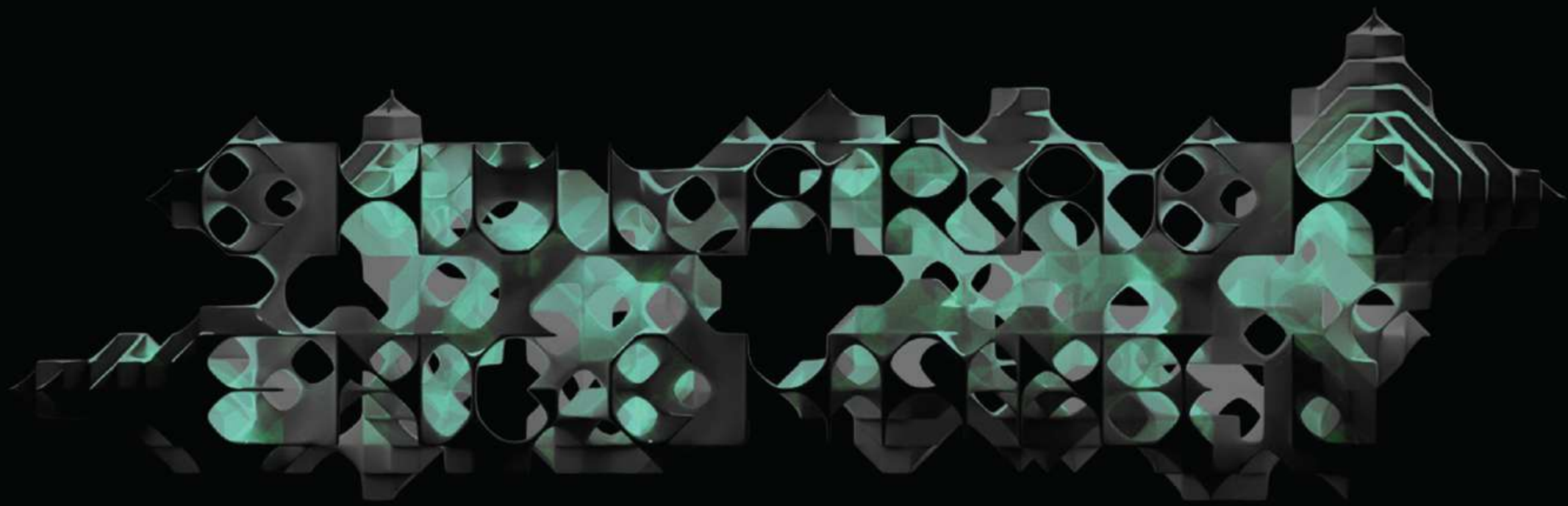

CHULARACH ENGCHANIL

ARCHITECTURE & DESIGN PORTFOLIO

CHULARACH

ABOUT

Date of birth: 14 November 1996

Nationality: Thai

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Address: 460 Mu 3 Mitraparp Road,Sila Subdistrict, Mueang District, Khonkaen, Thailand 40000

EDUCATION

Degree:

Bachelor of Science in Design & Architecture *from International Program in Design & Architecture (INDA), Faculty of Architecture, Chulalongkorn University (SY 2015-2018)*

Master of Architecture (Infromation Technology & Architecture) *from Thammasat Design School Graduate Program (TDS), Faculty of Architecture and Planning, Thammasat University (SY 2020-2022)*

SKILLS

Digital:

Knowledeable in Rhinoceros 3D Modelling Software *(including Grasshopper Plugins)*

Knowledgeable in Vray Rendering *(for Rhinoceros)*

Knowledgeable in Adobe Softwares *(including Photoshop, Illustrator, Indesign and After Effects)*

Workable experience in Photogrammetry Software *(Agisoft)*

Workable experience in Processing and Arduino Language *(Coding)*

Some exposure in Virtual Reality Software *(Unity, Shapespark)*

Some exposure in Maya 3D Modelling Software

Language: Proficient in English and Thai

CONTENTS

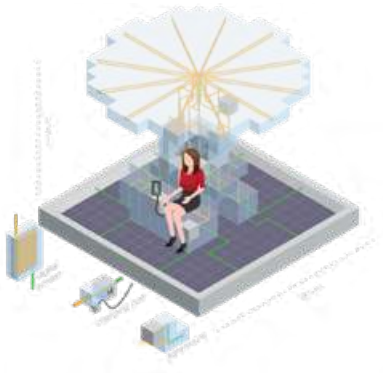
PROJECTS

Individual:

Collaboration:

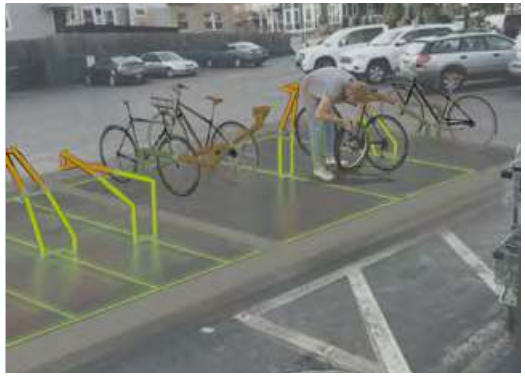
SOLAROAD PROJECT (Brand Flagship)

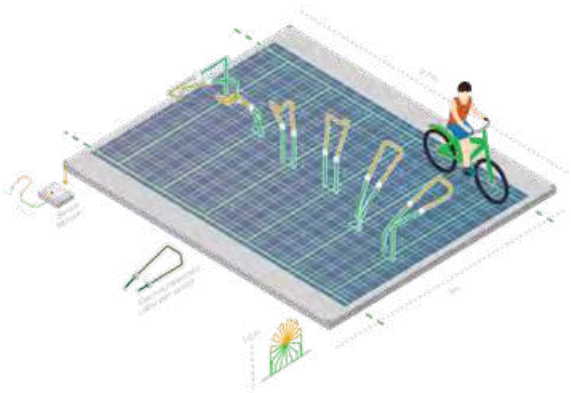
Solaroad is an innovative company inventing a road panel with solarcell embeded inside to utilize an infrastructure's surface as energy generator. The project aintends to reflect the company's vision about energy and sustainablility with new design and innovative materials. The new materials introduced here are glass bricks and electroluminescent cable which display the electrical flow to create awareness and consciousness about energy consumption thorugh transparency. This idea of exposure then get implemented into two designed components and the final architectural flagship of Solaroad.



Proposal 1: "Elec-Tree"

Free electricity charging point and bus stop shelter near Solaroad made out of glass bricks to expose the internal electricity flow and provoke awareness in energy consumption in our dailiy routine.



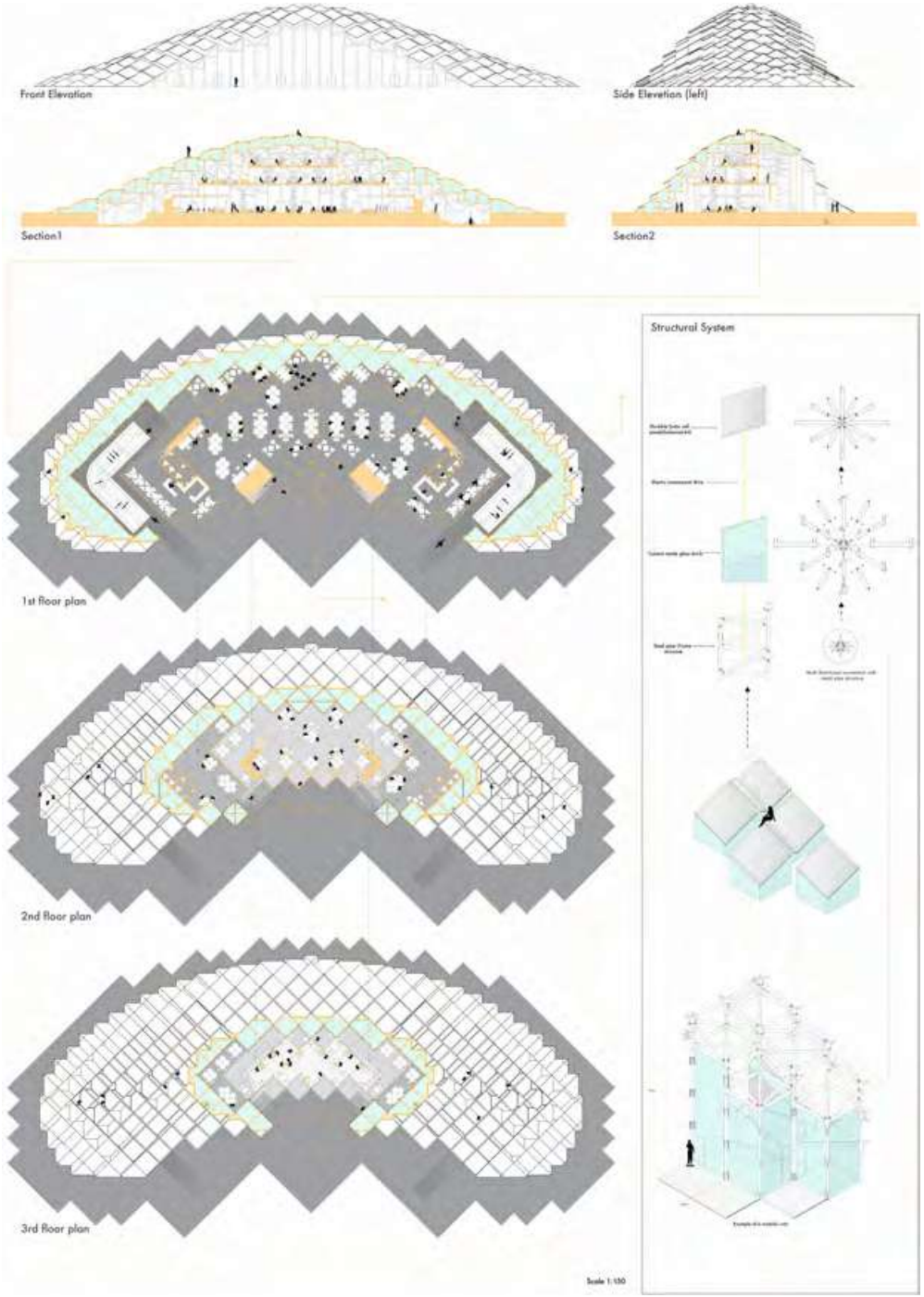


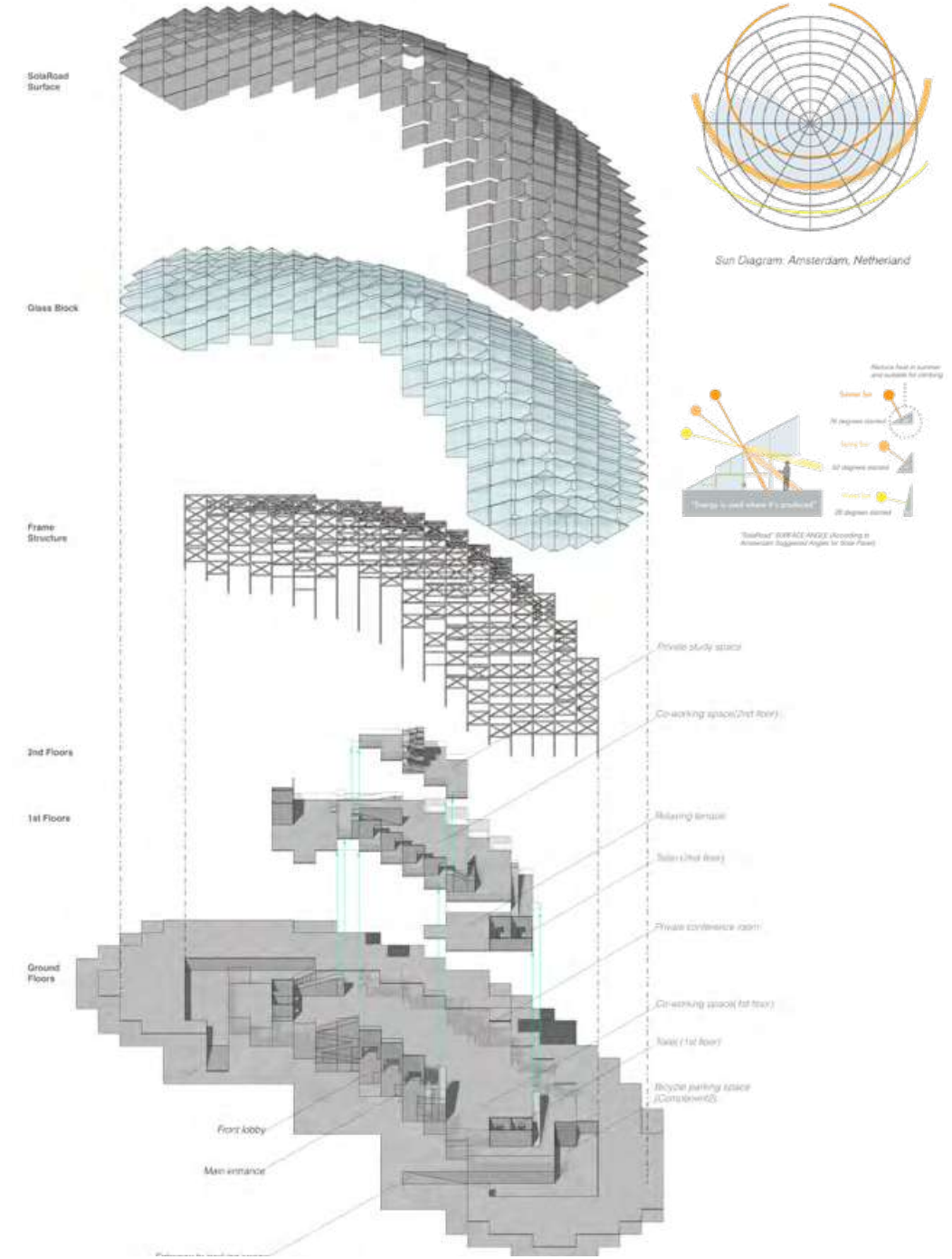
Proposal2: "SolaRack"

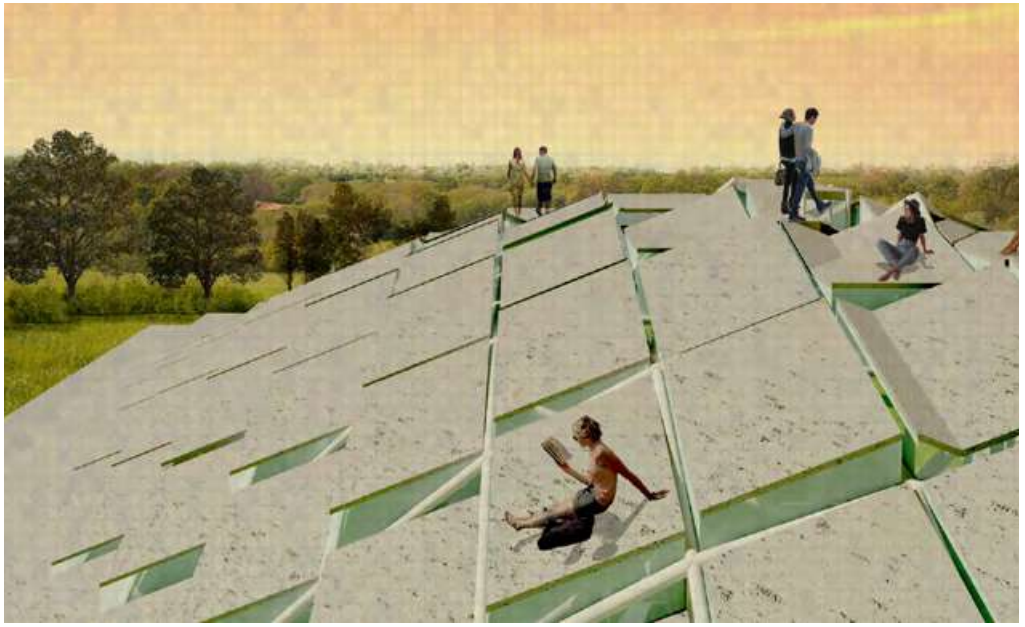
The sensor tracks people's circulation and lead them to the available parking space by turning on light line and switch off after parking to save energy.

Proposal 3: "Solar Hill"

Solarhill is designed as a flagship for a Dutch company "SolaRoad". The architectural proposal applies the Solaroad panel as a durable accessible roof for people to enjoy the sun shine while also collecting energy. The concept of integrating materials like Glass blocks and Electroluminescent cables in the design is to provoke the idea of energy consumption as the interior is programmed as a co-working space for students in the campus.

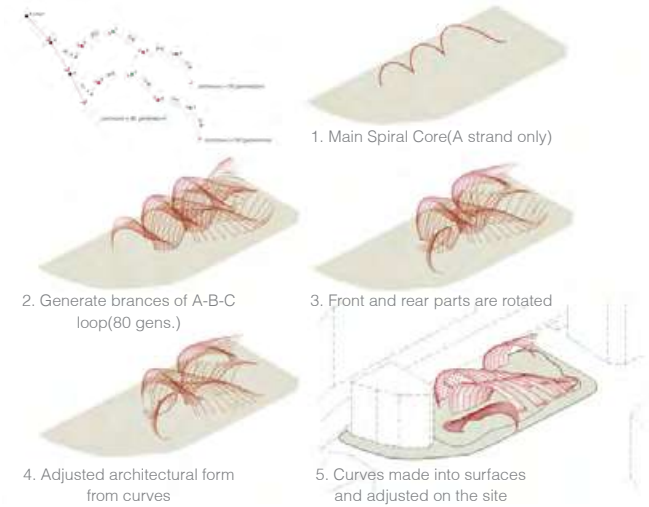

Front Elevation
Side Elevation (left)
Section1
Section2
1st floor plan
2nd floor plan
3rd floor plan
Structural System
Scale 1:150


SolaRoad Surface
Glass Block
Frame Structure
2nd Floors
1st Floors
Ground Floors
Sun Diagram: Amsterdam, Netherland
Private study space
Co-working space(2nd floor)
Relaxing terrace
Toilet (2nd floor)
Private conference room
Co-working space(1st floor)
Toilet (1st floor)
Bicycle parking space (Completed)
Front lobby
Main entrance



THE WEAVING WAVE

Apart from football in which Manchester is well known for, there are other cultural and historical aspects towards this city. For instance, the textile industry and trading expertise in the ocean were also identities of Manchester.Therefor, the pavilion tries to symbolize these two features with the interpretation of form. Textile requires the act of weaving threads together which resembles the activities planned in the pavilion to connect people in the neighbourhood together whether by the amphitheater, playground or multipurpose space provided for creative expression and interaction among users. The design of form here attempts to use an algorithm to help a designer break free from convention and find possibilities of forms and functions from a computer generated outcome where walls, floors or roofs have blur boundaries between them and are not strictly rational. The form derives from an algorithm written to generate fractal curves repeatedly with rules (L- System) that regulate how curves continue to grow and branch out like trees.



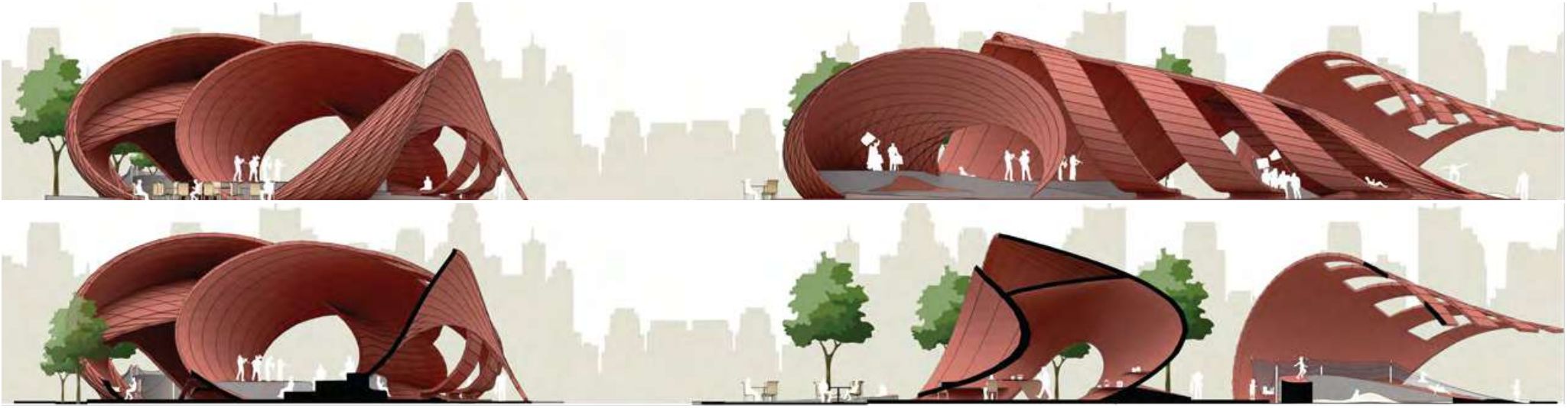
1. Main Spiral Core(A strand only)

2. Generate brances of A-B-C loop(80 gens.)

3. Front and rear parts are rotated

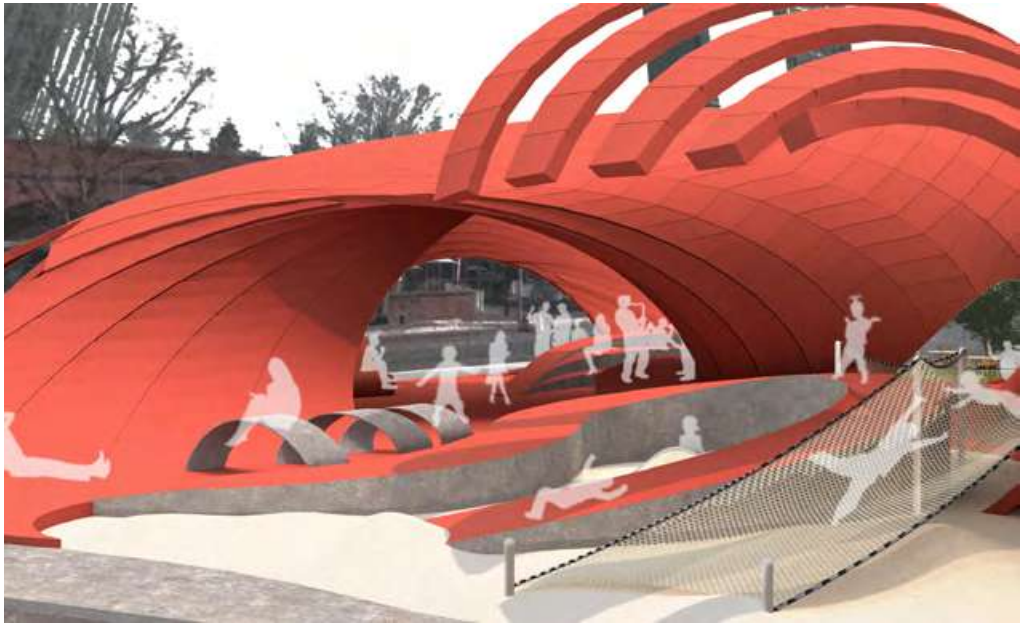
4. Adjusted architectural form from curves

5. Curves made into surfaces and adjusted on the site



Section 2

Section 1

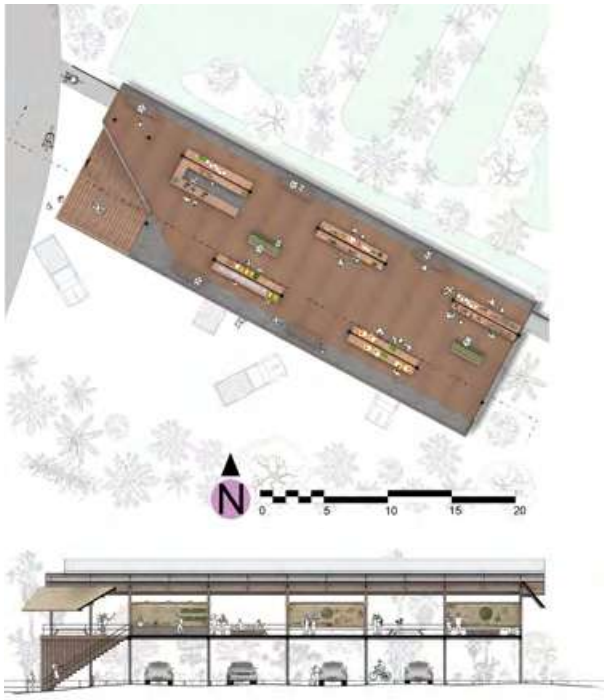


URBANGANIC (Urban-Bangkachao-Organic)

The Urbanganic urban project studied an local community at Bangkachao, a agricultural district in Bangkok Thailand, about the flow of materials, domestic organic waste from agriculture, food production as well as local lifestyle of the in habitants and tourists and then propose a series of pavilions as an architectural intervention on a sample site to promote agrotourism in the local community using the relationships between organic materials, agriculture and architecture.

Proposal1 : Information & Local Market Center

The first department is a centre to gather tourists and the locals together to introduce, distribute and attract them to visit different places by showcasing products or activities of the existing and proposed programs. This will also strengthen the local producers as they have a place to interact with each other and form a kind of cooperative for pricing as well as navigating visitors.

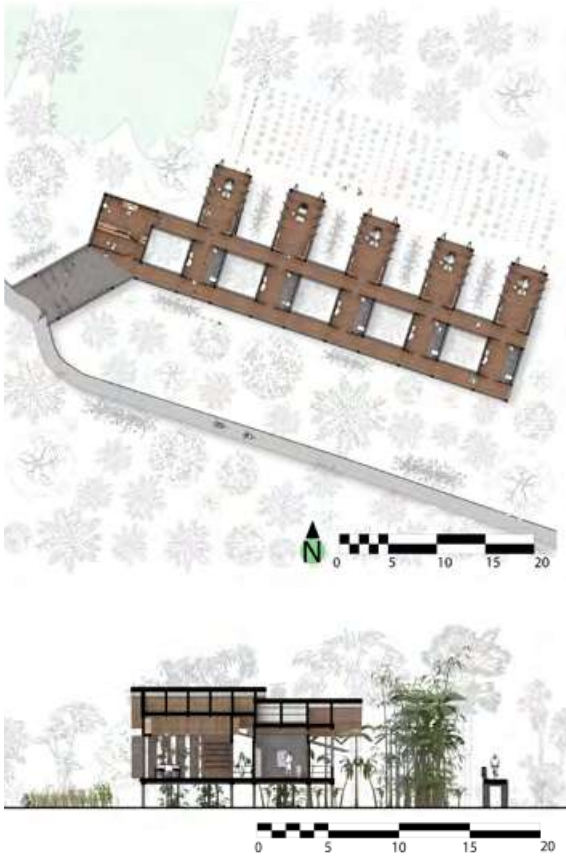


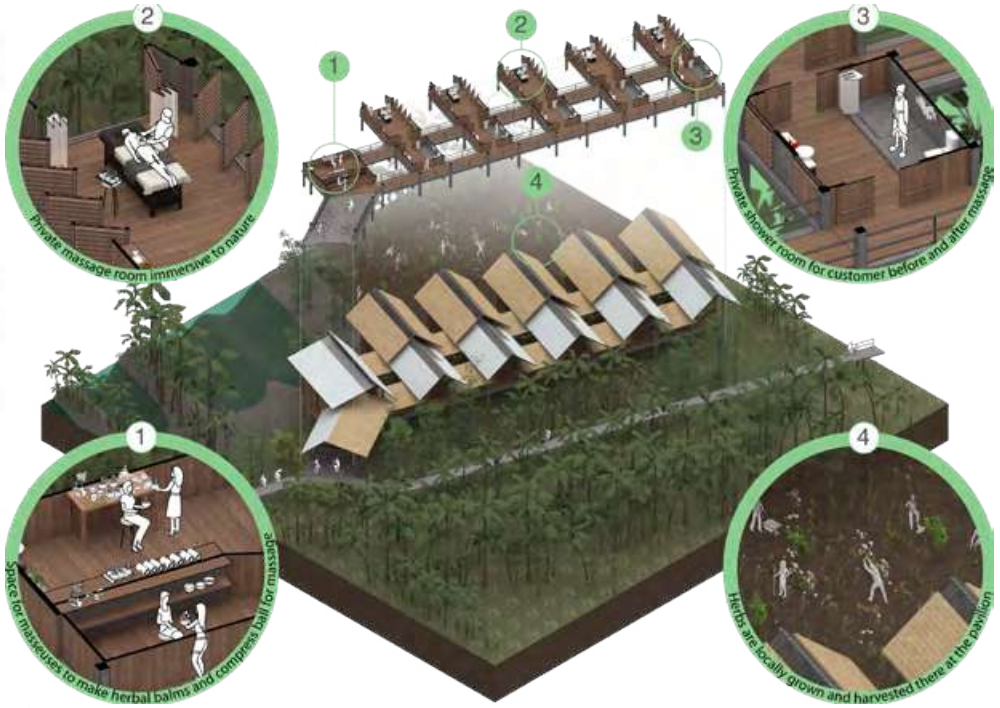
Proposal 2 :
Farm to Fork Restaurant

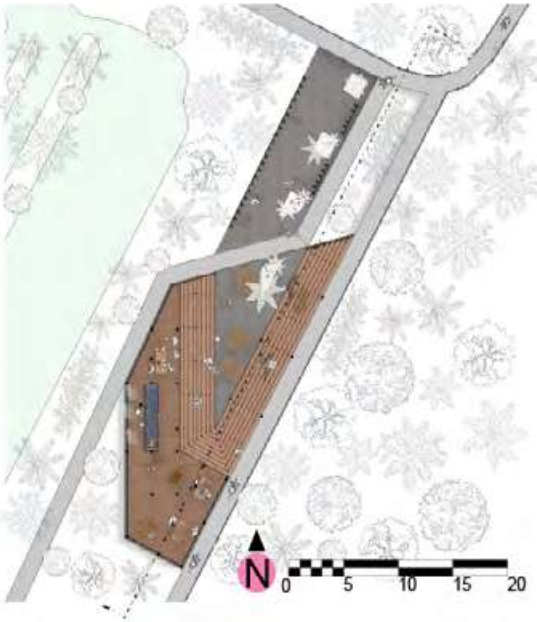
The next proposal is a participatory program in the form of a restaurant or the idea of "farm to fork" where customers can pick their own ingredients provided in the field and cook by themselves with the help of instructions and preparation by the restaurant to ensure healthiness of the food. There are also alternative plans for customers such as normal restaurant service both out door and indoor, a buffet area, a small cafe and relaxation area to experience the atmosphere among nature.

Proposal 3 :
Herbal Massage House

The third pavilion is a proposed program of traditional massage house using local herbs planted at the site in the process or made them as herbal compress balls. The design aims to offer customers immersive and relaxing experience among nature with open louvers in a massage room. The structure of the building sits on stilts and plan of the building is oriented to conform with the orchard lines to avoid cutting surrounding trees and minimize the impact on the landscape. As it is situated in dense vegetation, the massage room can be freely open to the view while still feeling private as those trees act as blinders shielding customers from outer vision.







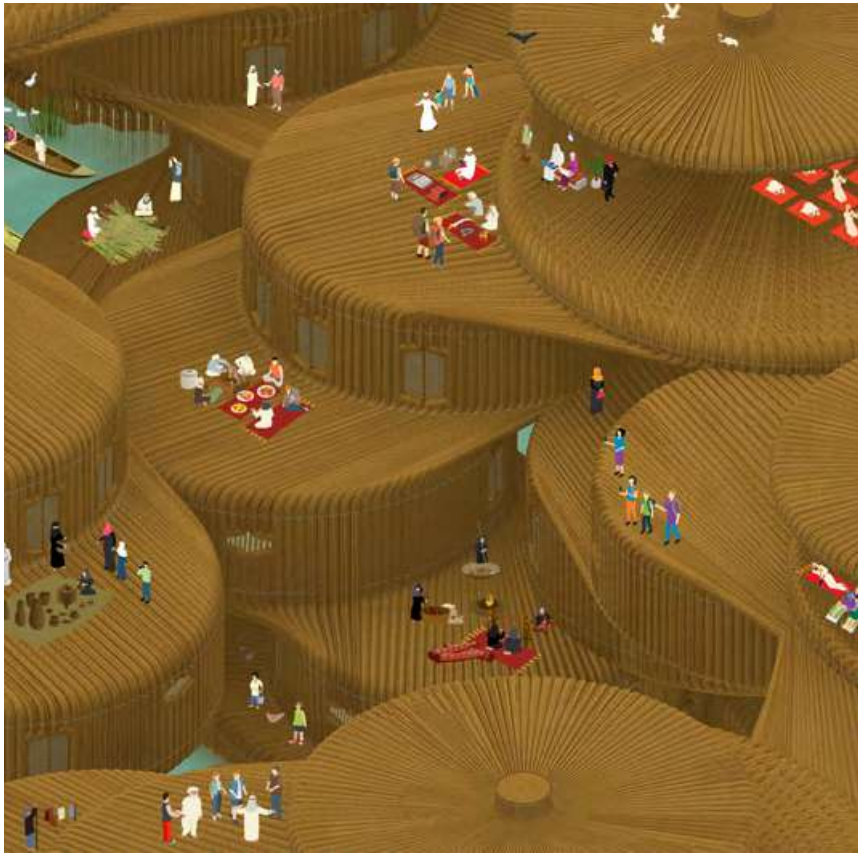
Proposal 4 :
Coconuts & Crafts Workshop

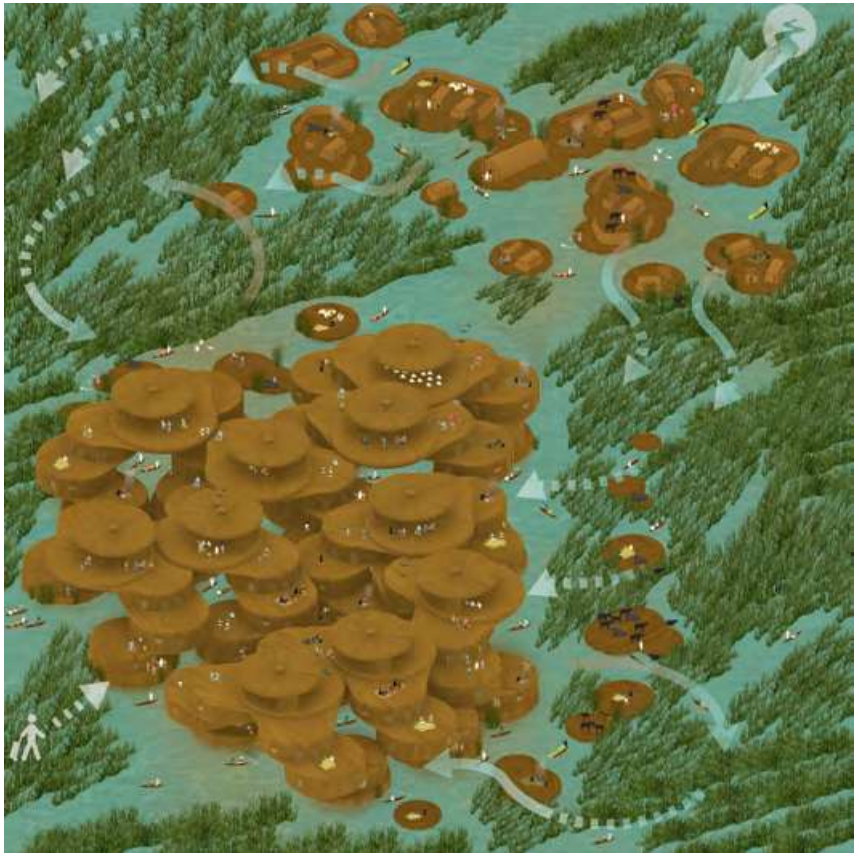
Another additional program is a pavilion to demonstrate coconut sugar, jaggery and molasses making process as well as thatch roof crafting as the area has many native species of palm trees and coconut as resources. The design offers an open courtyard for visitor as a resting spot from cycling while allowing them to participate and learn from this interactive experience with the locals next to the production site.

BUNDLE HOUSE PROJECT

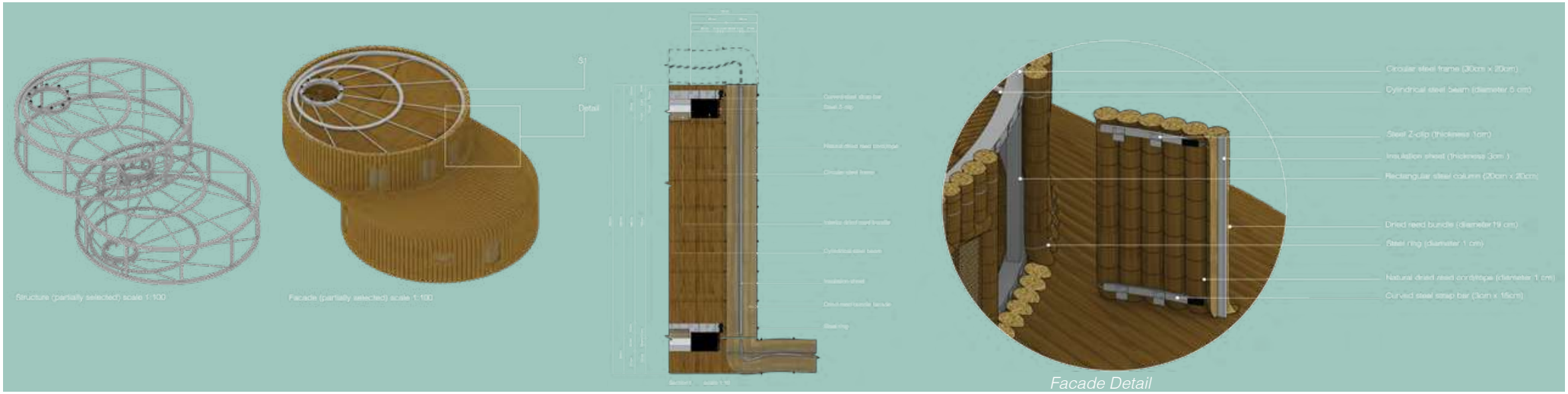
The study of the vernacular architecture of the Iraqi marsh arab's reed house "Mudhif" aims to reinterpret the native lifestyle of local people and redesign the Mudhif itself as a housing project that belongs to the present day and conditions in contemporary world. A mudhif is originally a long barrel vault building with the structure of arch ribs and series of purlins supporting inside. All parts of the construction uses the same local material which is the water reed plant that has been harvested around the village.

Therefore, this project proposes the future for marsh arabs as their new habitats and accommodation for tourists. The new community consists of multiple joining buildings where each has 6 living units and a joining communual terrace on top. The term bundle not only implies the construction method but also refers to the reformation of the more intimate community where everyone supports each other and enjoy the floating open space. Tourists can also wander around the terrace and observe people's life which traditionally take place outside in open spaces of individual balconies on water levels.





The demand for reed as a resource for building material will encourage the restoration of reed-beds in the marsh-land. Meanwhile, water reedbeds will also act as Anot only revive the traAAing but also improve the degraded water quality at the same time.



Facade Detail

WAT SA THONG BAAN BUA (Interactive Virtual Tour)

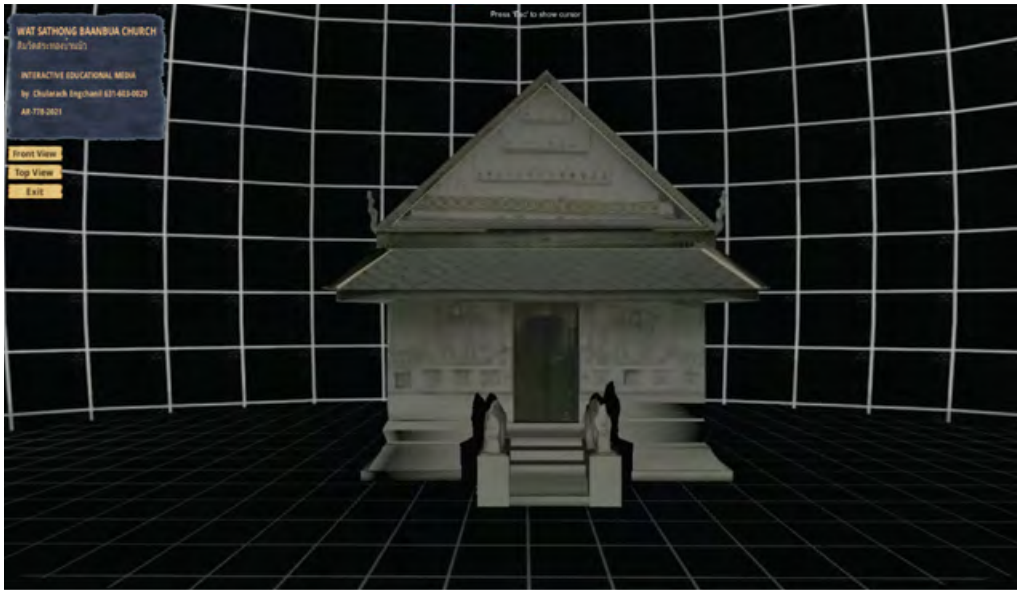
The project is based on an old ordination hall situated in Wat Sathong Baan Bua temple in Khon Kaen, a province in northest of Thailand. The building has an important historical value was awarded with the Award of Merit by the UNESCO in 2002.To help with the conservation of local architecture, the project aims to create an interactive virtual tour for a historical heritage with educational purpose as technology can now simulate environments for human to experience and learn digitally. To do so, the project has utilized an open source gaming software like Unity to locally built a prototype of the interactive simulation but with the accurate documentation of the heritage using the method of photogrammetry in Agisoft Photoscan and remapping texture in 3D modelling software like MAYA.

1. Point cloud generated by photogrametry software (Agisoft Photoscan)

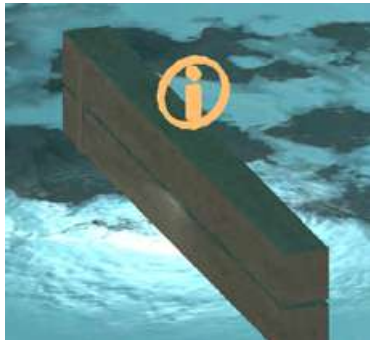
2. Polygonal mesh processed from pointcloud

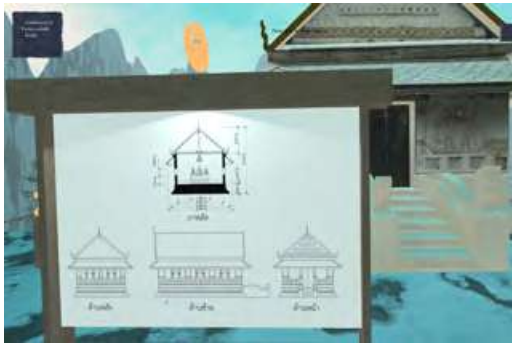
3. Remodelling based on the proportion retrieved from photogrammetry

4.Editting images of walls as textures on different parts of the surface and remap them textures on faces of the Maya model



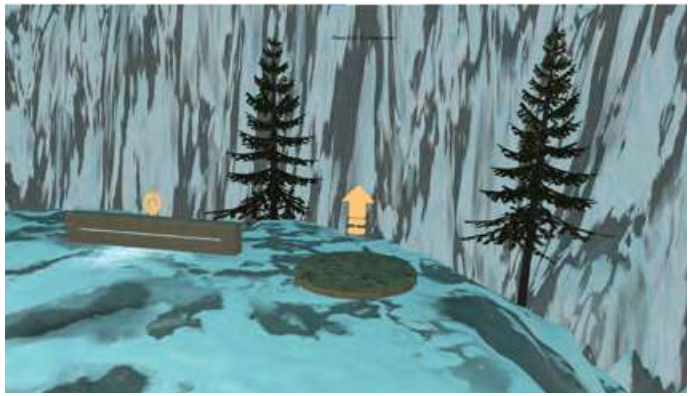
Interface of the interactive vertual tour befor entering and during the program. Both are designed for the user to focus on the architecture and notice the simulated environment.





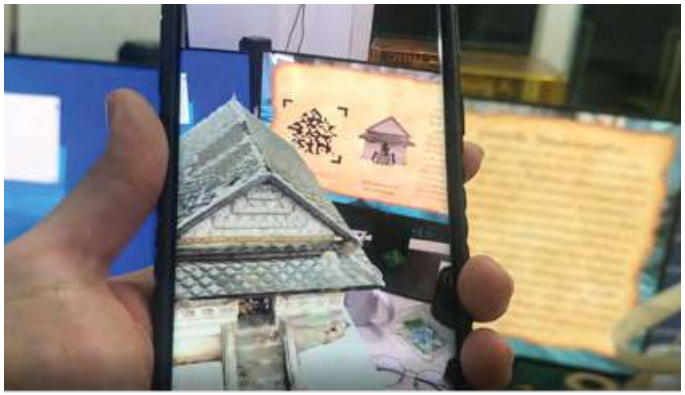
1. Pop-up drawing boards

: When triggered by walking to them, these boards will slide up to show architectural drawings of that side of the building.



2. Scene changing platform

: When triggered by walking to them, users will be teleported up or down to another scene to get different angles of the building .

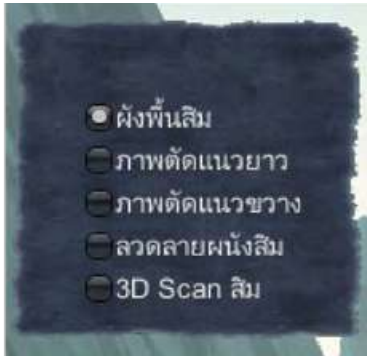


3. Detail Information & AR scan

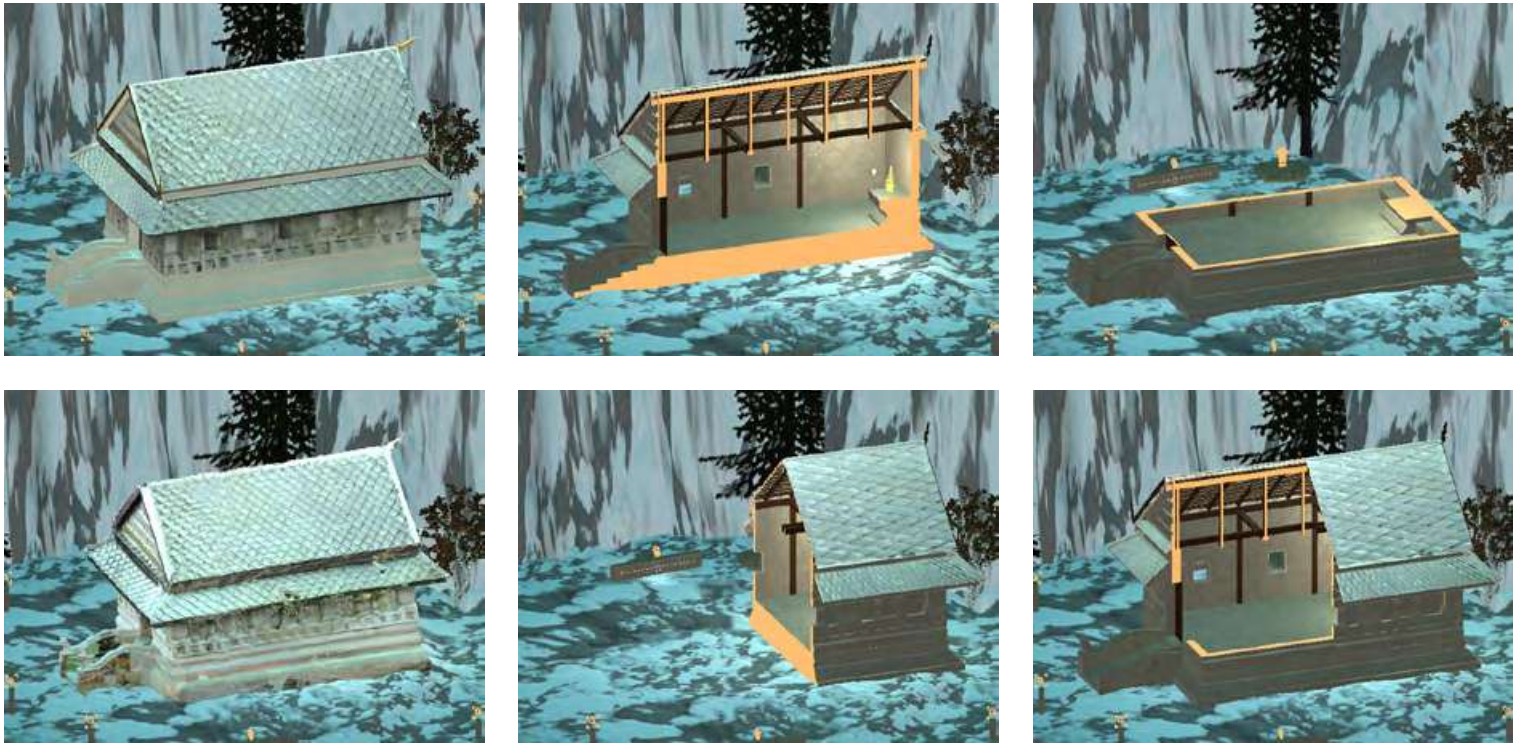
: When triggered by walking to them, an info. window about each building part will pop up and allows users who have installed an application made for this simulation with Unity and Vuforia plugin prior to this walk through to scan the QR code with the phone (while the app is on) and enables them to use Augmented Reality to view that part of the model three dimensionally on their phone.

4. Interior information viewer

: When users walk through the door and trigger the first token, a real photo of the interior of the hall will pop up to give a camparison to the digital one. Once the users walk further to the altar and trigger the second token, a window with history of the temple will be displayed.



5. 3D mode viewer

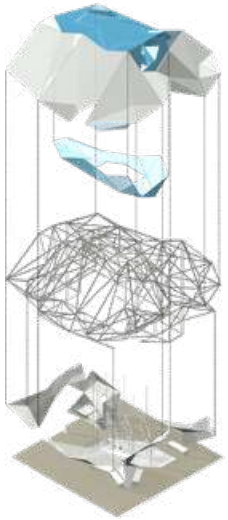


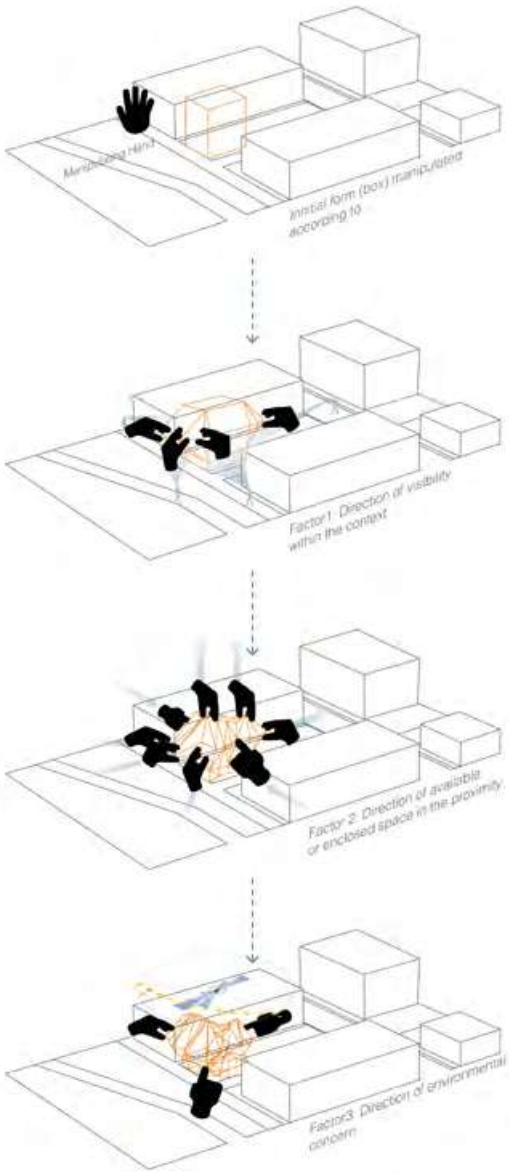
scan to watch the recorded walk-through
or Click

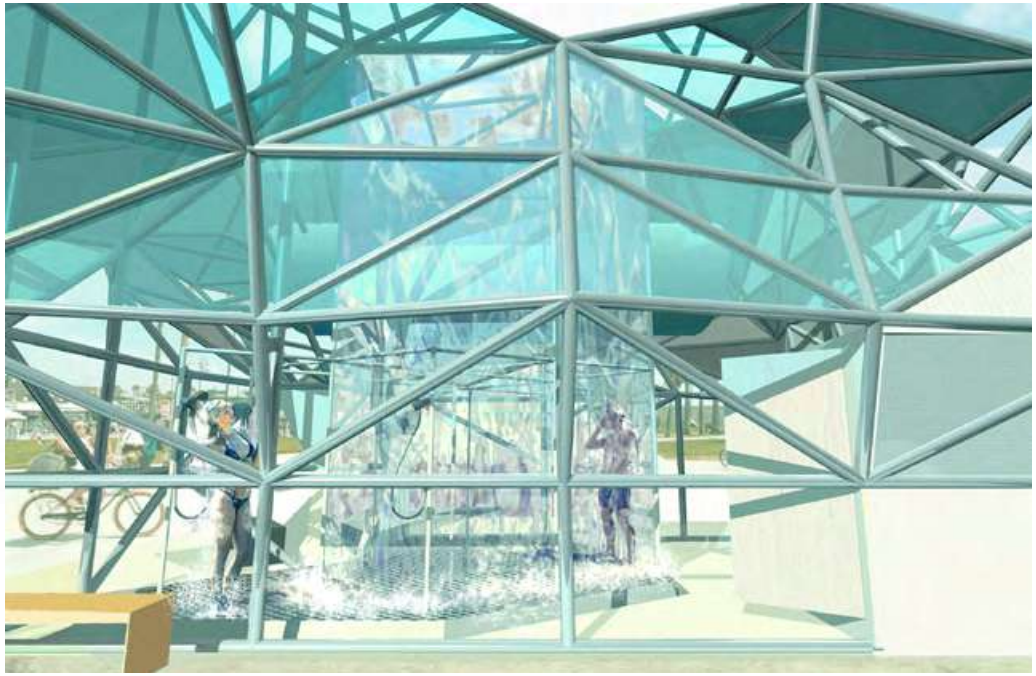
: When users are viewing the architectural drawing board (1.), one can press Esc in the keyboard and a small window with buttons on the top left corner will appear for them to toggle modes they want to view on and off. This includes the original 3D scanned mesh model from photogrammetry, the complete reconstructted model together with plan and sections.

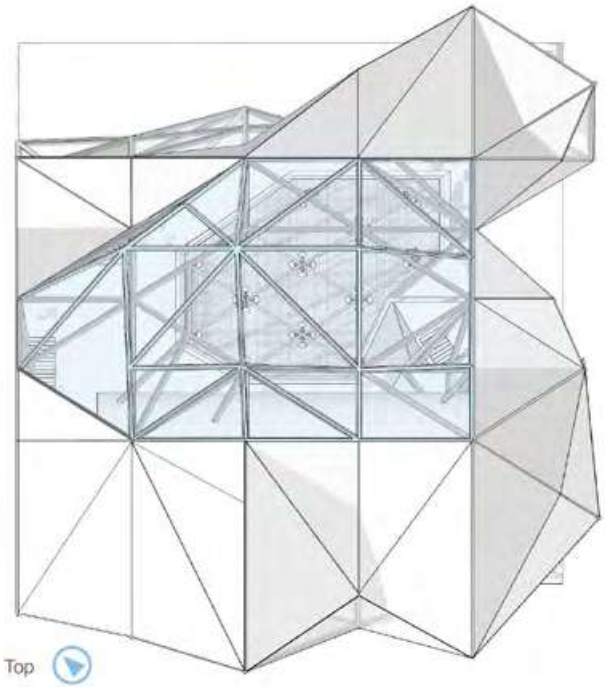
THE CLOUD (Shower Pavilion)

The project experimented with a design approach where architectural form is manipulated and deformed based on the conditions of the context to best promote and adapt itself to the environment. The concept is to manipulate a cubic mass into irregular form to juxtapost the surrounding buildings. It also provides a program as a public shower house that situated near near Venice Beach, L.A. The complex structure consists of trusses and thin canvas coverring roof, transparent facets and some oppenings to allow light and air to ventilate in better. Underneathe the roof, a water tank is installed to collect rain water dripping from angular faces and rails to store and used for shower

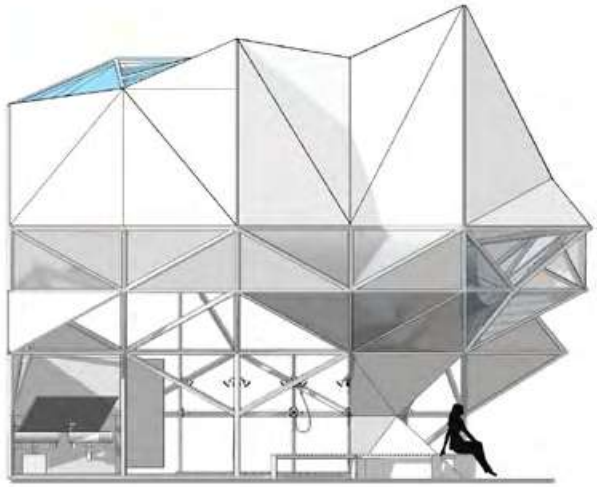






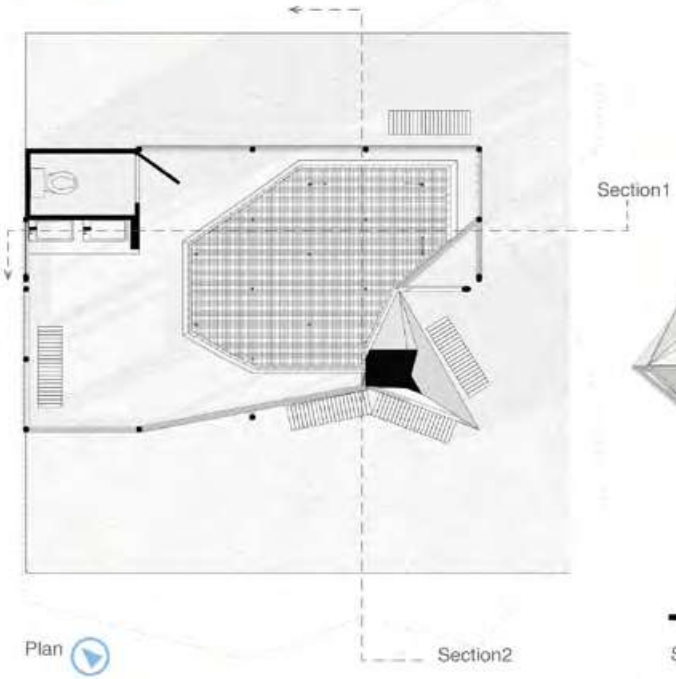


Top

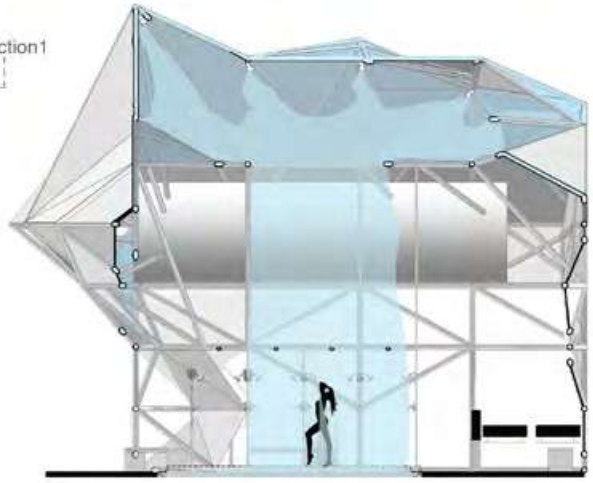


Front

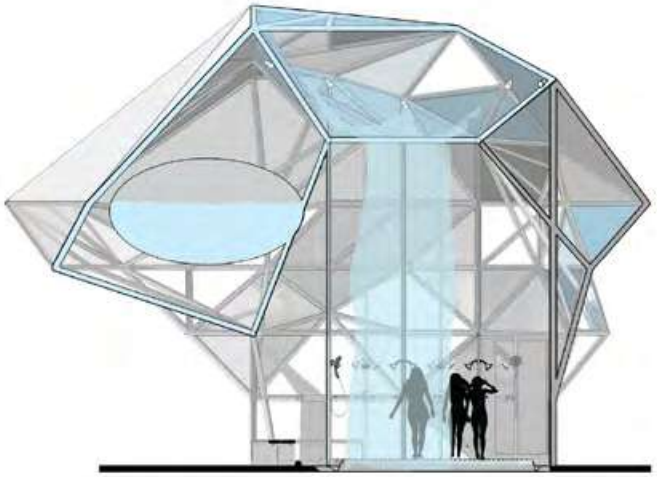
Right



Plan



Section1



Section2

PEPPER PATH

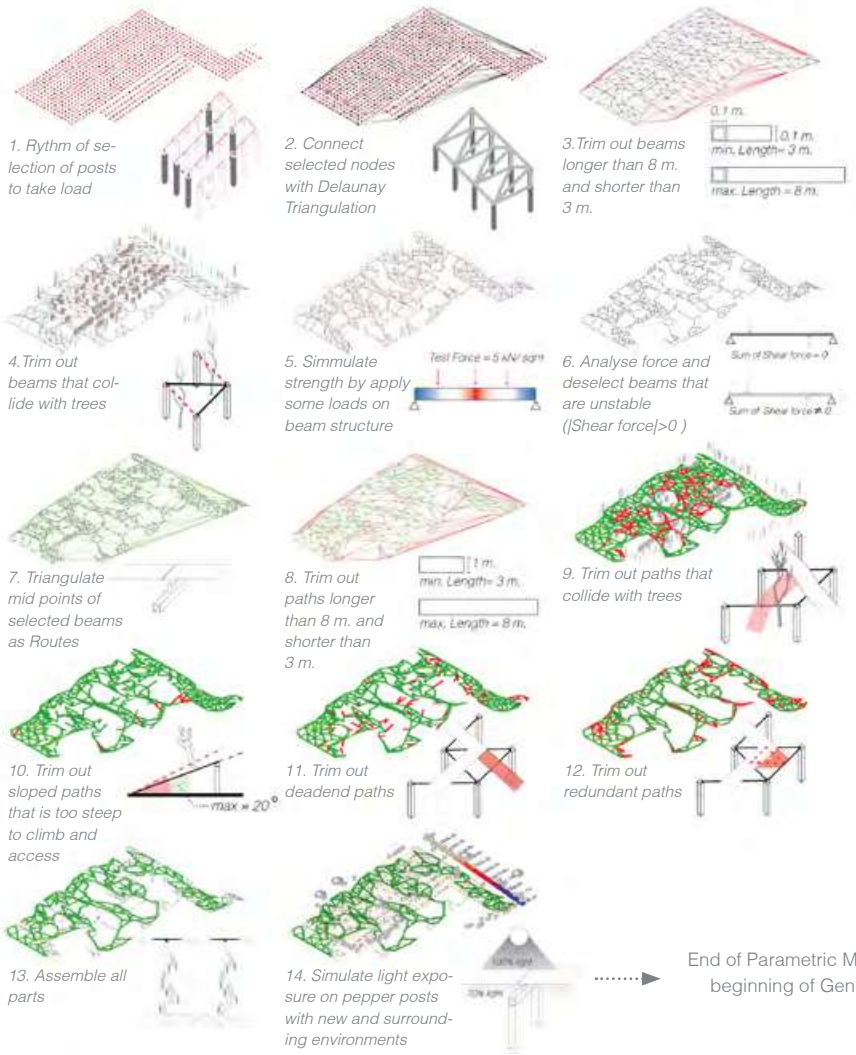
From the traditional ways of growing pepper on concrete pillars with shading net, *the overwhelming roles of pillars has caused the obstruction to the scenery so the idea is to create a walkway on these poles to both provide shading to reduce the amount of light for pepper plants and so that farmers can walk and inspect the pepper plants from above and offer a cross path way through the pepper the orchard. However, there are various possibilities to design the routes in order to meet the criteria such as letting the right amount of light to reach the poles, avoiding building structure that will collide with existing trees etc. It is a multi-objective problem with a variety of solutions and outcomes. Therefore, a technological approach is proposed here to use to design using parametric modelling and G.A. (Genetic Algorithm) to find the optimum design solution for efficiently laying paths and structures on the pepper poles. The objectives are to use the least amount of materials to built and covers as much area as possible while still reducing sun light to pepper plants to the right amount.*

Route that avoid existing trees, covers most of the area

Strongest configuration of beam structure with the least material

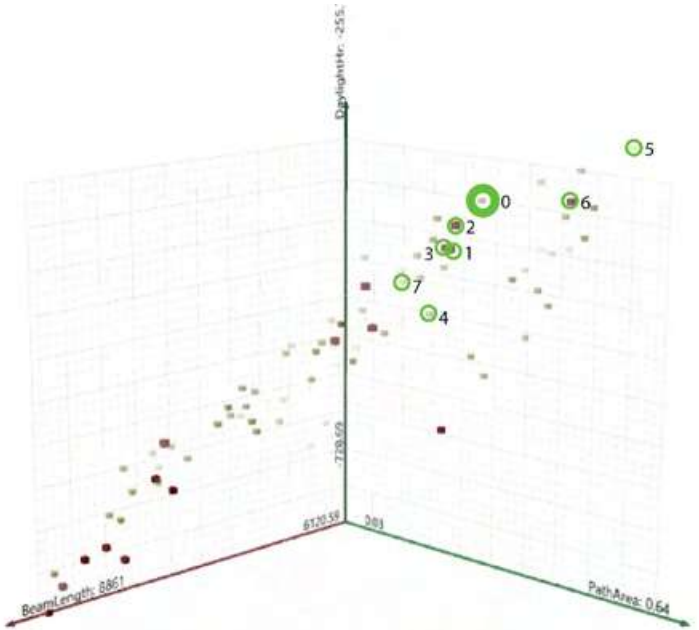
Enough shades to reduce sun exposure on pepper poles to 70 %

Multiobjective problem



Parametric Modelling Process

End of Parametric Modelling and the beginning of Genetic Algorithm

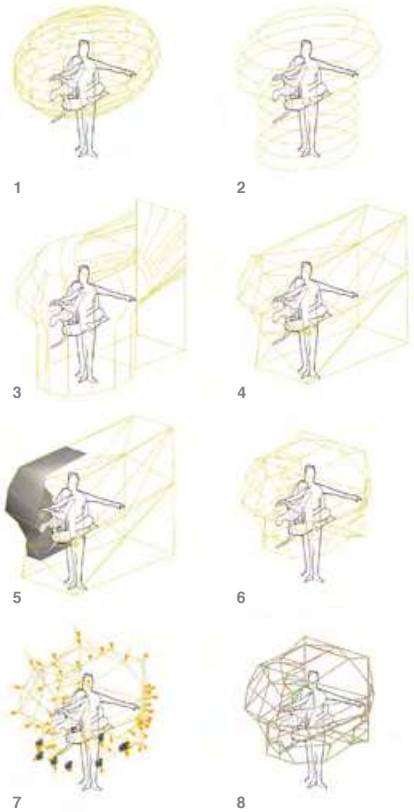


Genetic Algorithm (G.A.)

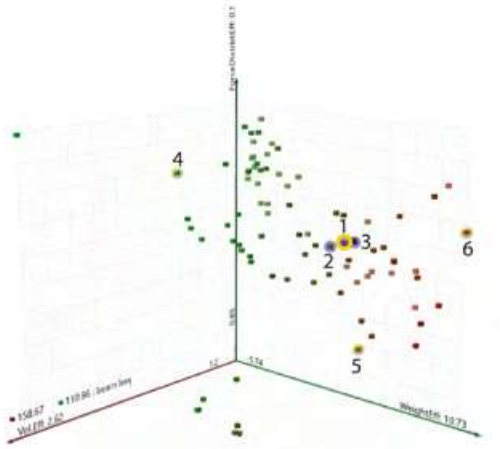
In the process of computation by G.A., 3 objectives were set in order to evaluate fitness of each possible design result from parametric modelling and simulations processes as follow - 1. the design with less beam structure, calculated from total beam length, is considered desirable - 2. the design with more area coverage, calculated from total path area, is considered desirable - 3. the design with the value of light exposure on the pepper posts close to 70% (compared to the value when without shading from the design result = 100%) , *calculated from total sun hr. in one year from sunlight simulation. The computation was set to generate 45 generations with the population size of 15 results per gen. using 7 hrs of calculation using Octopus plugin in Grasshopper. When plotting the results on a 3D graph, 6 of those with interesting traits were taken as the examples to compare the fitness. The decidsion to pick the final optimal result to further develop is decided from its fitnesses that is high in average in all objectives but might not be the highest in some with some trade off in the other objectives. Therefore, among all candidates, the design result no. 0 is the most satisfying and was selected as it has 2 high fitness values in desirable sun shading and less use of beam length while having 1 moderate fitnesses value in area coverage.*

WEARABLE SELF-QUARANTINE SHELTER

Since the emergence of the COVID-19 pandemics, quarantine facilities have been established to keep those at risk of infection under observation. To prevent the potential spread of the disease among the inhabitants, these facilities often isolate them into their private cells which restricts their mobility, physical contact, and interactions which can cause mental illness in a long duration quarantine. Meanwhile, some poorer-quality quarantine facilities without strictly enclosed private spaces for inhabitants can also raise safety concerns and cause doubts and discomfort. One approach to solve these issues about interaction, mobility and staying protected is to incorporate wearable architecture into a state quarantine facility. However, a wearable architecture module needs to have a lightweight, strong structure as well as a suitable shape and size for mobility and usage for interaction with others. These requirements can create a variety of design solutions which causes a difficulty to decide and conclude the most suitable design. Fortunately, nowadays there is a technological approach called Genetic Algorithm (G.A.) that helps designers decide on the selection of the most suitable design solution which will give designers confidence that they have delivered the best design decisions out of all possible outcomes. Therefore, this project aims to apply a Genetic Algorithm with parametric modelling to help determine the design of the wearable architecture as a mobile self-quarantine shelter that fits the declared multiple objectives the most and will be considered a guide for the design approach to further explore in the future this same topic in the aspects of structural integrity, suitable form, size, and weight for usage.



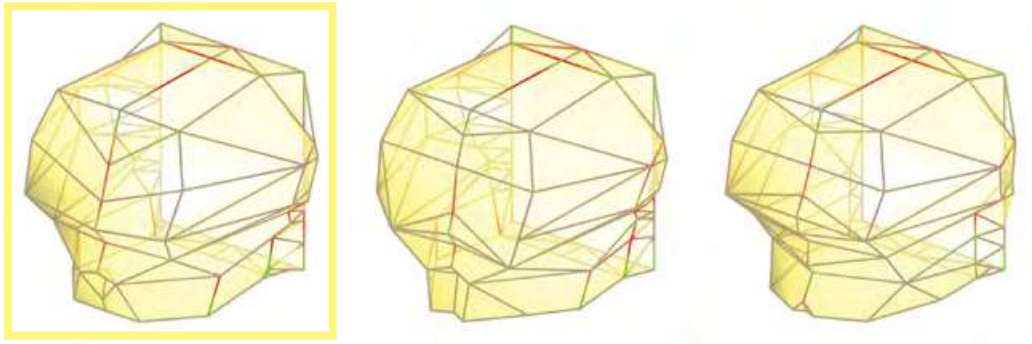
Parameretic Modelling Process



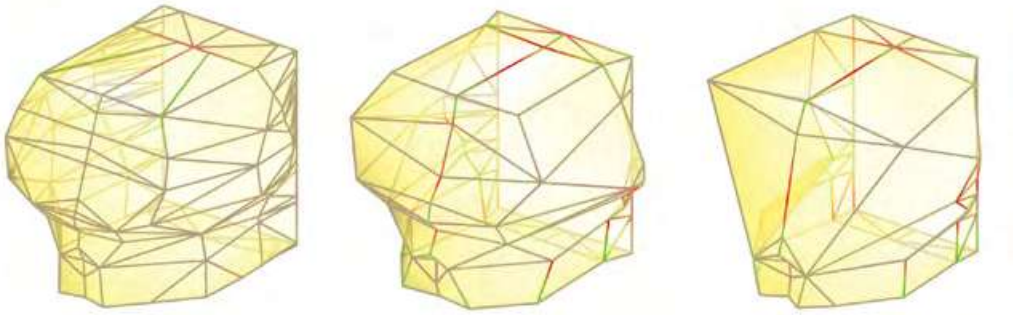
Result	Weight (kg)	Volume (m³)	Avg. Absolute Force (kN)	Total Structure Length (m.)
1	19.76	1.49	0.099253	57.25
2	20.57	1.50	0.100769	59.59
3	19.42	1.45	0.099237	56.23
4	30.05	1.70	0.085104	87.04
5	19.13	1.43	0.128899	55.41
6	14.27	1.20	0.094887	41.33

Desireable Undesirable Selected

Genetic Algorithm

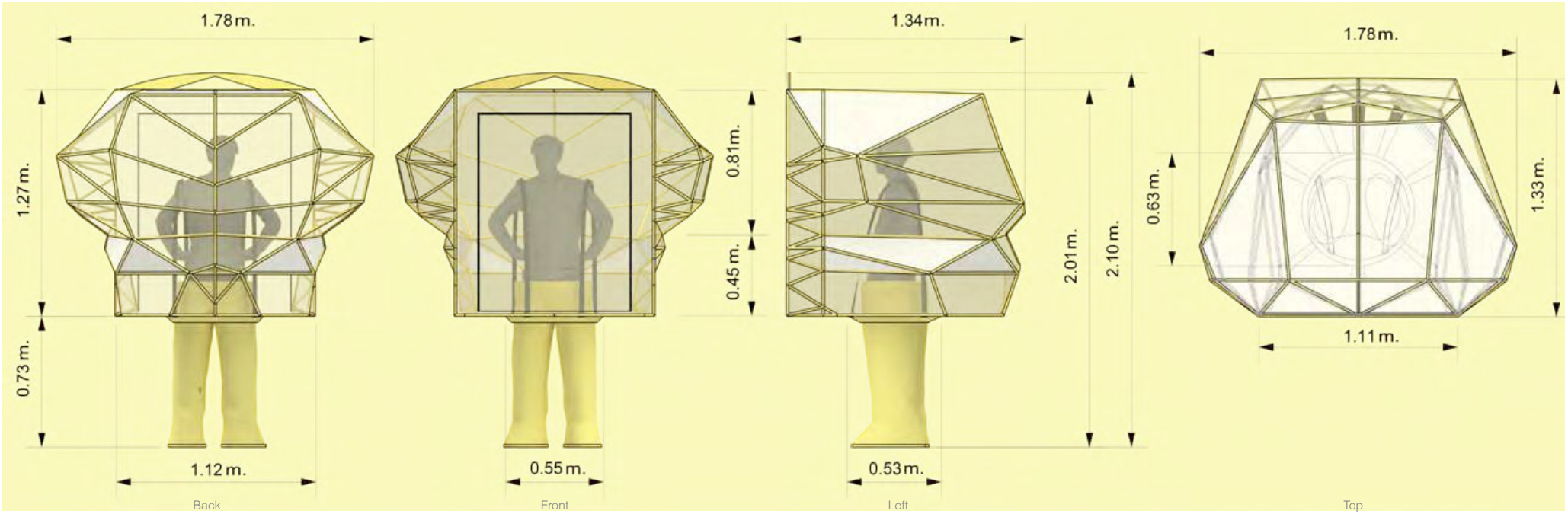


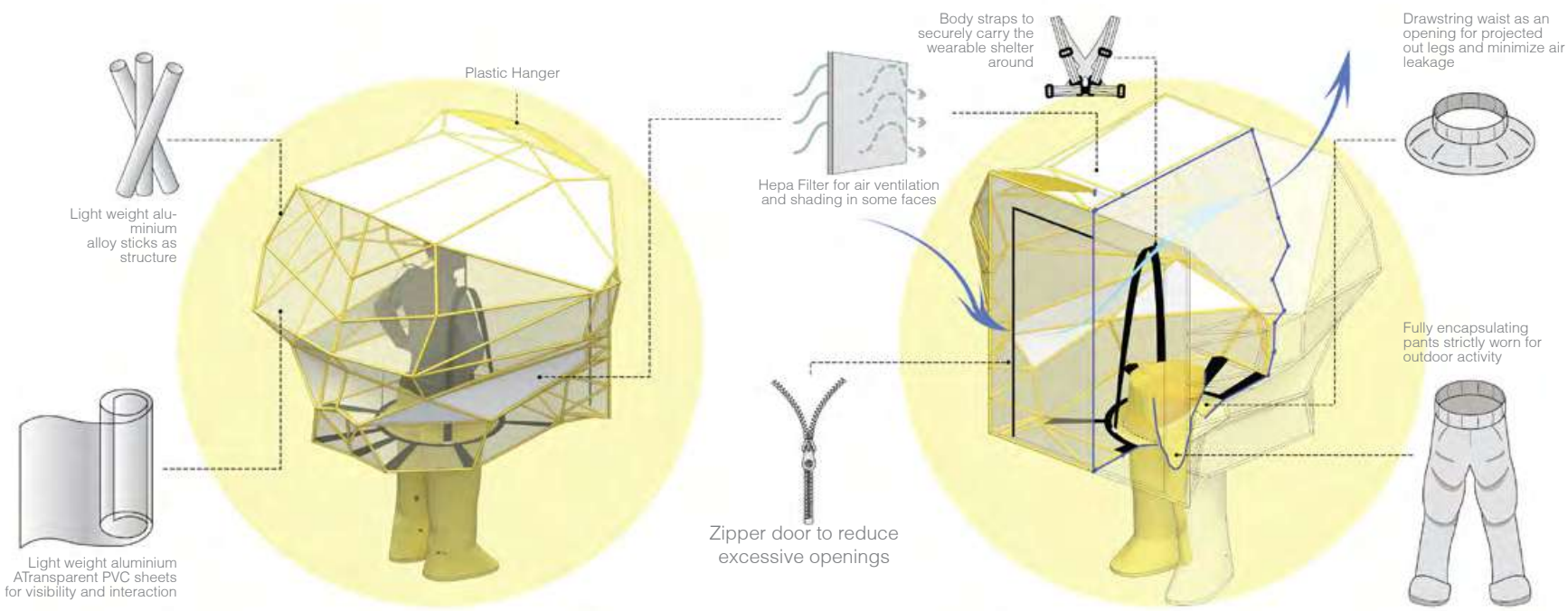
1. The Selectred Design *2. Candidate* *3. Candidate*

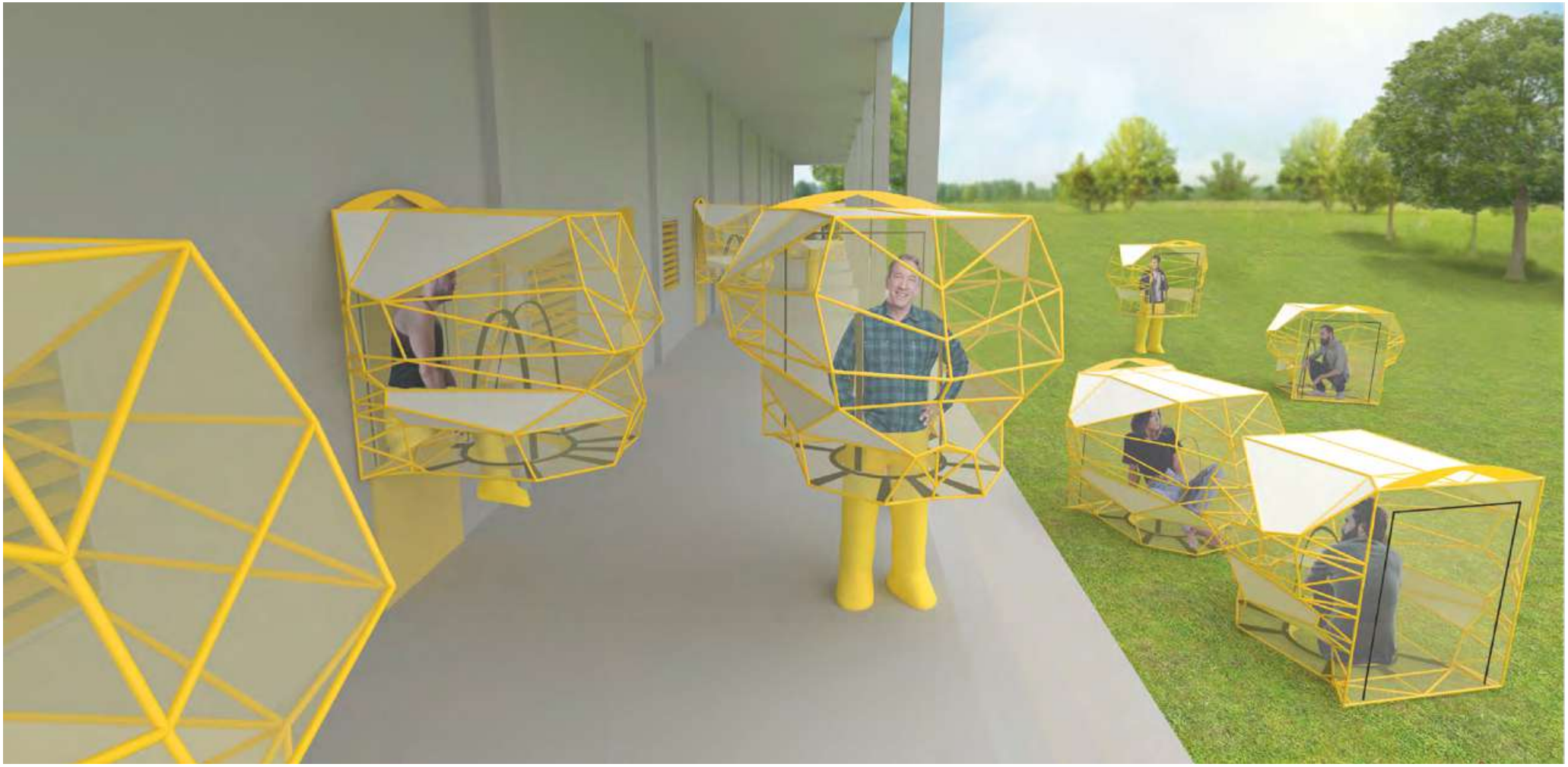


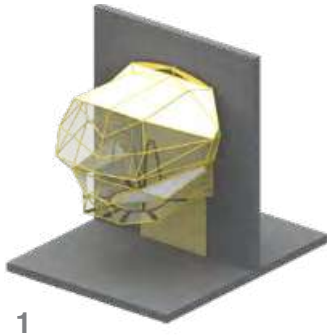
4. Too heavy *5. Bad force distribution (Weak)* *6. Too small*

Sample Results


1.78m.
1.27m.
0.73m.
1.12m.
Back
0.81m.
0.45m.
0.55m.
Front
1.34m.
2.01m.
2.10m.
0.53m.
Left
1.78m.
0.63m.
1.33m.
1.11m.
Top


Plastic Hanger
Light weight aluminium alloy sticks as structure
Light weight aluminium ATransparent PVC sheets for visibility and interaction
Hepa Filter for air ventilation and shading in some faces
Body straps to securely carry the wearable shelter around
Zipper door to reduce excessive openings
Drawstring waist as an opening for projected out legs and minimize air leakage
Fully encapsulating pants strictly worn for outdoor activity

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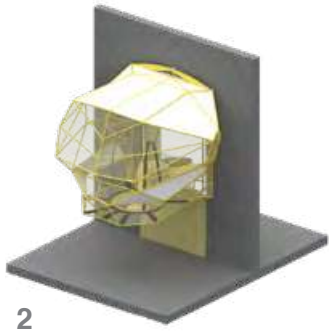
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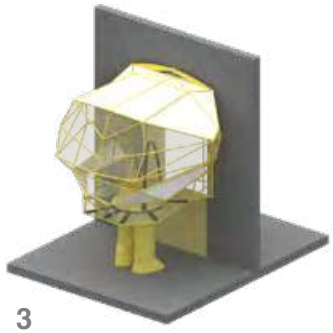
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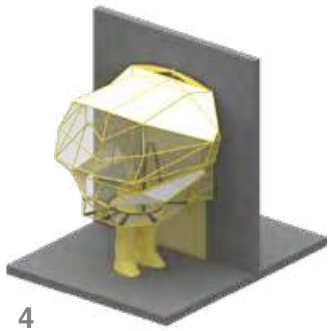
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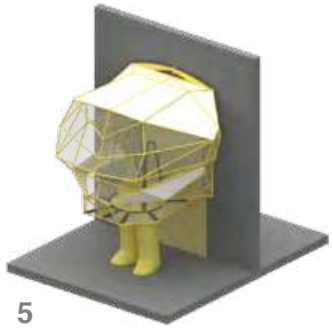
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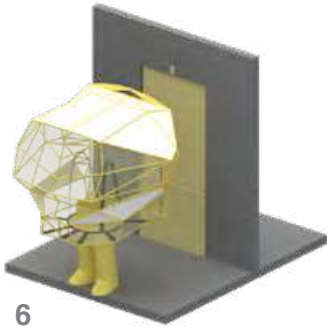
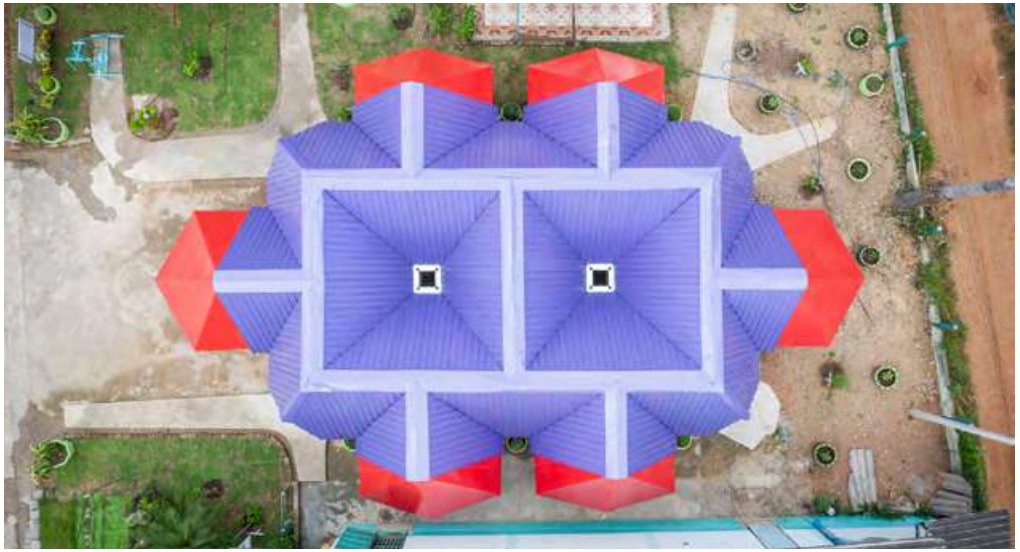

6

PYLONESQUE

Pylonesque combines climatic context and vernacular typologies into a semi-enclosed multi-purpose space for a primary and middle school in the Thai province of Uthai Thani; a region that experiences heavy rain seasons followed by extensive hot dry periods—where water holds cultural and practical significance as it is linked to agriculture, tradition, and festivities. As an architect's assistant and a teaching assistant, the main chanllenge for the construction of the project is the on site supervision and co-ordination with local workers to prepare and assemble pieces with precision in particular angles to form the complex truss structure of the roof as water harvesting funnel.



Role: *Architect Assistant and Teaching Assistant* **Conducted by:** *INDA Students of Chulalongkorn University* **Architect:** *PAREID* **Sponsor:** *Mitsubishi Elevator Thailand (CSR Project)* **Location:** *Baan WangToey School, Taluk Du, Uthai Tani, Thailand* **Date:** *July 2019 - November 2019*

FREC RENOVATION

Ford Resource and Engagement Center (FREC)is an open community hub, hosting several non-profit organizations under one roof. The demand for different group sizes, activities and events is accommodated with our rolling elements, repurposed from spare parts at the ford factory near Bangkok. The project includes interior renovation and furniture fabrication of three rooms; a class/conference room, an auditourium and a library. Most of the factory parts are given a new life for this local non-profit hub in NangLoeng.








Location: *Entrance at Nakornsawan Road, 77 Entrance, Wat Sommanat, Pom Prap Sattru Phai, Bangkok 10100* **Date:** *August 2019 - October 2019* **Role:** *Architect Assistant, Onsite Worker* **By:** *Space Saloon Studio* **Sponsor:** *Ford Resource and Engagement Center(FREC Bangkok)*

THE OSCILLOSCAPE

The Oscilloscape is both a tool for observing and reacting to the world around us. Part observation deck, part resting space, part entertainment stage, this mobile structure acts as a place for measuring, describing, analyzing, and creating various wave activities. The front of the structure—used throughout the day as a meeting space, stage, and bar—produces messages and sounds to be projected and amplified through the conic volume in the rear. Oscilloscape is a modern take on the mobile wagons of the Wild West. Its ability to reconfigure its use and location makes it an ideal station for analyzing new environments and reacting to constant changes in the landscape.

Role: *Designer, On-Site Builder* **By:** *Hello Wood + Space Saloon* **Location:** *Morongo Valley, California, USA* **Date:** *25 May- 1 June 2018*

BAN BAT GATEWAY

This pilot project creates a new entrance gate to their main alleyway. This public space provides shade, greenery and simple urban furniture, a space of rest for locals and visitors alike. A large mural accompanied by text panels, introduce visitors to the history of the community and the process of bat-making while facilitating their navigation with the aid of clear maps and legends.

Location: *Soi Ban Bat, Khwaeng Ban Bat, Khet Pom Prap Sattru Phai, Krung Thep Maha Nakhon 10100* **Duration:** *June - July 2018* **Role:** *On-Site Builder* **By:** *Design Construction For Community 2018* **Sponsor:** *CU INDA*

link to full portfolio