICAL SKILLS

- ▶ Rhinoceros 3D
- ▶ Grasshopper
- ▶ V-Ray for Rhino
- ▶ Basic AutoCAD
- ▶ Basic Revit
- ▶ Adobe Photoshop
- ▶ Adobe Illustrator
- ▶ Adobe InDesign
- ▶ Adobe Lightroom
- ▶ HTML & CSS
- ▶ Python
- ▶ Laser-Cutting
- ▶ 3D Printing
- ▶ Woodworking
- ▶ Microsoft Word
- ▶ Microsoft PowerPoint
- ▶ Microsoft Excel
- ▶ English
- ▶ Mandarin

ARCHITECTURE

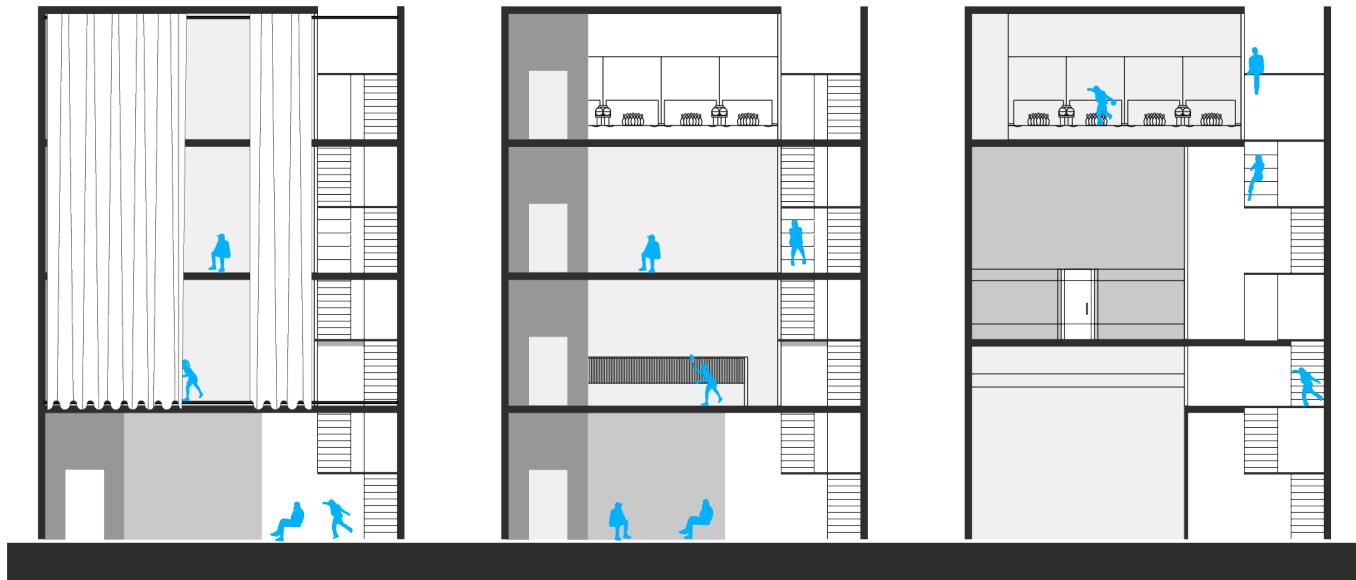
# COMMUNITY HUB: THE INTERSTICE

The Interstice is a neighborhood recreation center along Amoy Street.

The design of the building emphasizes activity: athletes playing sports, visitors having lively conversation in the ground floor cafe, flowing curtains on the facade, and the wacky stairs that create spaces for visitors to play.

Open access on the ground floor acts as a shortcut to the backstreet, allowing free movement through the building. Public facing balconies hint at the activity within.

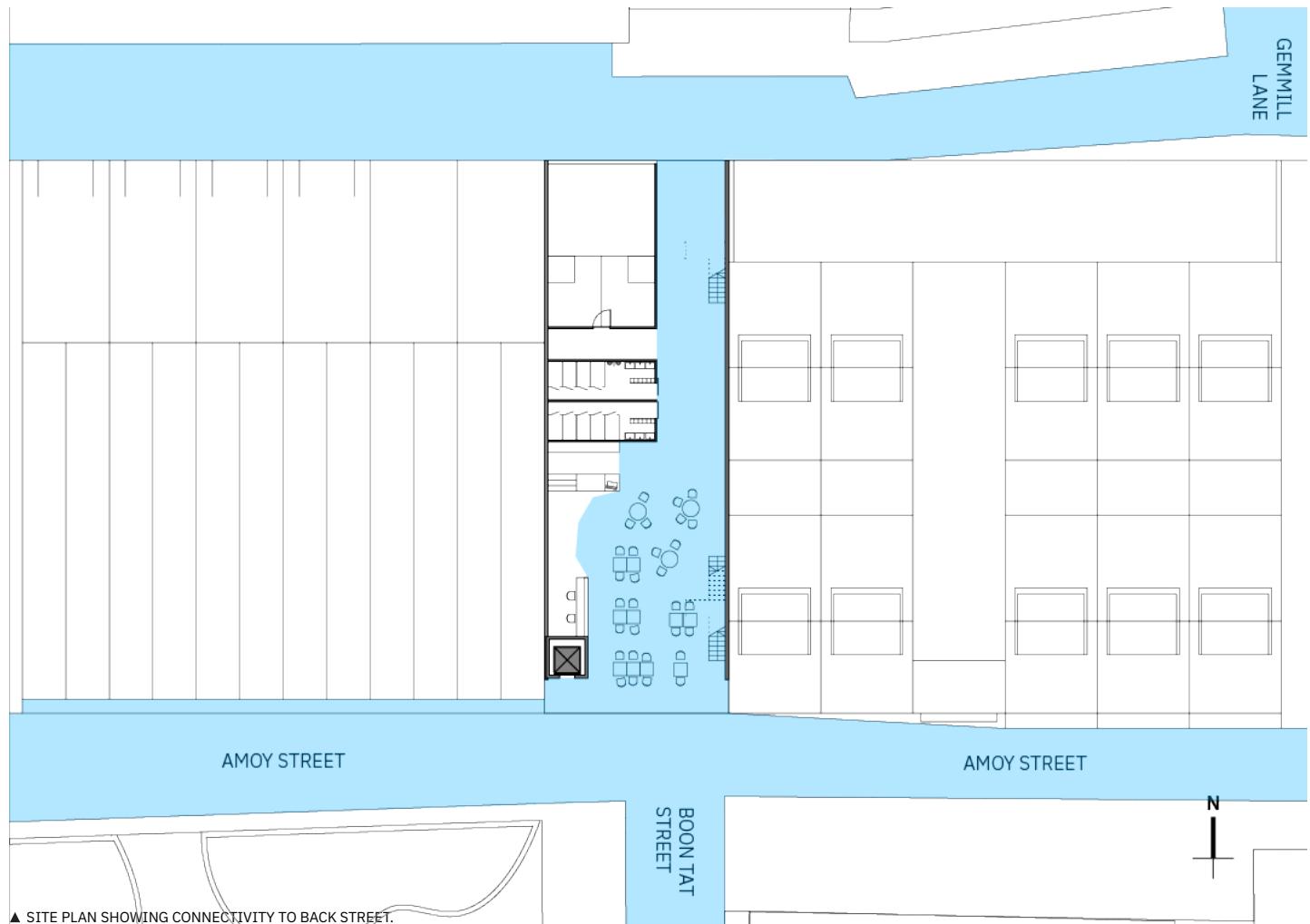


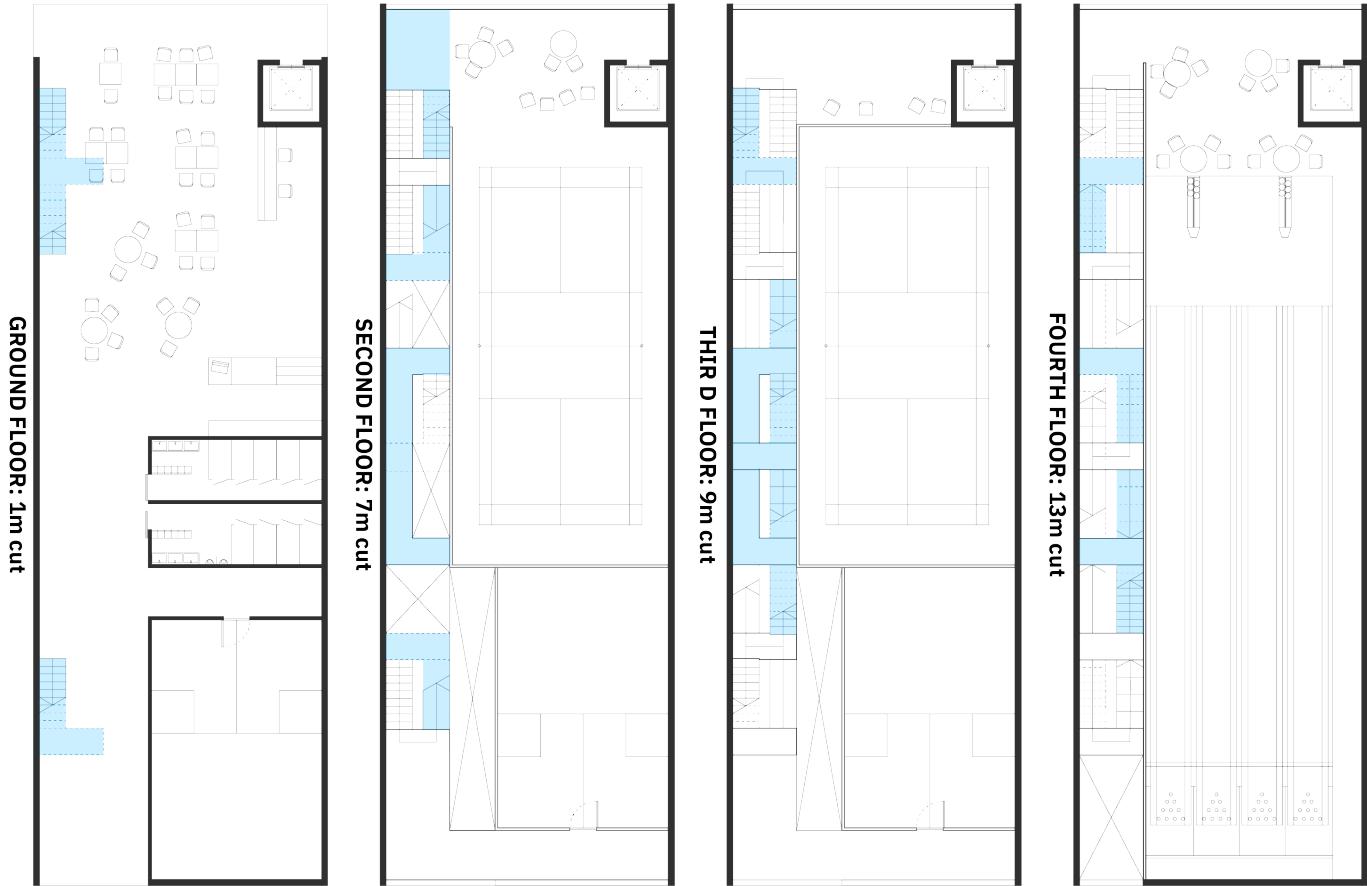


▲ FRONT ELEVATION.

▲ MID SECTION.

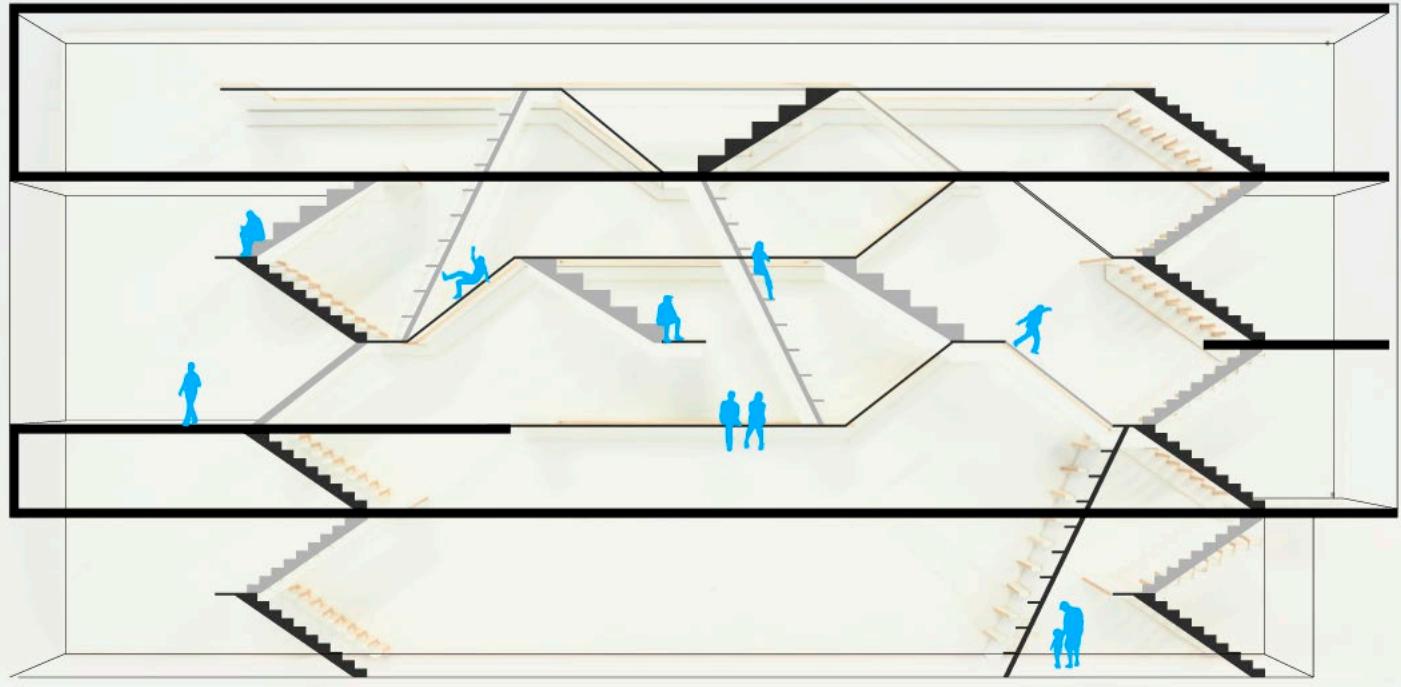
▲ FRONT SECTION.





▲ BUILDING FLOOR PLANS, AND SHIFTING STAIRS.





▲ SECTION OVERLAI'D ON MODEL.

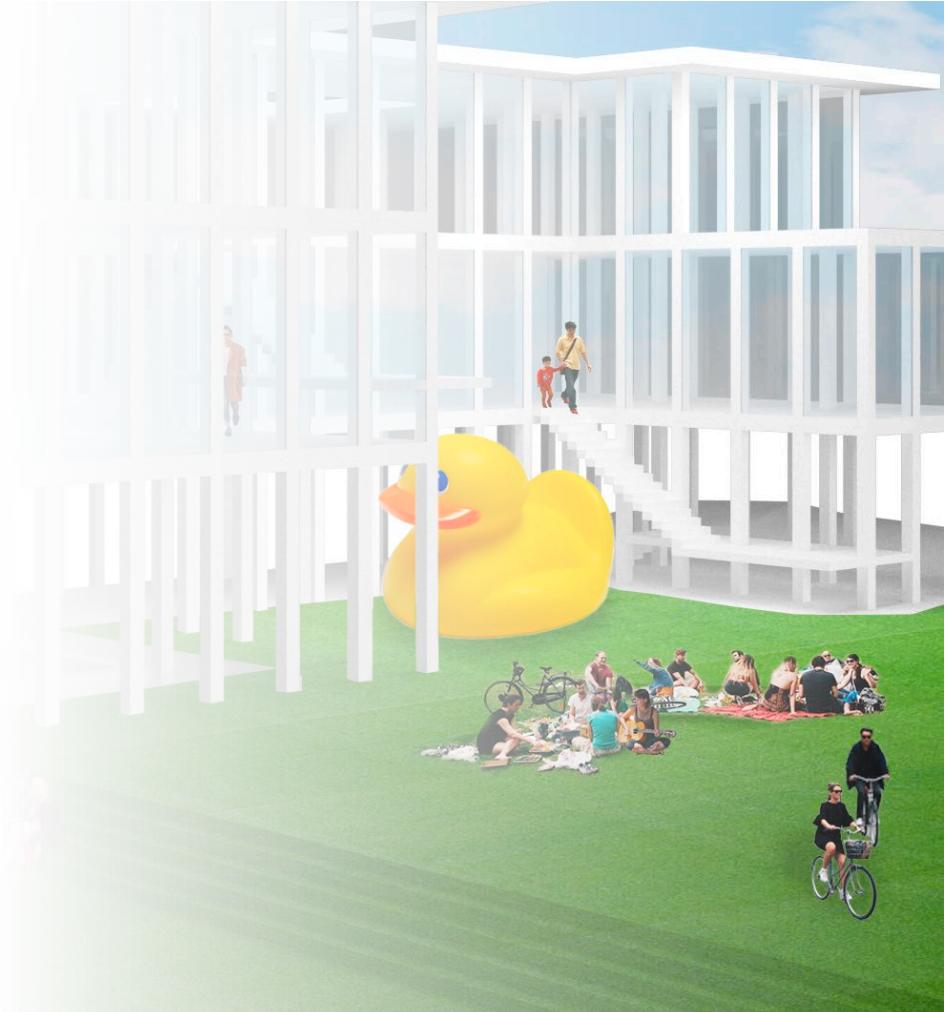
ARCHITECTURE

# NEW MoMA: THE COMMUNE

The Commune is an adaptation of the Greek stoa, in order to create a space for gathering and appreciation of art.

The terraced ground floor creates a functional and accessible plaza for public gathering, performance, and display of art. The main volume is raised above the ground.

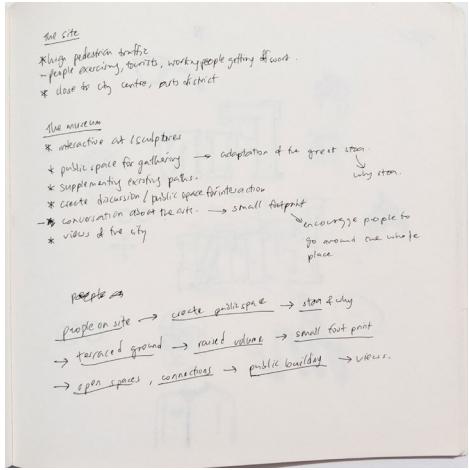
The small footprint and openness of the interior encourages visitors to explore its entirety, discovering new art and discussions about it.





In the past, this area was also known as scandal point, a place where people would gather to gossip.

▼ TRIVIA:

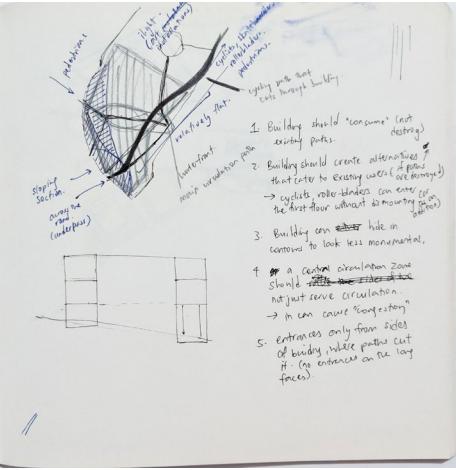


▲ SITE STUDY:

Observed how the site was used as a space for gathering and its existing role as a space for the arts.

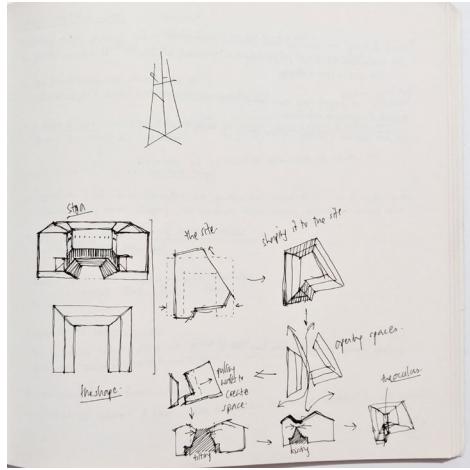
Determining constraints defined by existing use and traffic flow on the site.

▼ CONSTRAINTS:



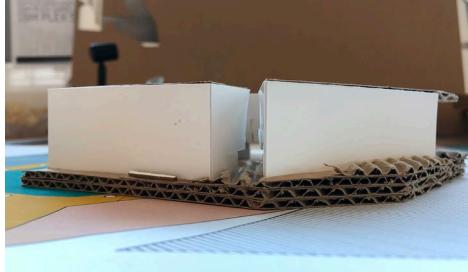
▲ CONCEPT:

The idea of the Greek stoa came to mind: a public space where merchants sold goods, artists displayed their works, and where people gathered.



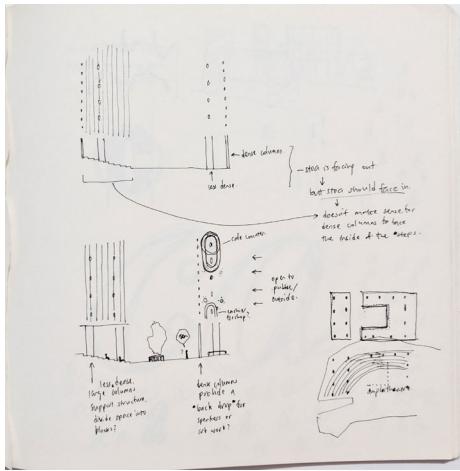
▲ SKETCHES:

Folding a stoa onto the site, and modifying it to increase floor area.



▲ CONCEPT MODELS:

Narrow spaces opening up into a spacious courtyard.

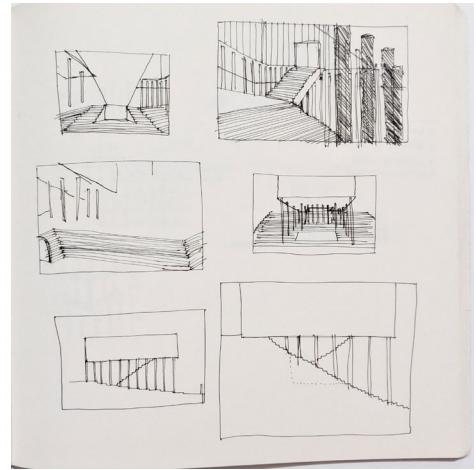


▲ DEVELOPMENT:

Developing a circulation path, and playing with different sizes and densities of columns to define space, without physical barriers.

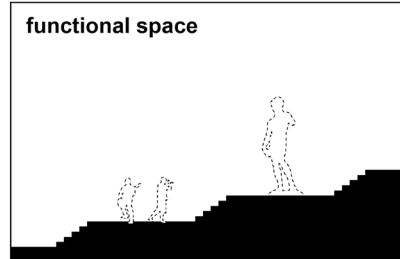
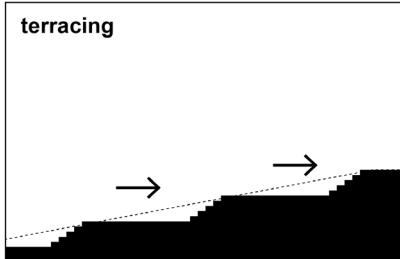
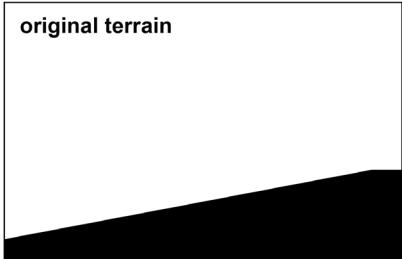
Attempts at making a grand entrance.

▼ ENTERING A SPACE:

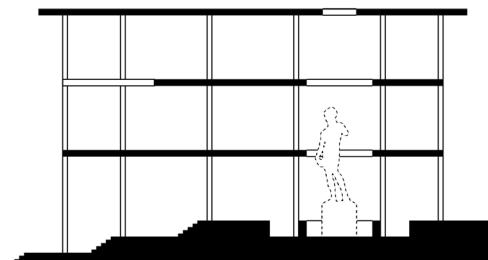
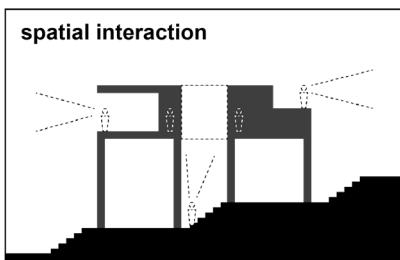
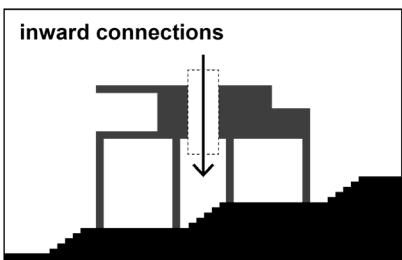
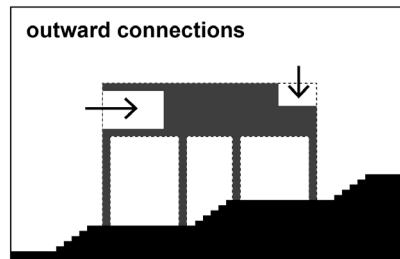
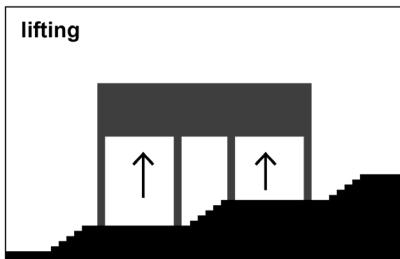
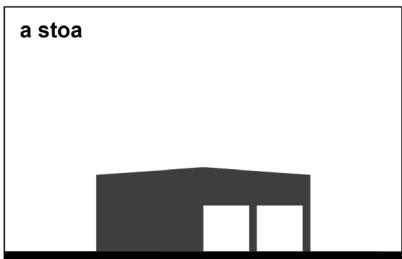


Terracing the ground floor to create more accessible and functional spaces.

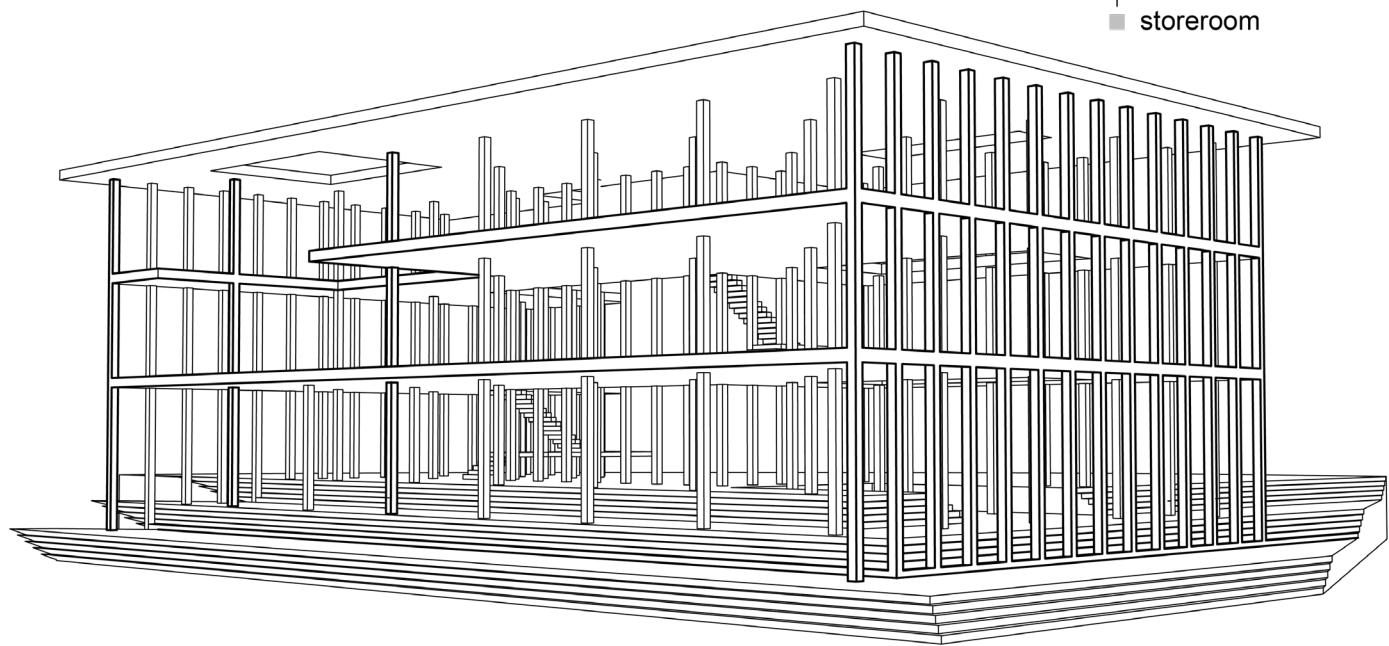
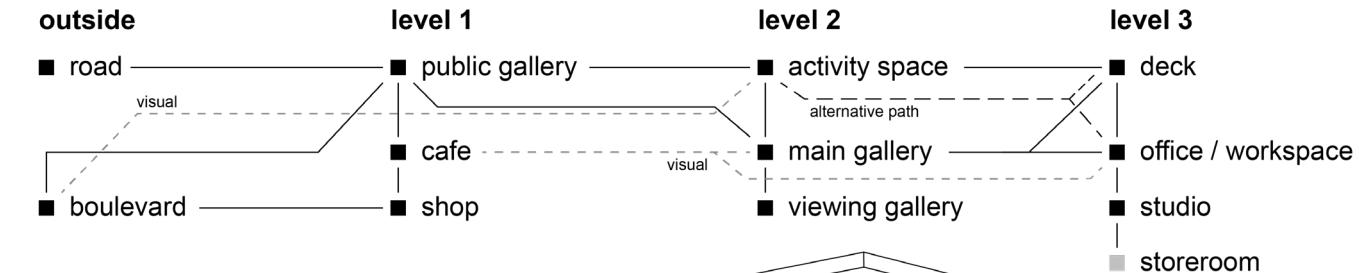
## site



## volume



# circulation



## ARCHITECTURE

# TINY TOWER

The Tiny Tower was designed to look like a wooden structure held together purely by friction and tension.

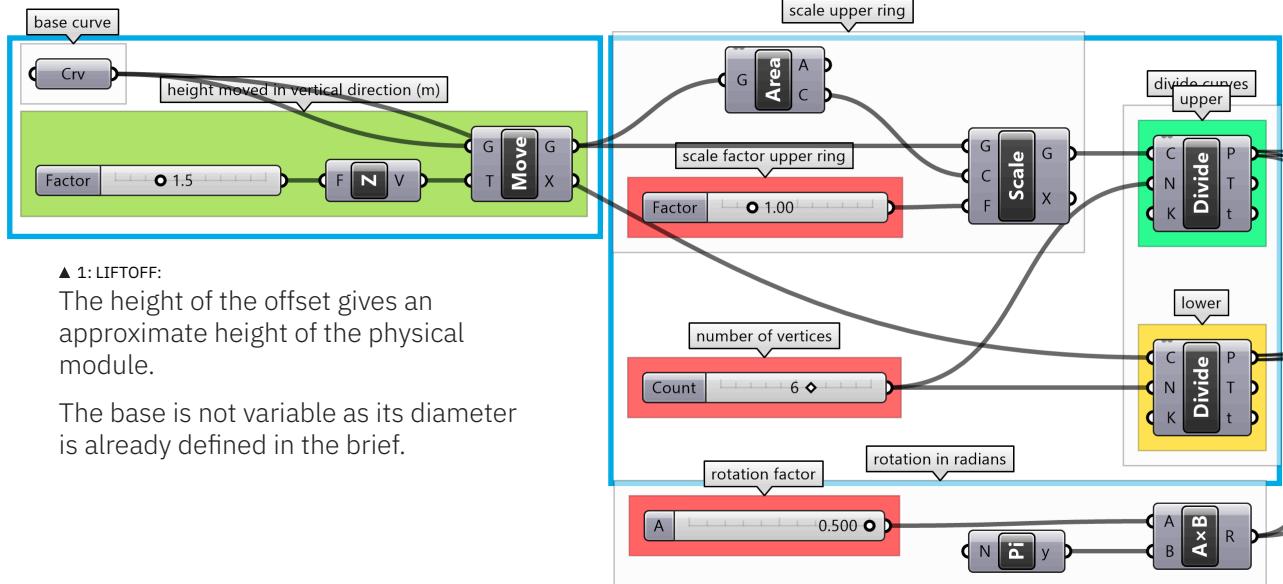
The design is inspired by hyperboloid structures, and completely avoids typical metallic fasteners and joints. Instead, it uses recycled plastic bottles as joints. This is possible because plastic bottles shrink when heated, and take the shape of the objects they are wrapped around, helping to keep the wooden members in place. Nylon strings circle the top and bottom of each module to keep it in tension.

The consistent use of transparent connection methods allows the Tiny Tower to achieve its design intent.





◀ TEAMWORK MAKES THE DREAM WORK.



#### INDEPENDENT VARIABLES.

**Vertical Height** affects how tall the hyperboloid structure will be.

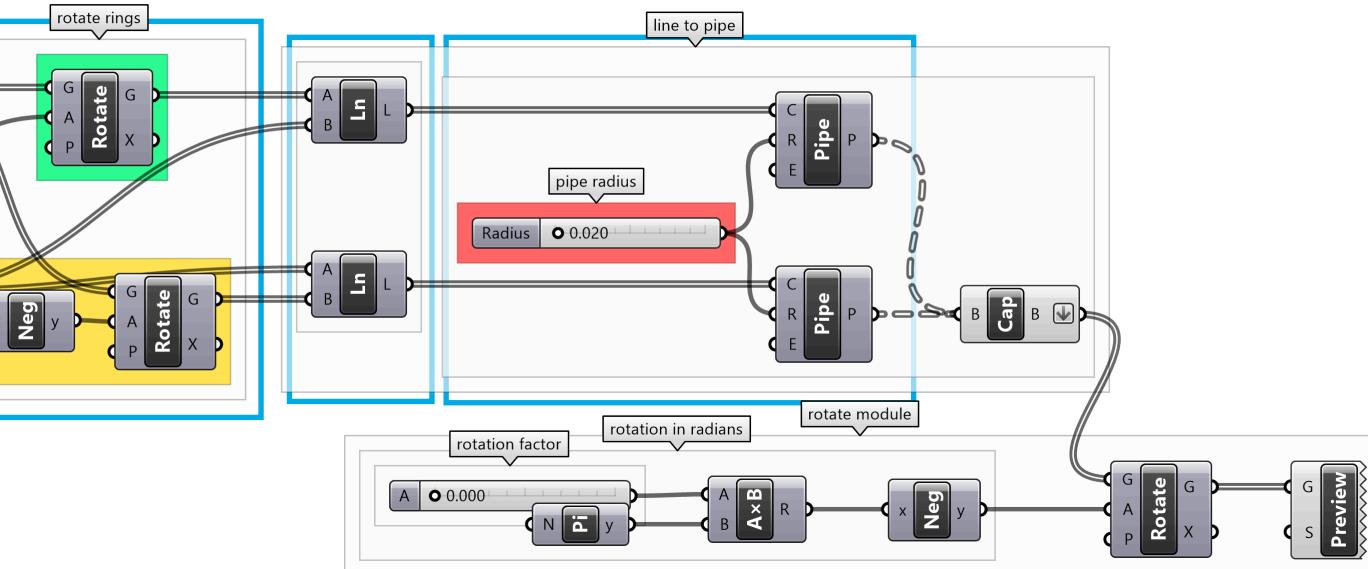
**Scale** determines how large the top of the hyperboloid is.

**Vertices** affects the number of elements in the structure.

**Rotation** affects the slant of each element.

The points on the upper circle are rotated in both directions around the normal in the center of the circle.

▼ 3: ANGLE ROTATION:

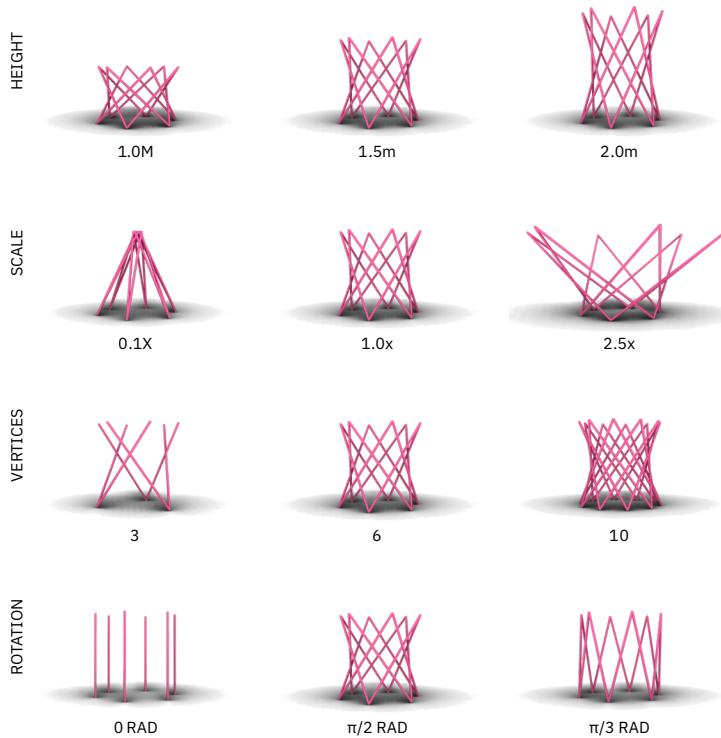


▲ 4: DRAWING LINES:

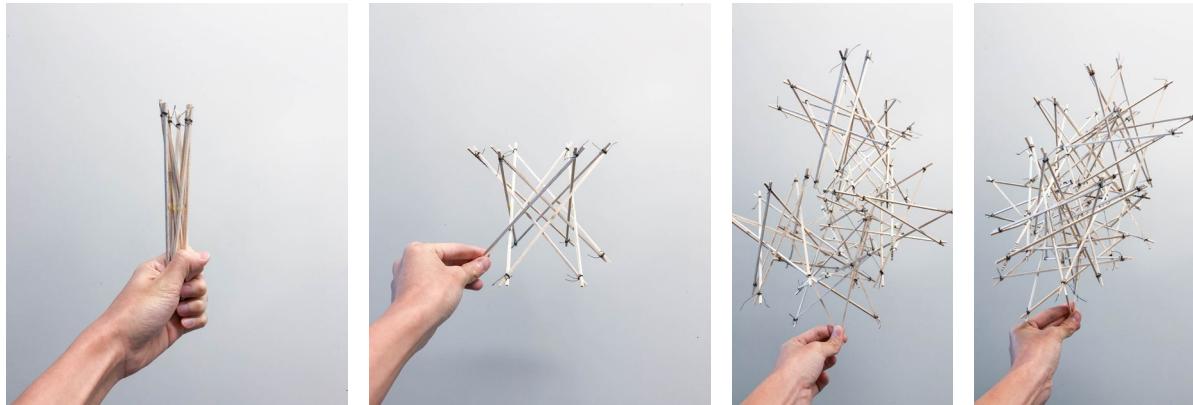
Lines from points on the bottom circle are drawn to the corresponding point in both rotated sets.

The lines are converted into 3D forms through a pipe. This helps us visualise the structure and intersections better.

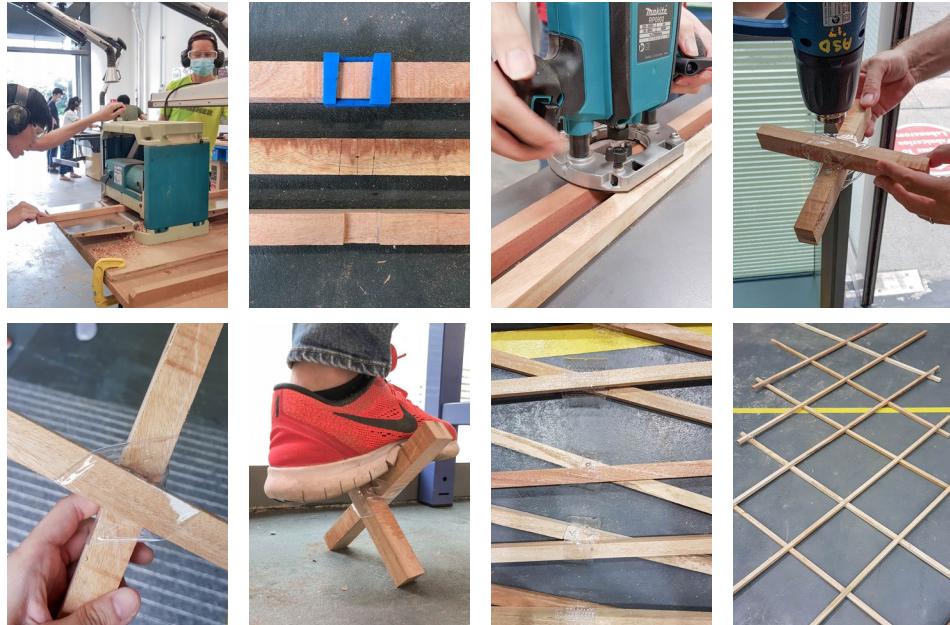
▼ 5: NOT JUST A PIPE DREAM:



▲ VARIATIONS IN PARAMETERS GIVE DIFFERENT FORMS.

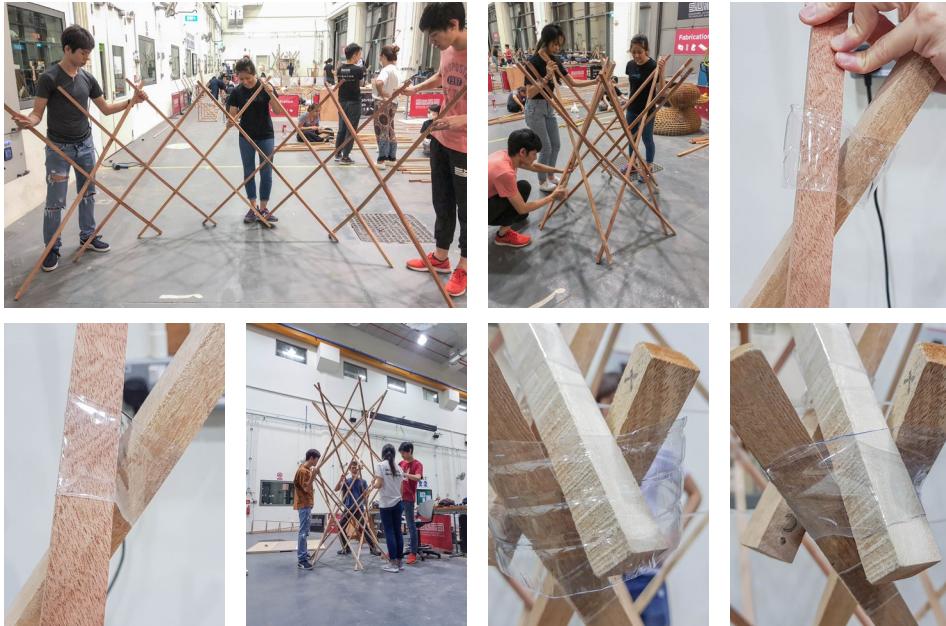


▲ PROTOTYPE DESIGN: COLLAPSIBLE MODULE.



Because of the large margin of errors in this project (due to the warping of wood), we made use of the mitered intersection points as guides.

▲ MATERIAL PREP, TO MATERIAL TESTING, TO LAYOUT.



The points where one member should have intersected with other members were used to increase the friction in each module.

ARCHITECTURE

# AL BAHAR ANALYSIS

The aim of this project was to provide an analysis on the form and facade of technological buildings.

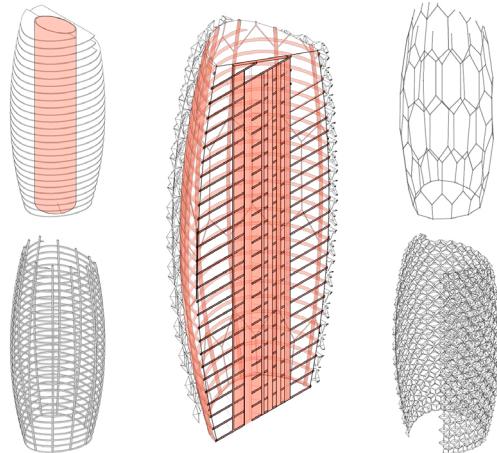
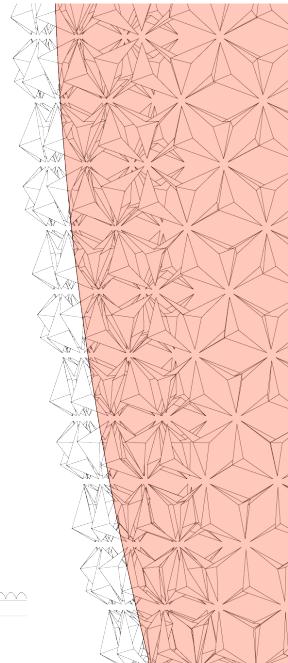
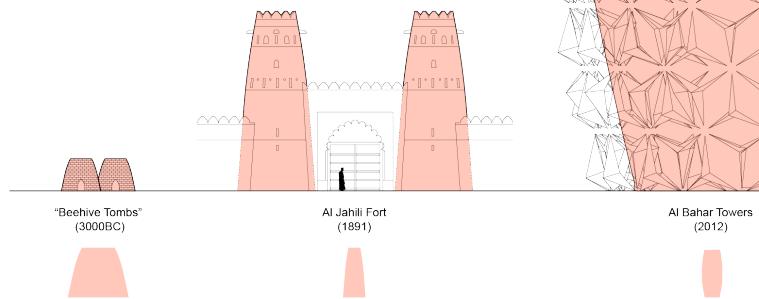
The building my group chose was the Al Bahar Tower in Abu Dhabi, UAE.

My role in the project was to illustrate the form generation process of the floor-plates, as well as present the report in an interesting manner.

## form generation: al bahar towers

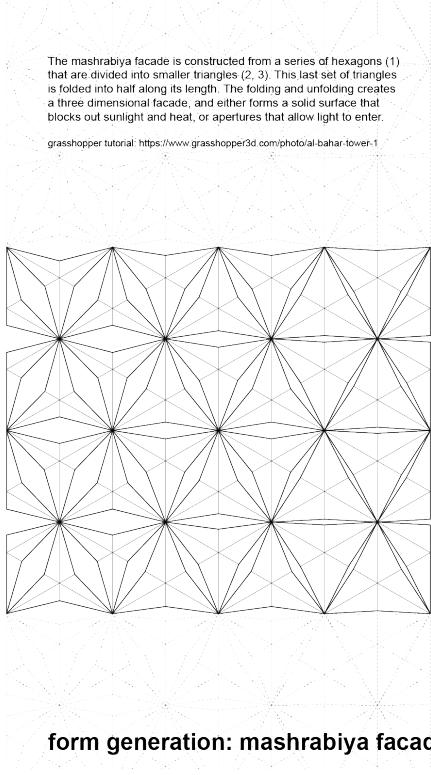
The overall shape of the Al Bahar Towers is a cylinder that bulges in the middle and tapers at the top and bottom. This is a variation of the geometry particular to the Middle-Eastern region and architecture. It is featured in a range of structures, from the ancient remnants of the "Beehive Tombs" in Oman, a protohistoric archaeological site, to structures in the 1900s, such as the Al Jahili Fort in Al Ain. This geometry is popular in the region as the gradually tapering top increases the stability of the stone structure, as the building leans into itself. The circular plan of these structures reduces the number of weak points present at the corners. Al Bahar adapts this form, with its tapered bottom reducing the building footprint, while maintaining the bulging middle and tapered top.

The modified form of Al Bahar is therefore familiar to locals, and can be said to be contextually sensitive.



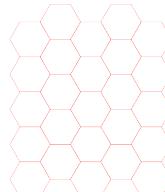
Exploded Axonometric Scale 1:1000  
Sectional Axonometric Scale 1: 1000  
**structure**

The overall shape of the Al Bahar Towers bulges in the middle and tapers at the top. The structure system consists of a central core and a rectilinear grid around the internal circumference of the floorspace. The Al Bahar Towers are column free as the floor slabs are directly supported by the core and external structure.

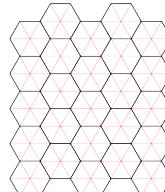


The mashrabiya facade is constructed from a series of hexagons (1) that are divided into smaller triangles (2, 3). This last set of triangles is folded into half along its length. The folding and unfolding creates a three dimensional facade, and either forms a solid surface that blocks out sunlight and heat, or apertures that allow light to enter.

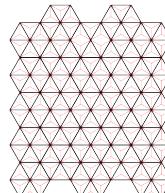
grasshopper tutorial: <https://www.grasshopper3d.com/photo/al-bahar-tower-1>



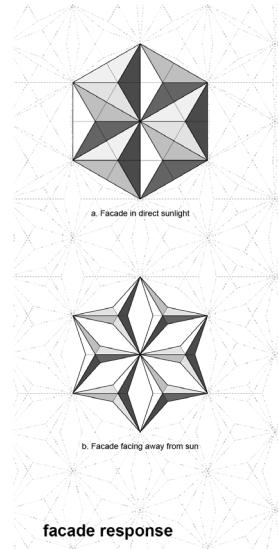
1. The base of the mashrabiya facade starts with a hexagon.



2. The hexagon is divided into groups of 6 triangles.



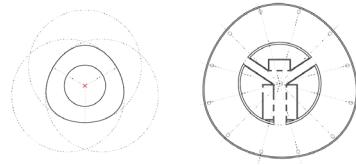
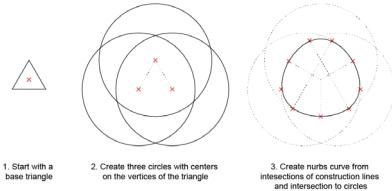
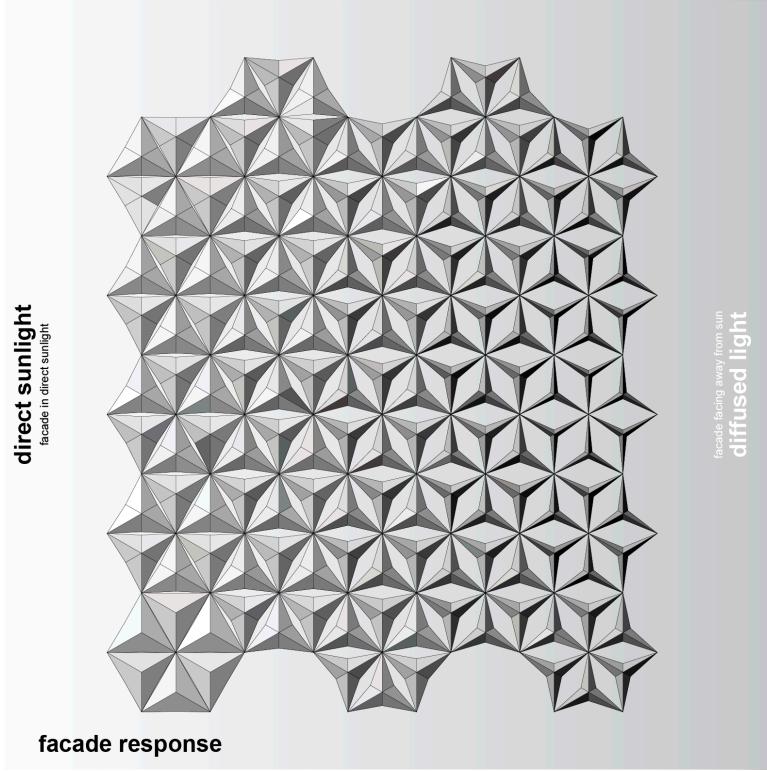
3. The triangles are then divided again into three more triangles.



**facade response**



The facade of the Al Bahar towers responds to the sun, closing up when the sun is acting directly (a), and opening when the sun starts to shift away (b). By doing so, the facade is able to reduce solar heat gain from direct sunlight, while allowing the building to still be naturally lit.



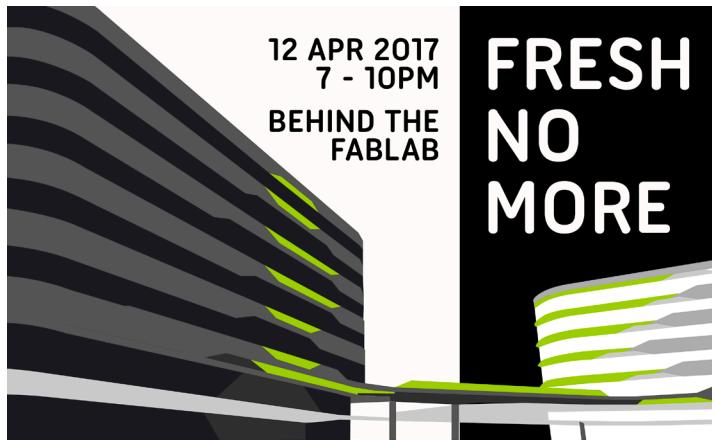
### form generation: floor plate

The shape of the floor plate of the Al Bahar towers is derived from a Reuleaux triangle, with rounded corners. This shape allows the creation of a uniform space of constant diameter.

## GRAPHIC DESIGN

# FRESH-NO-MORE

Fresh-No-More is an annual event at the Singapore University of Technology and Design, celebrating each batch of students' progress from the Freshmore year (first three terms of school), to their Sophomore term.

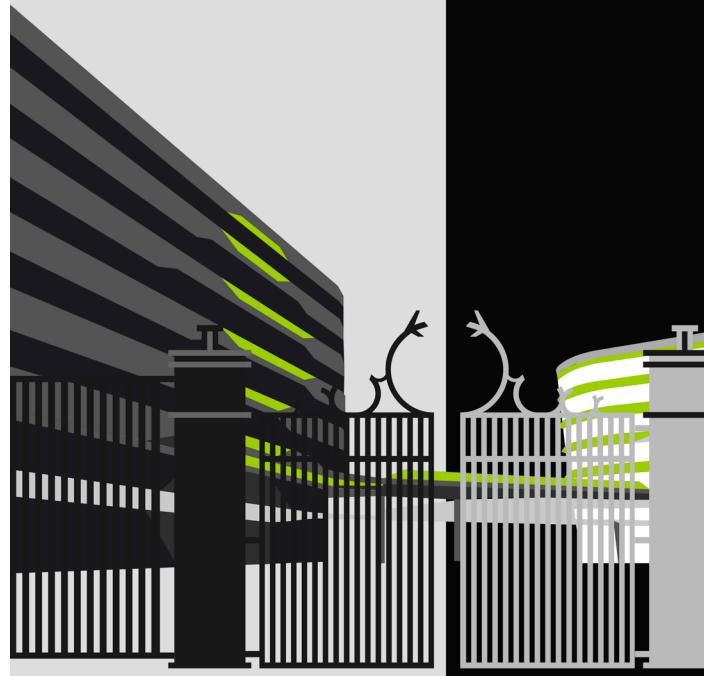


▲ TICKET DESIGN.

# FRESH NO MORE

12 APR 2017  
7 - 10PM

BEHIND THE  
FABLAB



## GRAPHIC DESIGN

# YUSHENG APP

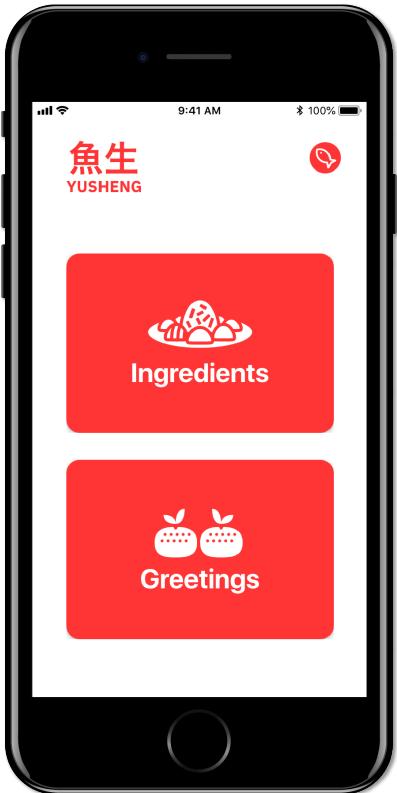
The app aims to help you learn more about the Southeast Asian Chinese tradition of *yusheng*.

It was featured by Apple on the App Store for Chinese New Year in 2019.

The app was developed by my friend, Koh Jing Yu, and designed by me.

The app has two functions: (1) to teach users about the ingredients in *yusheng* and the meaning behind them, and (2) to give users greetings that they can use during the *yusheng* tossing session, or as general greetings to one's elders.





▲ APP FRONT PAGE.



▲ YUSHENG. ▲ GREETINGS. ▲ SHARING PAGE.

The first part of the app gives you an introduction to the ingredients in *yusheng* in a card view, presenting one ingredient at a time, in the order that they are added to the table. Each ingredient comes with an associated saying that includes an audio clip for you to practice.

The second part gives you greetings that you can use during the *yusheng*, or the Lunar New Year in general. It also indicates which zodiac animal the greeting is associated with (because of word plays), and the meaning behind it.

The share sheet lets you send the greetings to your friends and family.

## GRAPHIC DESIGN

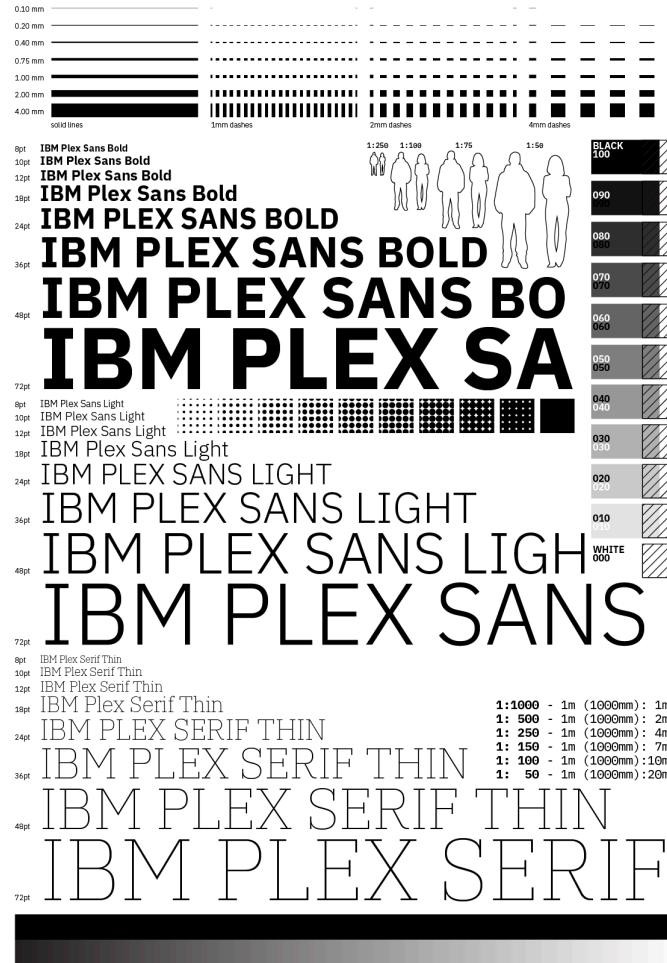
# REFERENCE SHEET

A reference sheet for architectural drawings and pin-up boards.

The sheet presents various line weights, dash lengths, and font sizes, to allow students to quickly see what is visible and at a distance.

Readability is key when presenting on posters, which is why text and line weights take up the majority of the sheet. Developing good contrast also helps to make text readable and diagrams understandable when viewed from a distance.

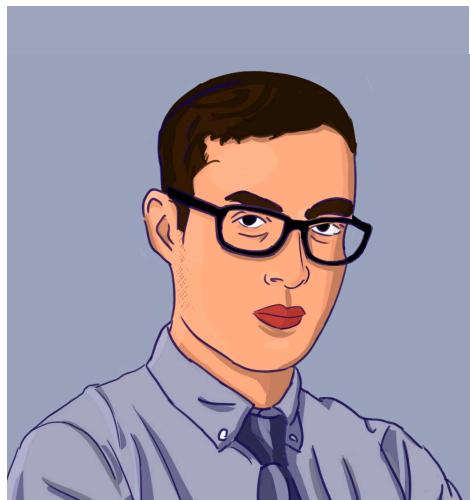
Also included at a smaller size are scaled humans and scale conversions for quick reference, as these are meant to be used when developing the poster before the presentation.

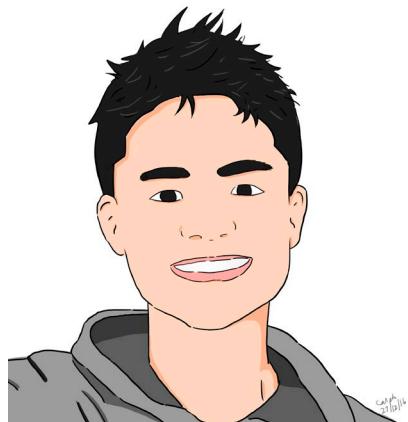
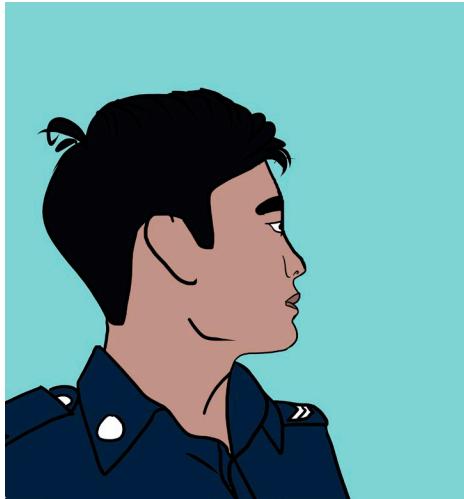


## ILLUSTRATION

# PORTRAITS

An ongoing series of portraits, which I began back in 2014 for my colleagues in NS. I've been slowly expanding the collection in my free time, as I meet new people who play a major role in my life, or request for one.

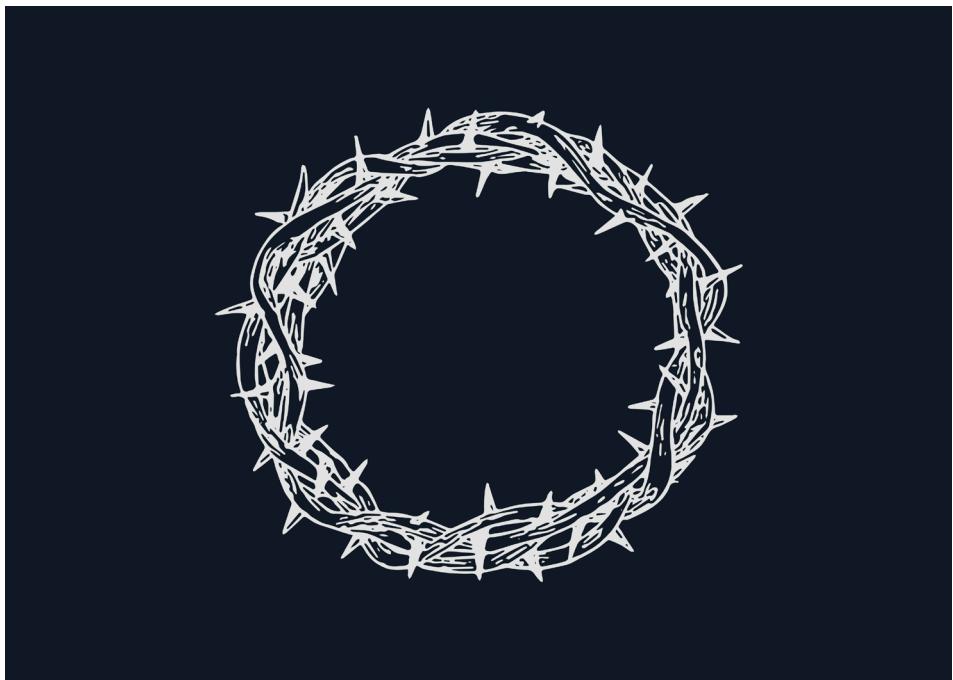
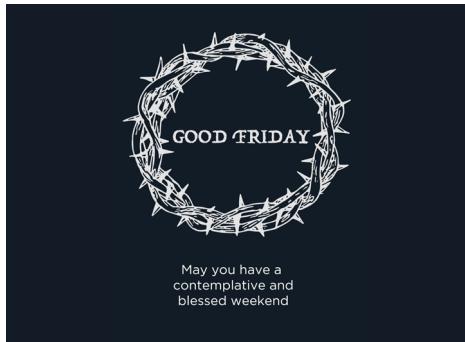




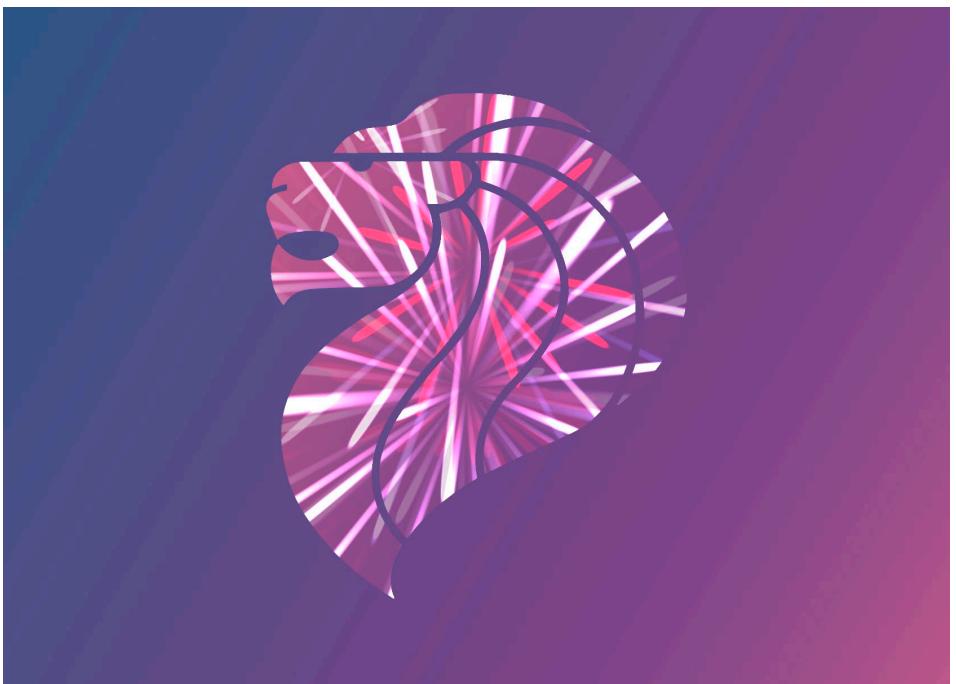
ILLUSTRATION

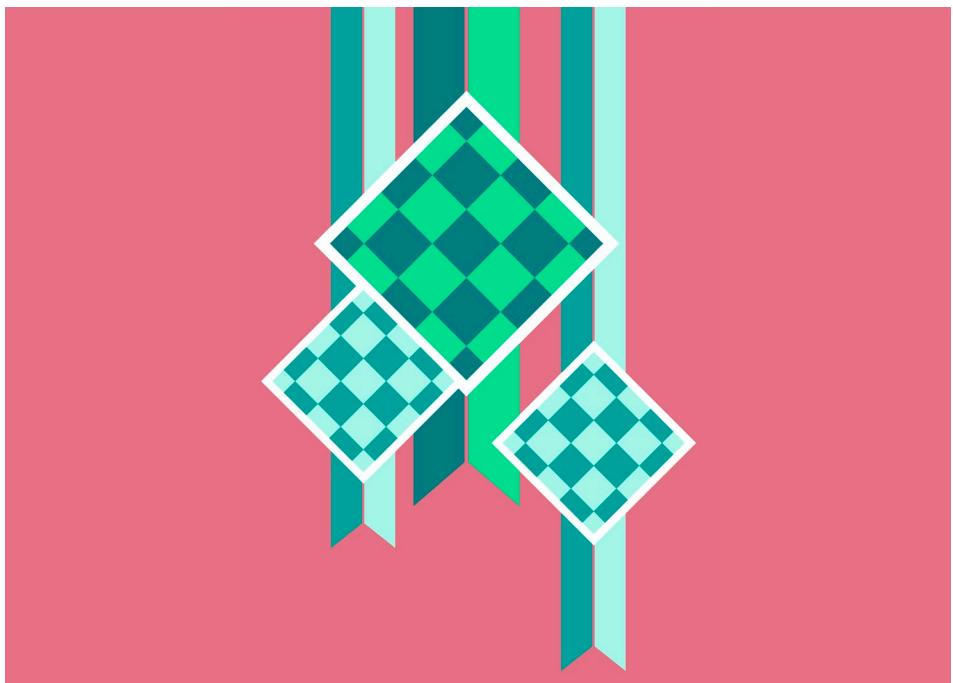
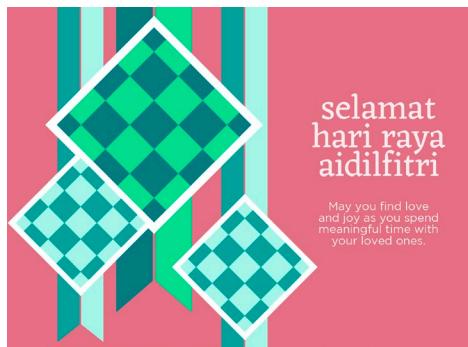
# PUBLIC HOLIDAYS

These holiday posters were developed as holiday greetings from the school's Student Government, and were sent out to the student body on their corresponding public holidays.







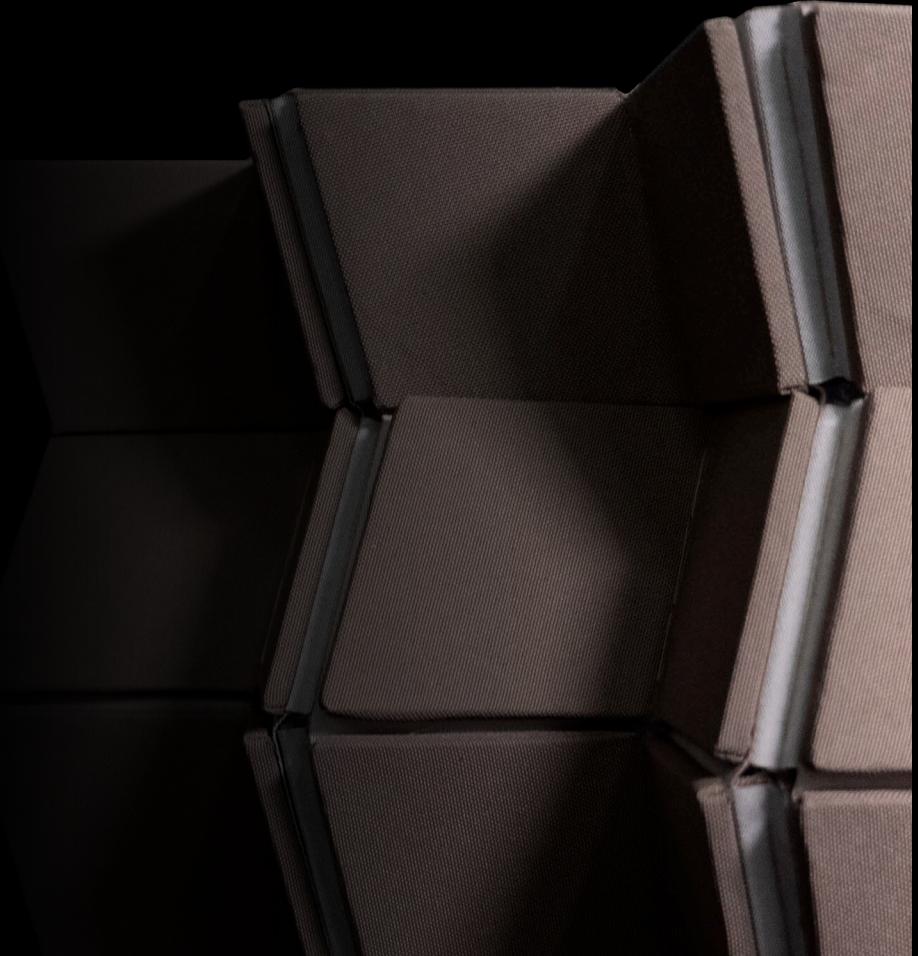


## PRODUCT DESIGN

# ■ NOW PANEL

The Now Panel is my final year project, in collaboration with fellow architecture and engineering students, with mentorship from ARUP.

I worked with my friend to develop the form, mechanism, and finish of the panel, which is meant to be modular and collapsible. The material combination was researched by my other architecture friends.

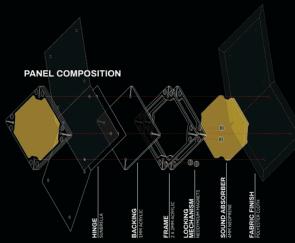


# the now panel

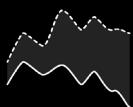
DESIGNED BY CHUN-MAN YAU, ON JIA LIU, TAN ZHENGJIE,  
PRO. DR. RENZO LIU, BRIAN KOO AND GY WANN YUN  
SPECIAL THANKS TO DR. JU ZHENGJIE AND DR. MARTIN GROHSE FROM ARUP AND DR. PAULA SULIK AND DR. RICHARD TRACY  
FOR THEIR COLLABORATION THROUGHOUT THE PROJECT.

In an open-plan office, employees often have discussions and phone calls which can get quite loud, disturbing the people sitting around them. Quiet rooms which are spread across the office are not frequently used because they are less convenient.

The NOW panel is an easy-to-deploy and portable acoustic barrier for the open-plan office. NOW panels reduce noise, in order to improve privacy, productivity and well-being.



ARUP  
STRUCTURAL DESIGN



UP TO 10DB  
REDUCTION



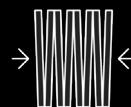
TARGETS MIDS  
AND HIGHS



DIFFUSES  
SOUND



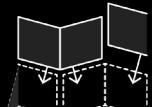
QUIET  
OPERATION



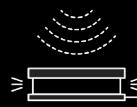
COMPACT  
DESIGN



PORTABLE  
DESIGN



MODULAR  
DESIGN

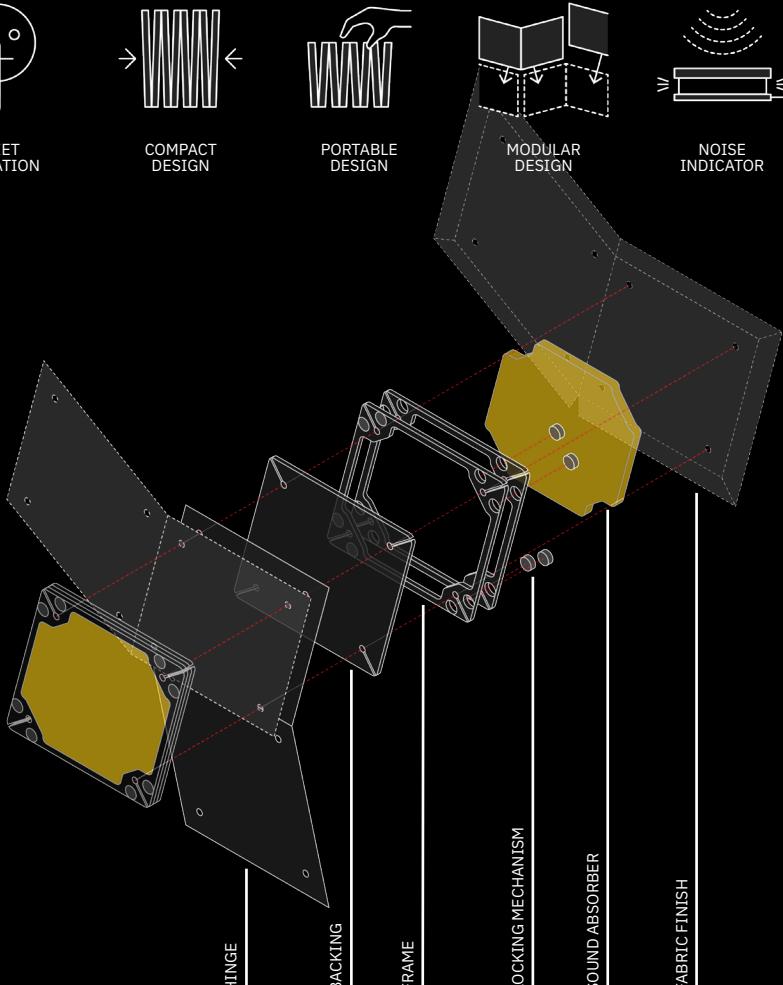


NOISE  
INDICATOR

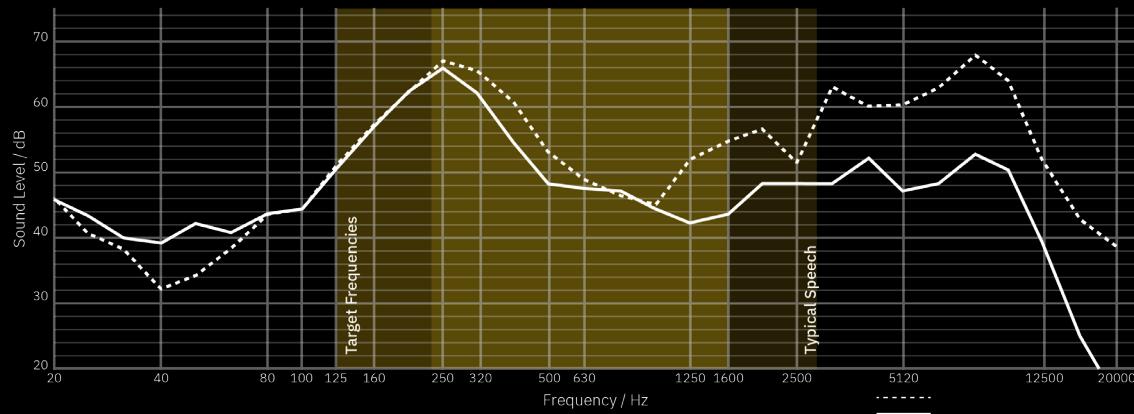
#### PRODUCT DESCRIPTION:

In an open-plan office, employees often have discussions and phone calls which can get quite loud, disturbing those around them. Quiet rooms which are spread across the ARUP office are not frequently used because they are much less convenient.

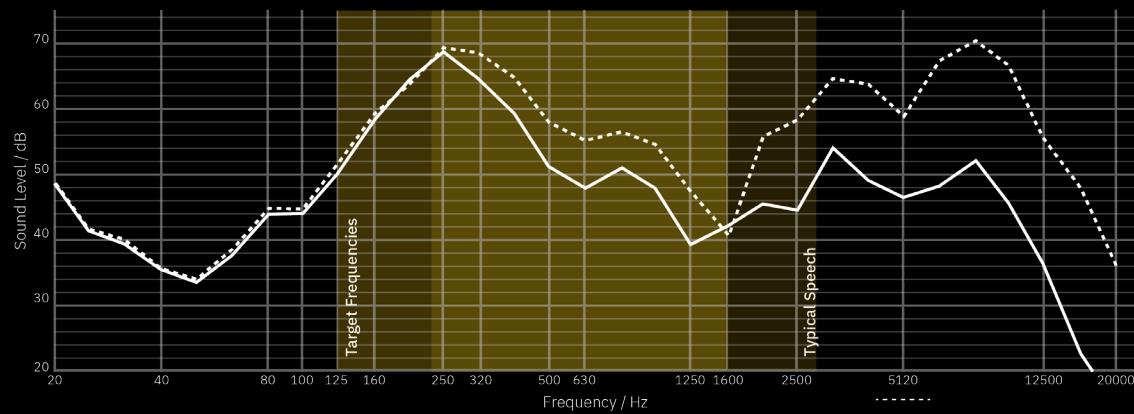
The NOW panel is an easy-to-deploy and portable acoustic barrier for the open-plan office. NOW panels reduce noise, in order to improve privacy, productivity and well-being.



▼ NOISE REDUCTION (INDIRECT SOUND)



▼ NOISE REDUCTION (DIRECT SOUND)



## PRODUCT DESIGN

# SMART BEAUTY

Smart Beauty is a project I participated in, while on exchange at Zhejiang University, organized in collaboration with mentor company Hot Design. Four groups of students worked to develop products that represented different possibilities of the smart future which we are headed towards.

My group used colored resin to develop lamps which are meant to soothe the soul.

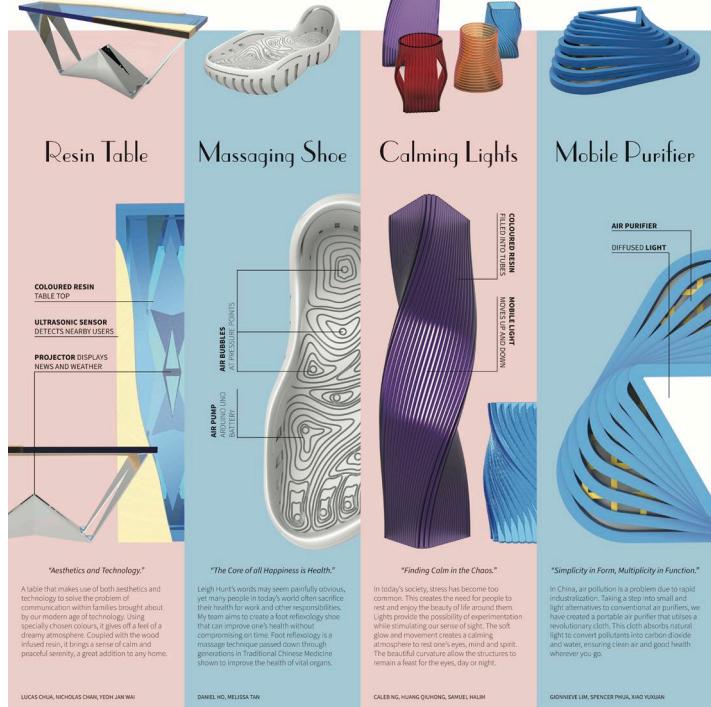
The poster design aims to give a sense of refinement and modernity; a certain “poshness” which reflects the nature of the products which we designed.



# SMART BEAUTY

This theme is led by:

Prof. Yan Cheng (任成) and Zhao Yuan (赵芸)  
TAs: Zhang Caowei (张曹伟), Liu Xin (刘欣), Tang Chui (唐楚),  
Li Han (李汉), Lu Hanhan (吕涵涵), Xunyi (徐益) and Zhanglin (张琳).



**Resin Table**



*"Aesthetics and Technology."*

A table that makes use of both aesthetics and technology to solve the problem of common stress. It has been thought about by our modern age of technology. Using specially chosen colours, it gives off a feel of a dreamlike atmosphere. By using coloured infused resin, it brings a sense of calm and peaceful serenity, a great addition to any home.

LUCAS CHUA, NICHOLAS CHAN, YEH JAN WAI

**Massaging Shoe**



*"The Core of all Happiness is Health."*

Leigh Hui's shoe may seem painfully obvious, yet many people in today's world often sacrifice their health for convenience and pleasure. My team aims to create a foot reflexology shoe that can improve one's health without causing any physical discomfort. This shoe uses a massage technique passed down through generations in Traditional Chinese Medicine known to improve the health of vital organs.

DANIEL HO, MELISSA TAN



**Calming Lights**



*"Finding Calm in the Chaos."*

In today's society, stress has become too common. This creates the need for people to decompress and relax. Our Calming Lights provide the possibility of experimentation while stimulating our sense of sight. The soft glow of the lights creates a relaxing, meditative atmosphere to rest one's eyes, mind and spirit. The beautiful curvature allows the structures to remain a focal point for the eyes, day or night.

CALEE NG, HUANG QIUSHENG, SAMUEL HALIM

**Smart Beauty** is about the future world of smart devices that we are heading towards. Our lives will be significantly changed, not only at a technological level, but also at an artistic and psychological level.

*This is where design happens.*

This is why we need to integrate technology and aesthetics.

For the past two and a half months, our theme has moved through basic design training to prototyping; we have learned, thought, and experienced so much.

What you see before you are the fruits of our labour. Please enjoy!



**Mobile Purifier**



*"Simplicity in Form, Multiplicity in Function."*

In China, air pollution is a problem due to rapid industrialization. Taking a step into small and portable air purifiers, we have created one. When we have created a portable air purifier that utilises a revolutionary cloth, this cloth absorbs natural pollutants and binds carbon dioxide and water, ensuring clean air and good health whenever you go.

GIOVANNI LIM, SPENCER PHUA, KAO YUQIAN

PHOTOS OF THE NOW PANEL WERE TAKEN BY MY GROUPMATE TAN JINGREN.  
YOU CAN FIND HIS WORK ON [WWW.TANJINGREN.COM](http://WWW.TANJINGREN.COM) AND [WWW.MADEBYCOLUMN.COM](http://WWW.MADEBYCOLUMN.COM)  
OR FIND HIM ON INSTAGRAM [@TANJINGREN](https://www.instagram.com/tanjingren) AND [@MADEBYCOLUMN](https://www.instagram.com/madebycolumn).