



SHUNO
OMNIS

SHUMO

DESIGN PORTFOLIO

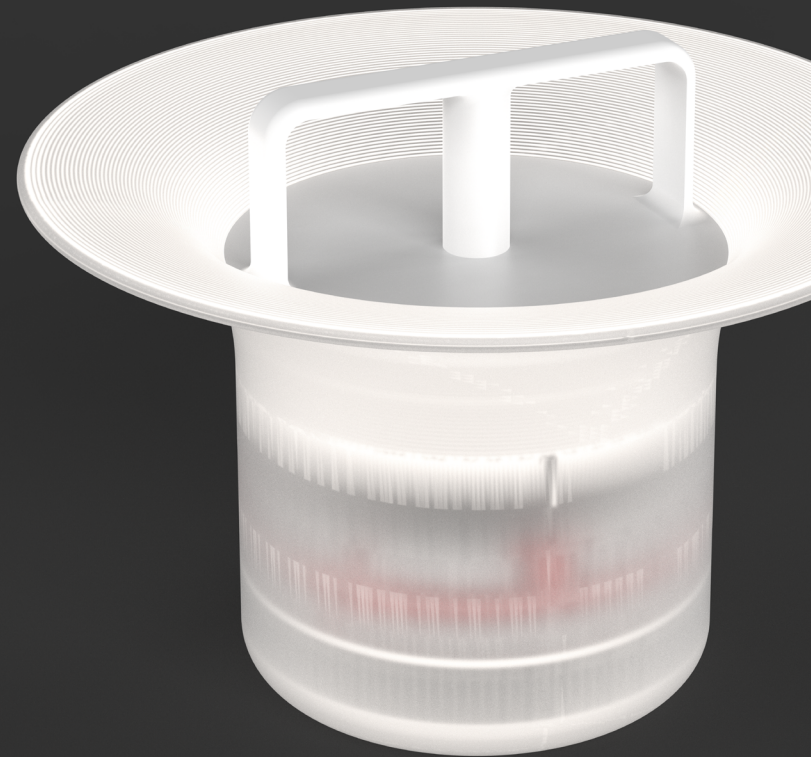
Parsons School of Design
Product Design

TABLE OF CONTENTS

Flora	5
Petal	15
Undull	27
Artworks	41

Flora

Disaster-resilient
Design



Disaster to Address



Data source:

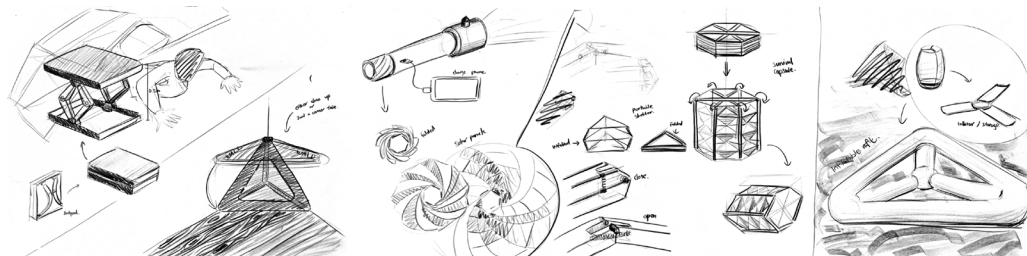
DOI: 10.16867/j.cnki.cfdm.2016.02.010

Photo source:

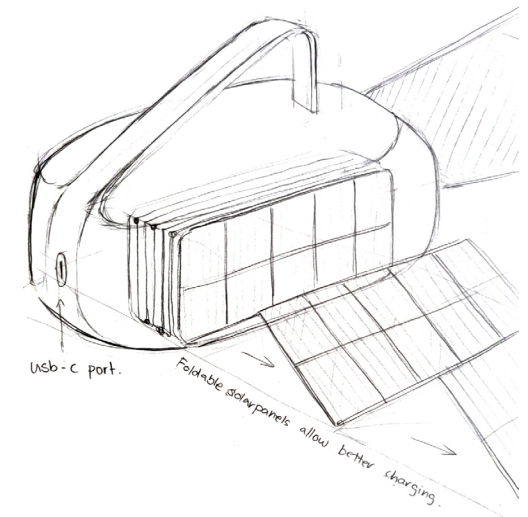
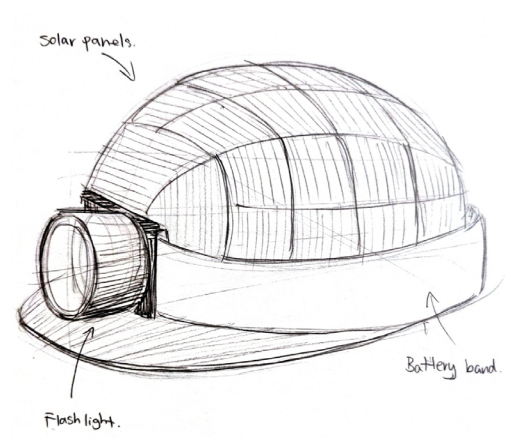
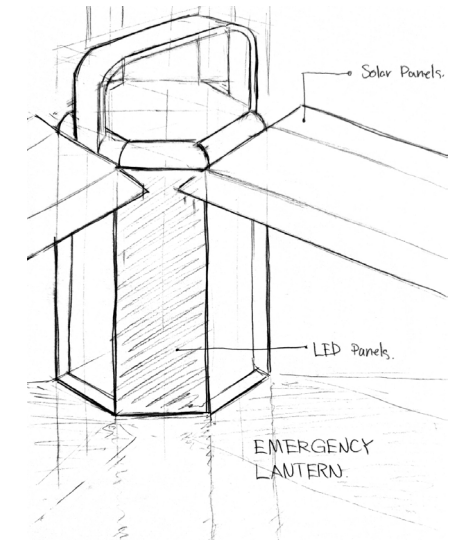
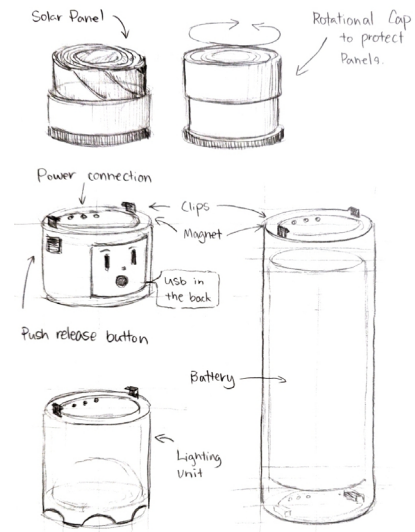
<https://www.nytimes.com/2019/08/11/world/asia/china-typhoon-leki-ma.html>

Typhoon

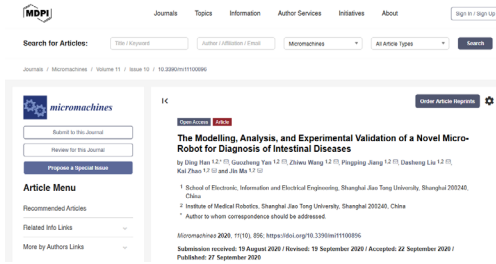
An average of 27 typhoons are generated in the Northwest Pacific (including the South China Sea) each year, and an average of 7 typhoons land in China. My hometown Zhejiang province as a coastal province is one of the most vulnerable to typhoons. The concept of this project is to design a product that addresses the ongoing typhoon disasters happening around the globe.



Idea Development

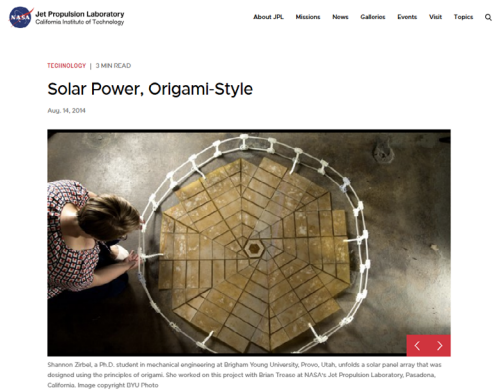


Online Research



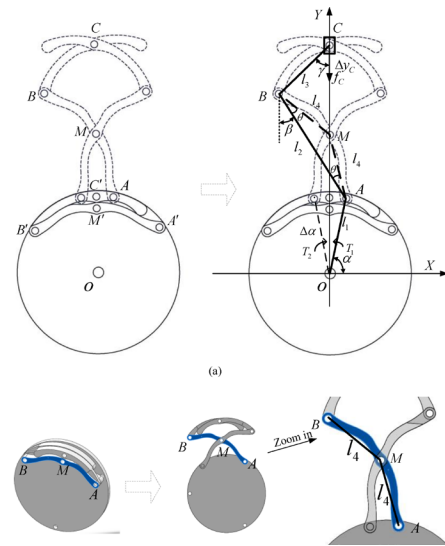
The Modelling, Analysis, and Experimental Validation of a Novel Micro-Robot for Diagnosis of Intestinal Diseases

<https://www.mdpi.com/2072-666X/11/10/896>

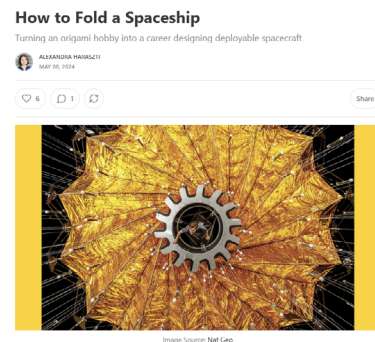


Solar Power, Origami-Style

<https://www.jpl.nasa.gov/news/solar-power-origami-style/>



The Overview

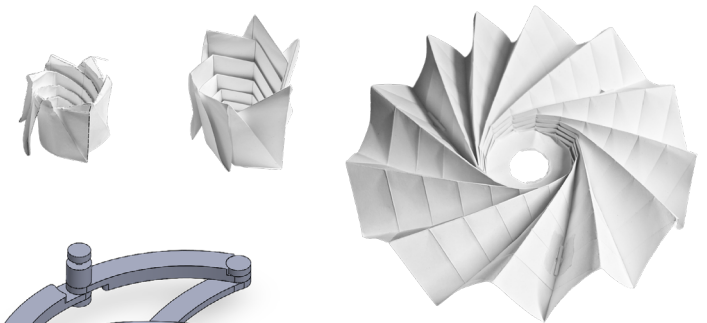


How to Fold a Spaceship

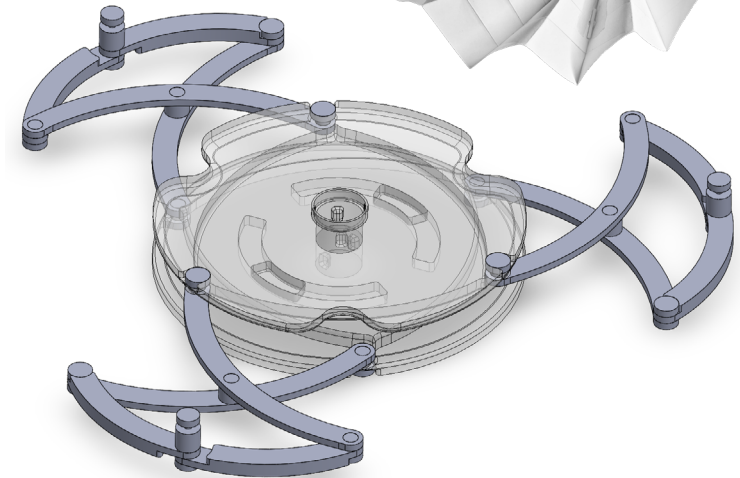
<https://www.theoverview.org/p/how-to-fold-a-spaceship>

Design Progress

Paper Folding



CAD Modeling



3D Printing



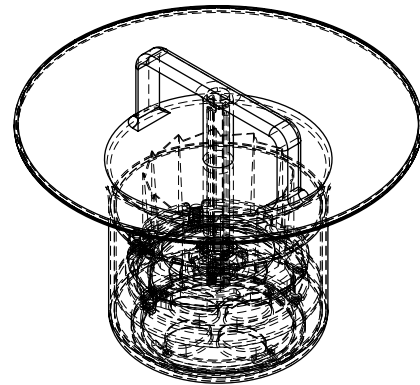
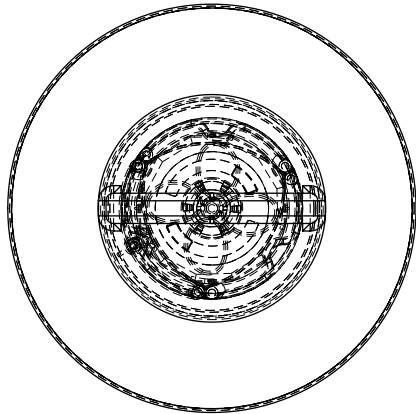
Technical Drawing

1:4 Scale Orthographic & Isometric

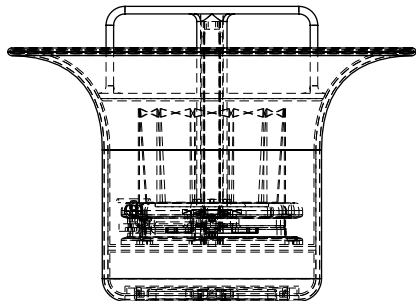
Lantern mode Flora approximately:

21.6 cm x 21.6 cm x 15.6 cm

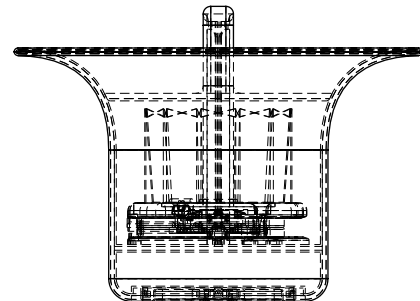
Top View



Front View



Side View



Final Model

Lantern Mode

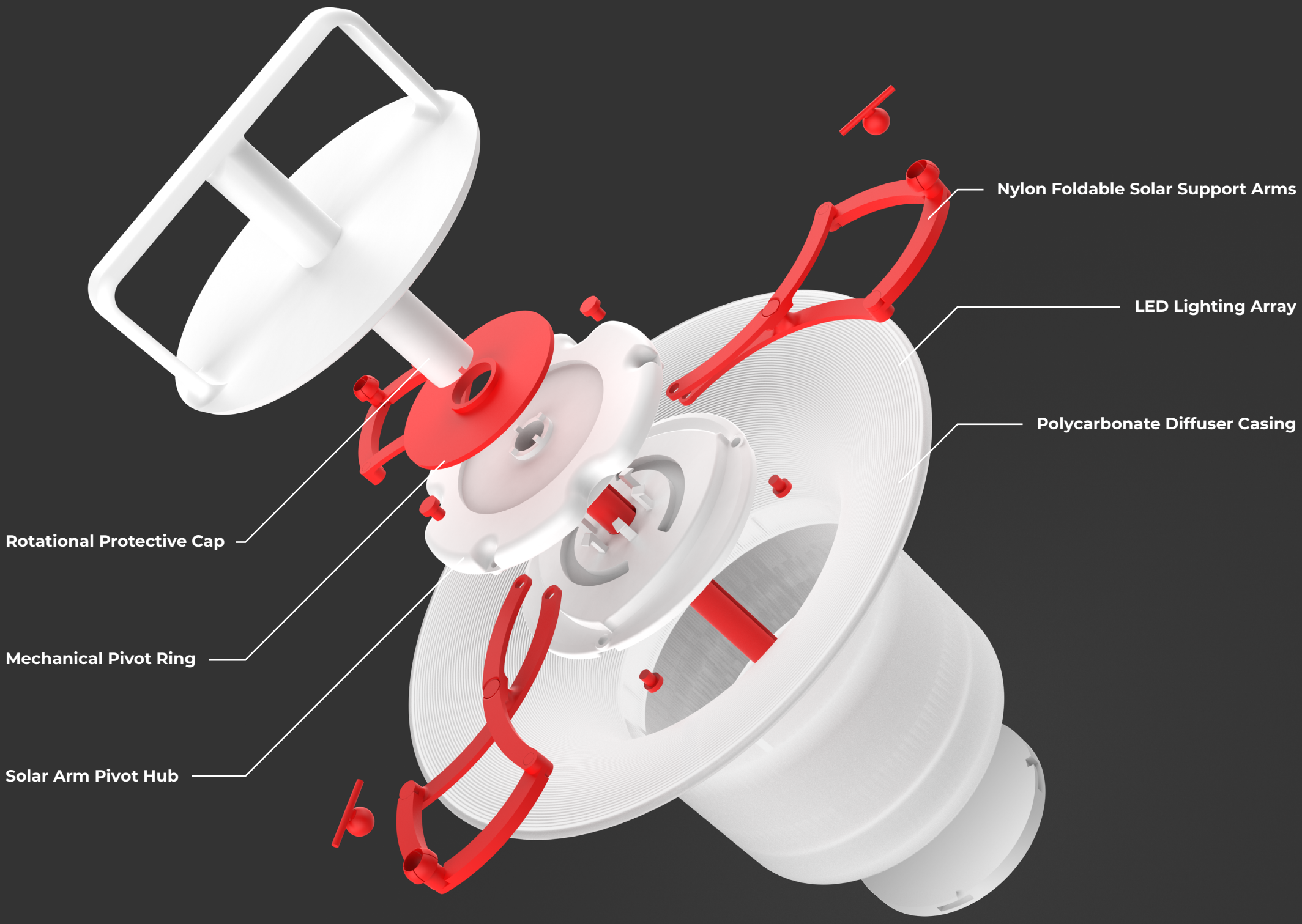
Flora can be in two different forms, lantern mode which is the form when Flora serves as an emergency light source, and recharge mode which is the form when Flora automatically recharges using solar energy. In lantern mode, the handle of Flora will be locked mechanically and could be held by the user, hang inside a tent and more. Flora's lights are embedded in the casing and diffused by sandblasted, high-resistance polycarbonate.



Recharge Mode

Rotate the handle to unlock, pull up and rotate again to expand the flexible solar panel. The solar panels automatically charge Flora's battery when exposed to sunlight. The USB-C port located below the light up button can not only charge Flora but also provide reverse charging to other devices such as mobile phones during emergency situations.





Rotational Protective Cap

Mechanical Pivot Ring

Solar Arm Pivot Hub

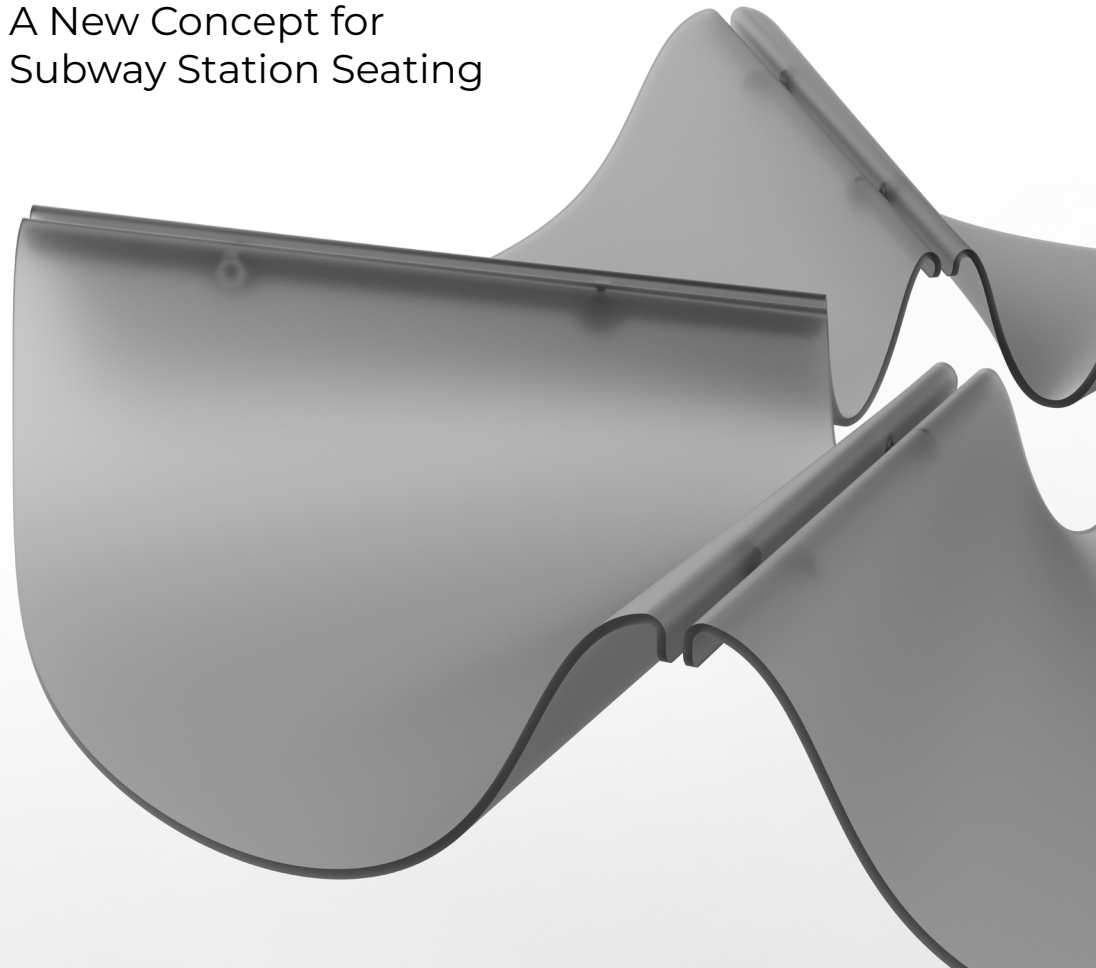
Nylon Foldable Solar Support Arms

LED Lighting Array

Polycarbonate Diffuser Casing

Petal

A New Concept for
Subway Station Seating



Problem to Address

MTA New York City Transit

MTA Leaning Bars are new, uncomfortable metal slates replacing traditional benches in some NYC subway stations, designed to offer a place to lean rather than sit. However, people do need a place to sit, especially for those with disabilities, elderly, and more. Having the chairs removed from the station is a huge inconvenience for a lot of people, redesigning a chair that provides a place for people to sit while waiting for the trains, at the same time preventing people from sleeping on them so that the seat is solely for seating is very important.

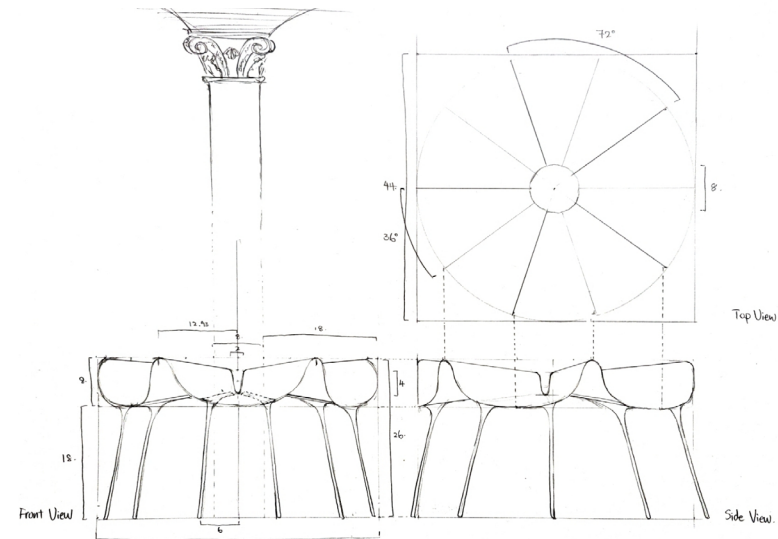
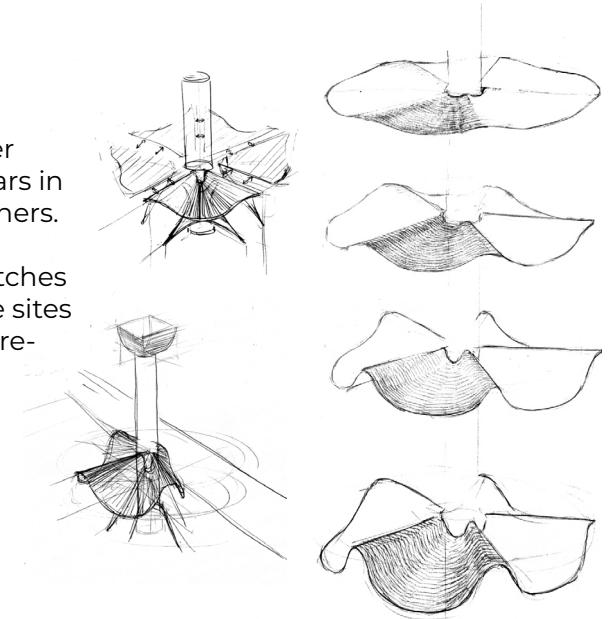


Idea Development

Version 1 & 2

Version one, conceptual ideas around subway pillars, and other pillar-like objects. Including pillars in Parsons buildings, trees, and others.

Version two, refine concept sketches into more refined shape, decide sites for the chair. Set the key measurements of the design.

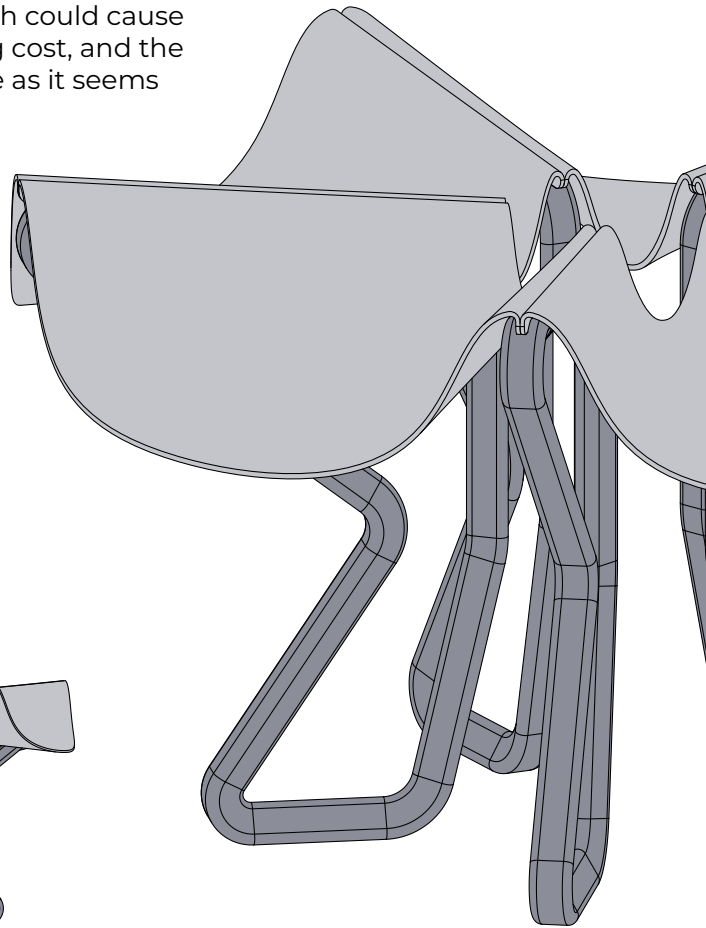
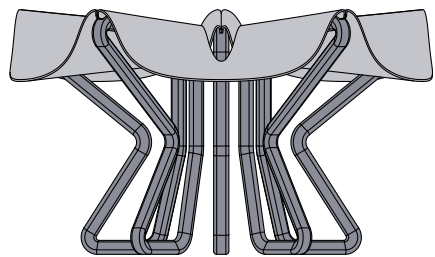


Early Drawings

Design Progress

Version 3

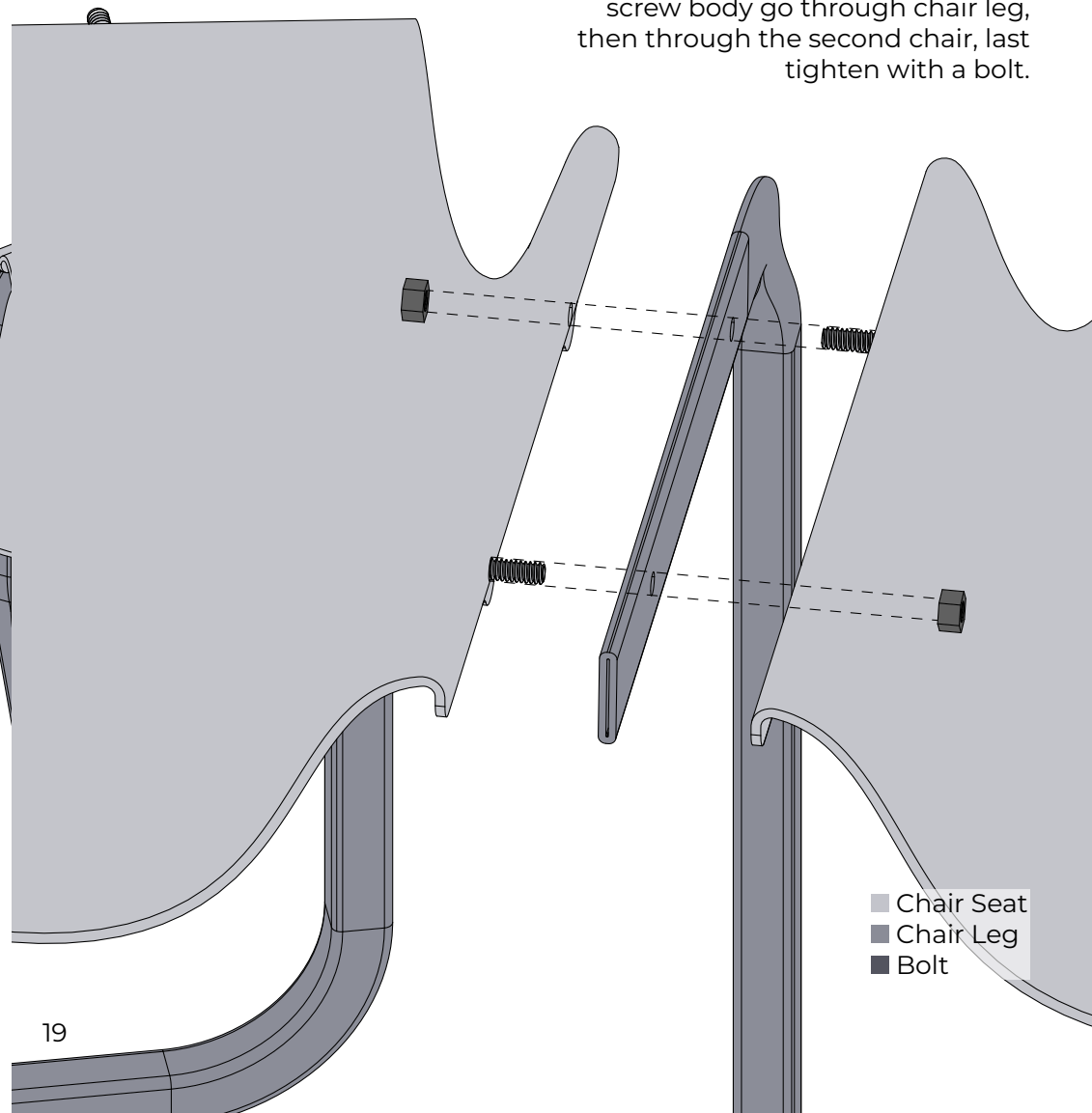
Version three redesigned legs of the chair to stand on its own without the support of pillar, so that the chair could fit in most kinds of pillars. The downside of this design is that the triangular legs are relatively hard to manufacture which could cause increase of manufacturing cost, and the chair legs are not as stable as it seems to, at least for subway station purposes.



Assembly Details

1:3 Scale Isometric

Screw is welded on the chair body, screw body go through chair leg, then through the second chair, last tighten with a bolt.

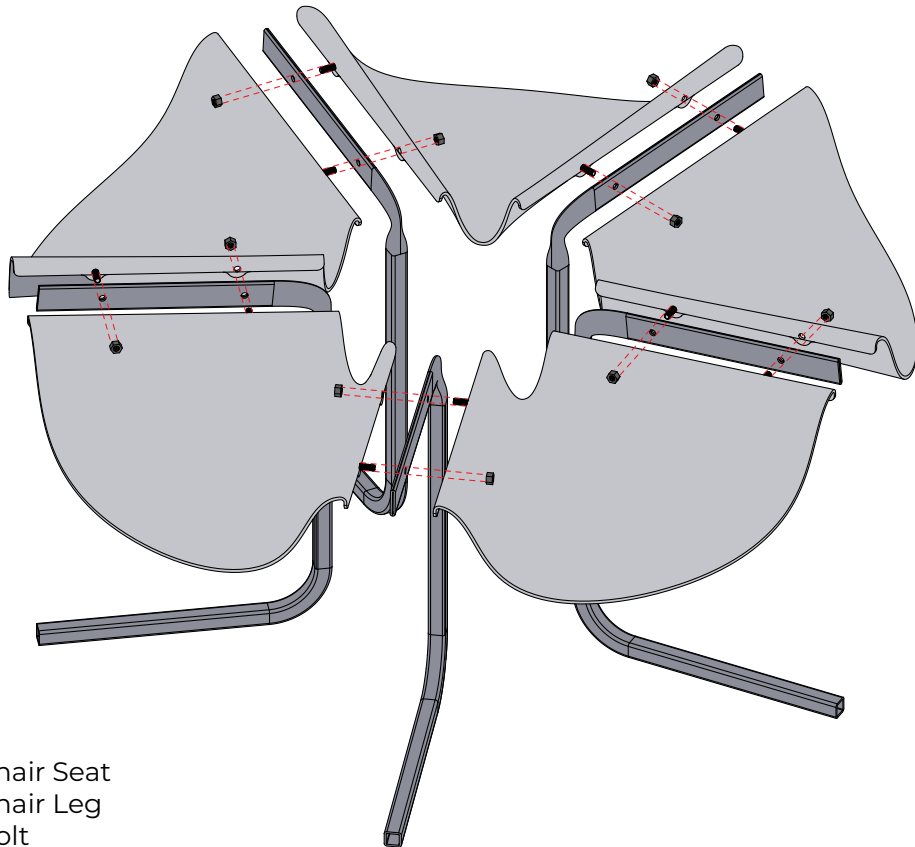


- Chair Seat
- Chair Leg
- Bolt

Assembly & Disassembly

1:11 Scale Isometric

The entire chair comprises 20 parts in total, including 5 chair seat parts, 5 chair leg parts, and 10 bolts. The assembly points are marked on the graph with dotted lines, only a wrench is required in the process of assembly. Petal is designed for fast assembly and disassembly with minimal connection points and easy to understand joints.

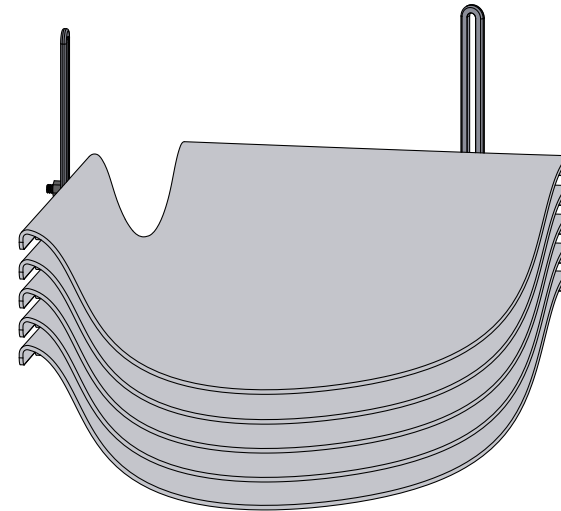
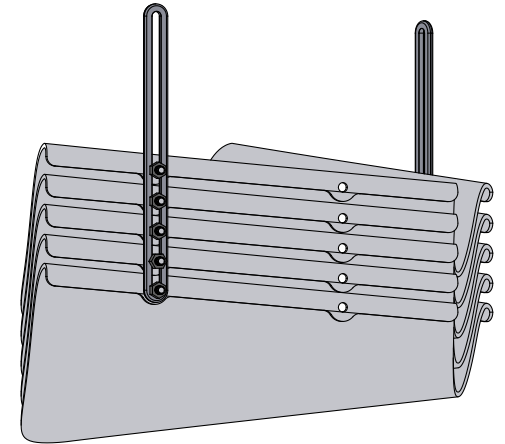


- Chair Seat
- Chair Leg
- Bolt

Transportation & Shipping

1:8 Scale

Petal is designed to be stackable, the stacked seating units can be secured with a connector piece that allow easier shipping and transporting.



- Chair Seat
- Connector
- Bolt

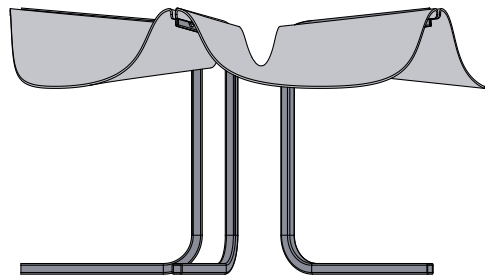
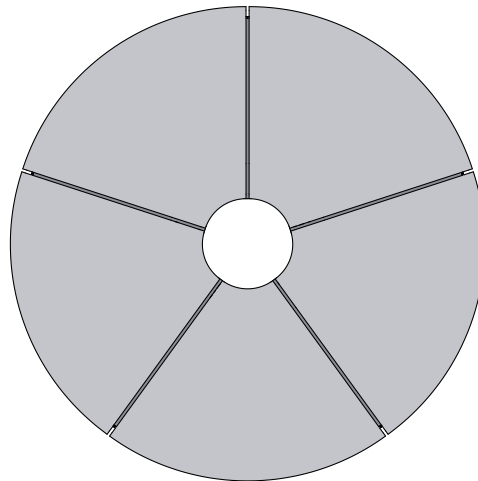
Technical Drawing

1:18 Scale Orthographic

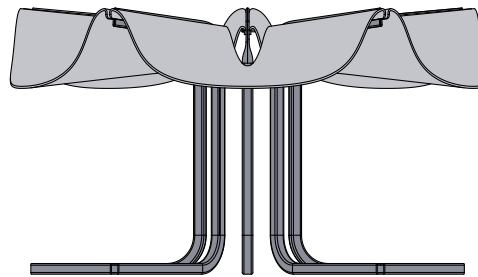
The dimensions of the fully assembled Petal is approximately:

44.5 in x 44.5 in x 25 in

Top View



Side View

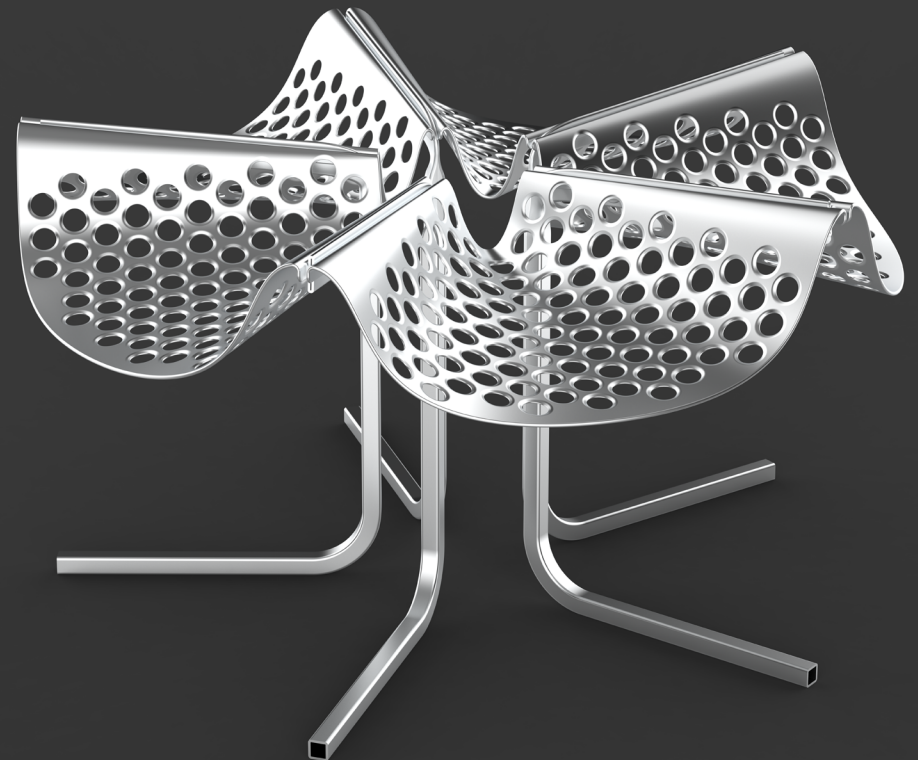


Front View

Final Render Image

Mono-material Design

The entire chair is made of stainless steel, seat is made of sheet metal with cut holes, and the legs are bent cube profile tubes. Both are relatively easy to manufacture, and durable for public spaces.





Times Square 42 Street

Track
1

Informa

Times
Square

Undull

Ergonomic Knife Sharpener



Problem to Address



Data source:

DOI: 10.1016/j.jemermed.2012.11.092

Photo source:

https://www.reddit.com/r/Well-thatsucks/comments/1237gcf/just_sharpening_my_knife_to_cut_some_acorn_squash/

Problems with Knife Sharpening

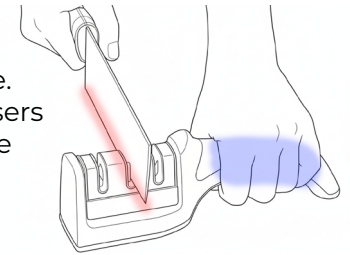
Knife-related injury rate was 1.56 injuries per 1000 US residents per year. A large number of accidents involve cutting with dull or damaged knives while cooking. The common cheap knife sharpeners on the market rather are scraping the knife not sharpening the knife, this not only won't sharpen the knife and also damage the blade. The more "advanced" tools take a long time to learn how to use them and they require a long time to set up. They are also not safe for the user, the blade is pointing directly towards the user's hand, could easily cause injuries even with careful attention.

Undull is an ergonomic knife sharpening tool that sharpens knives quick and efficient, while maintaining this experience safe and easy.

Product Analysis

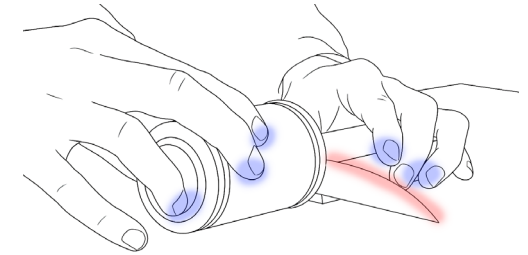
Product Type A

- The grip is designed to be away from the blade.
- The handle is not designed to fit all hands, if users have large hands, they won't be able to grip the handle with all fingers.
- Knife is pointing down, away from user.



Product Type B

- No grip designed.
- User's hand could be very close to the knife, holding it far away from the knife will have less grip.
- Blade is pointing up towards the user.



Product Type C

- No specific grip designed.
- User's hand is always close to the blade, making it very dangerous to handle, and the motion of sharpening user's hand is constantly moving towards the blade.
- Blade is pointing towards the user.

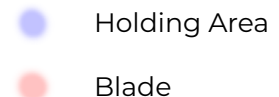
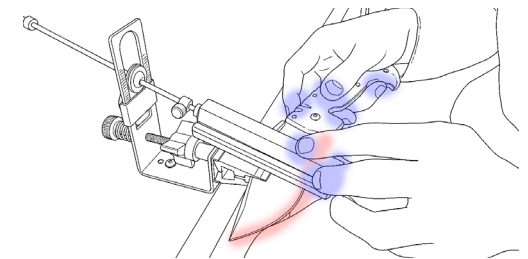
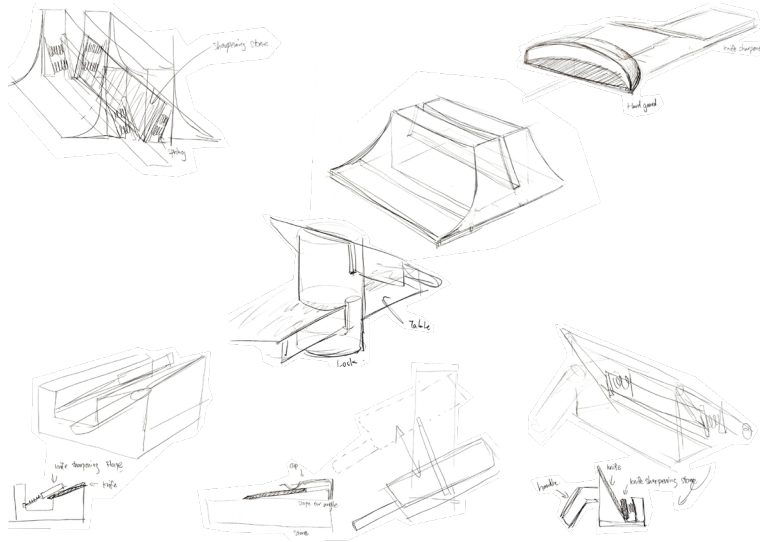


Image generated with Google Gemini

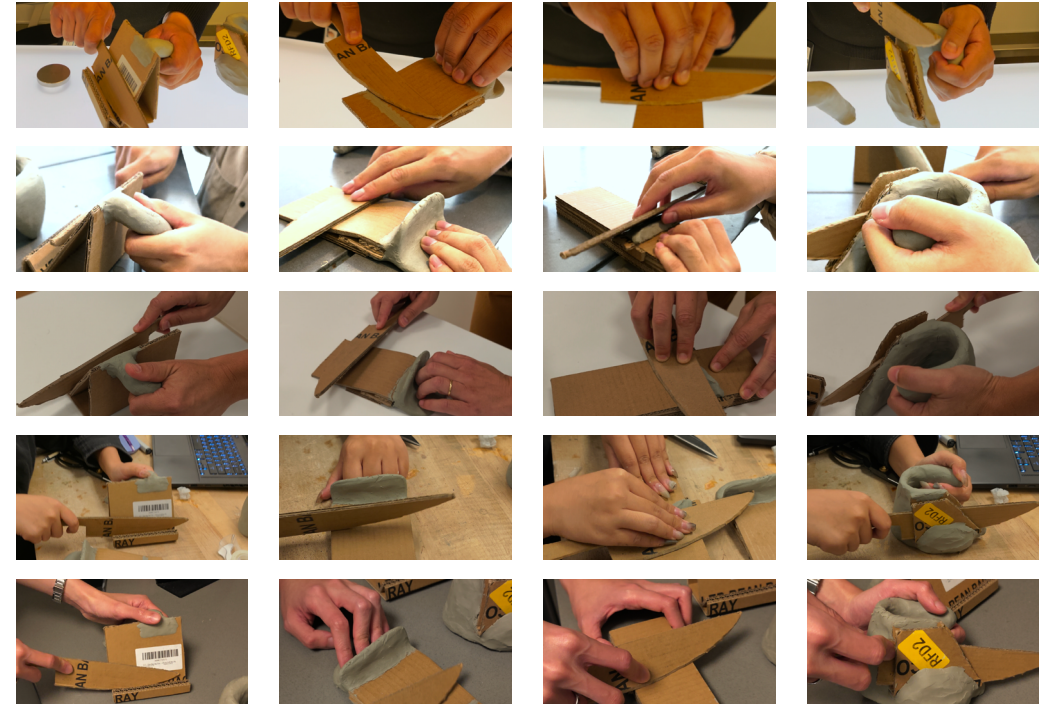
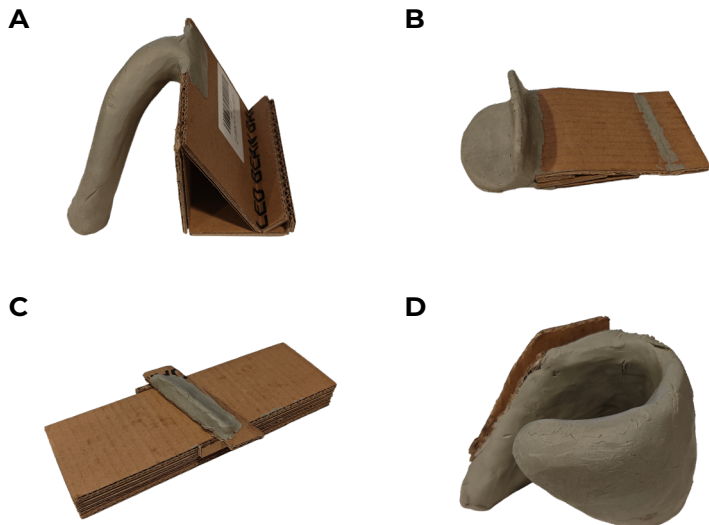
Ideation & Design

User Testing Pt1

Sketches



Models



Design A

Pros:
Familiar handle shape. Quite comfortable. Easy to use.

Cons:
Only sharp one side of the blade.

B

Pros:
Similar as cutting. Good protection.

Cons:
Only sharp one side of the blade.

C

Pros:
Minor addition to existing product. Easy to use.

Cons:
Not for all users. Bad grip. Need some kind of support.

D

Pros:
Familiar handle shape. Very comfortable. Easy to use. Sense of safety.

Cons:
This shape might be confusing.

User Testing Pt2

I decided to further develop design B, because of its very ergonomic shape, and general familiarity of the handle shape.

For the second set of user testing, there are four clay models made to test on four key parts of the design, the space between the handle and the knife sharpening part, overall handle height, the height of the back of the handle, and whether there should be a pinky rest. All user testers tested each of the models with different orders to reduce bias.



Variant A

B

C

D

Handle space:
Narrow

Handle space:
Open

Handle space:
Open

Handle space:
Open

Overall Height:
High

Overall Height:
Low

Overall Height:
High

Overall Height:
High

Back Height:
High

Back Height:
Low

Back Height:
Low

Back Height:
High

Pinky Rest:
Without

Pinky Rest:
Without

Pinky Rest:
With

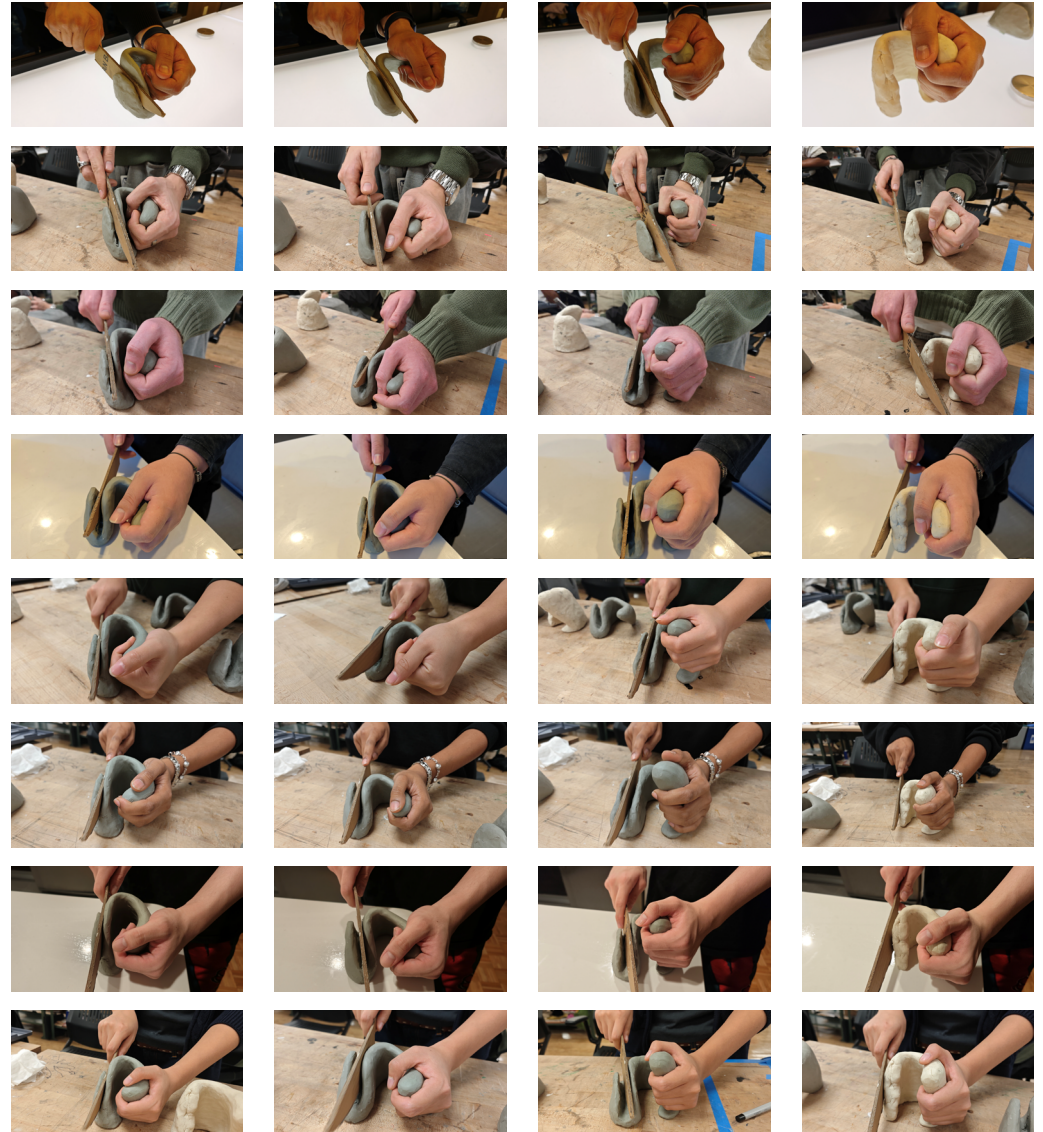
Pinky Rest:
With

Variant A

B

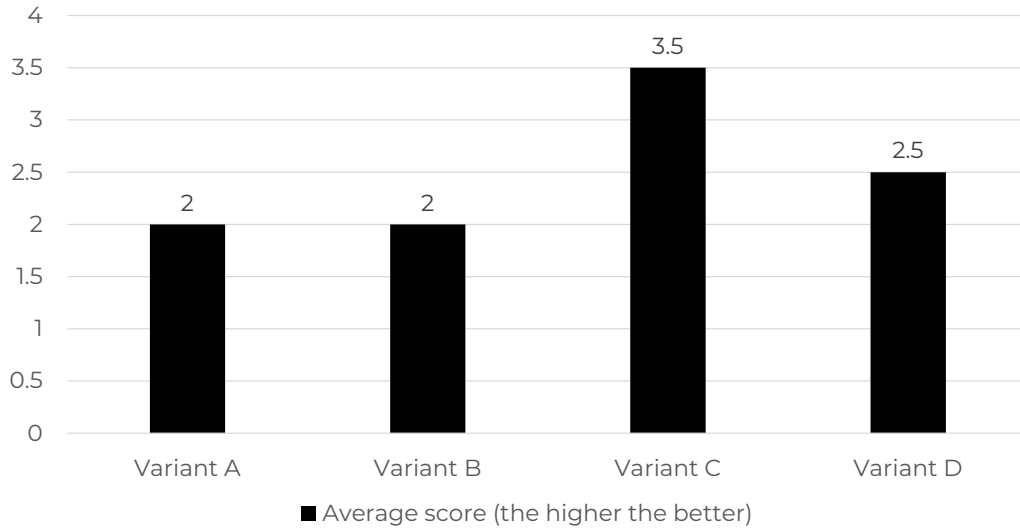
C

D

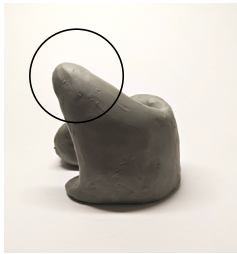


8 testers ranked all four variants.

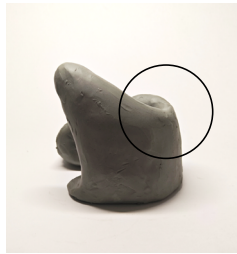
The best variant will get 4 points, second best will get 3 points, second least will get 2 points and last will get 1 point. Variant C had the highest score compared to all the other variants.



Handle Space
Maintain a safe space between handle and knife sharpening section.



Handle Front
Be taller and relatively larger, for better grip.

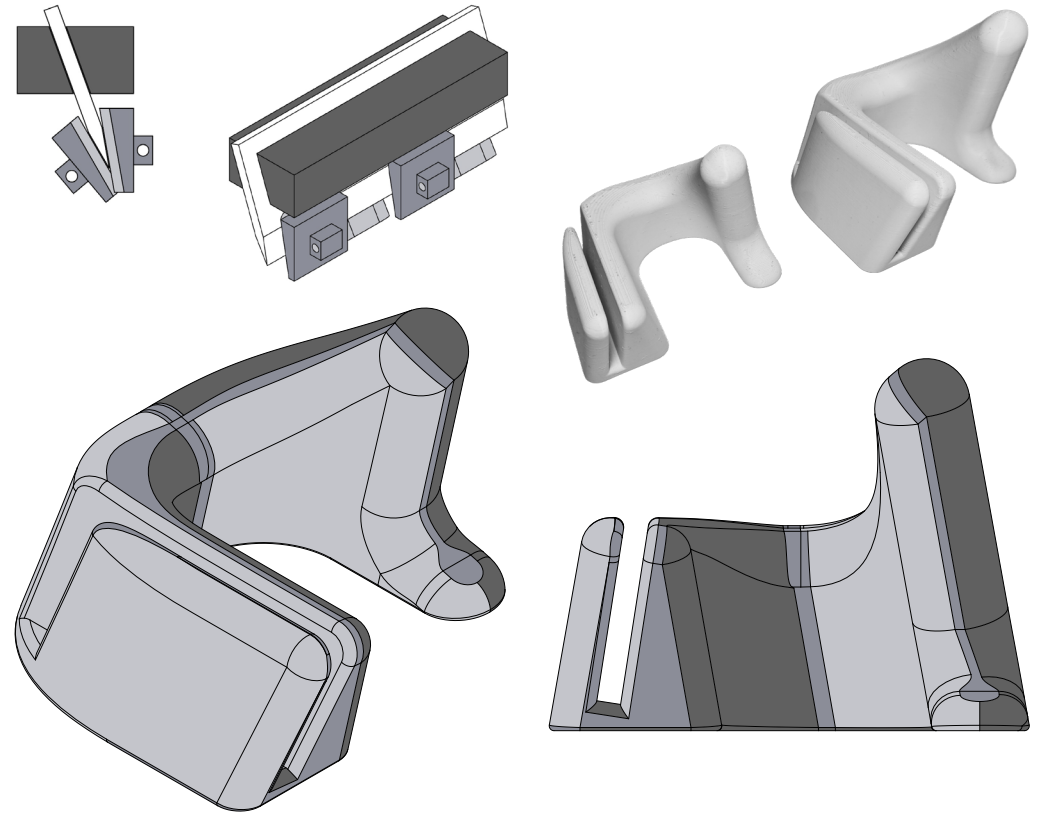


Handle Back
Declining back of the handle for better grip and comfort.



Pinky Rest
Pinky rest to counteract downward force, and comfort.

Design Progress



Key Learnings

The remodeled parametric 3D solid modeling isn't the same as I modeled with clay, even though they share multiple features, but it is just simply not ergonomic.

User Testing Pt3



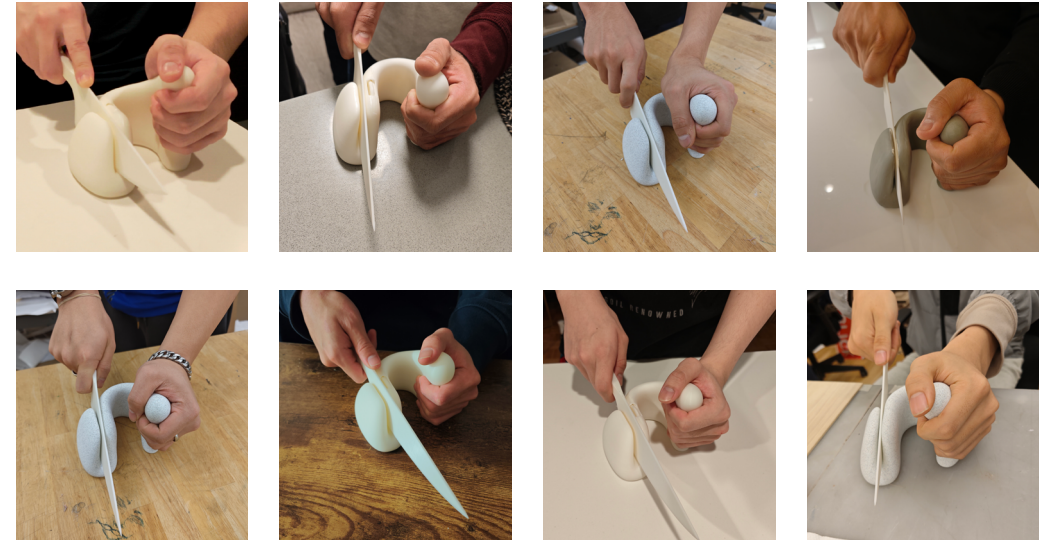
Design Progress

After failing to model it using parametric modeling tool, I came back to clay modeling, refining the shape further, and included the gap reserved for the space for knife sharpening. I used LiDAR scanners to scan the clay model and further smooth the surface on CAD software. Lastly, I 3D printed the body and parts and assembled them for last round of user testing.

Earlier Versions



Later Versions



87.5% satisfaction rate.

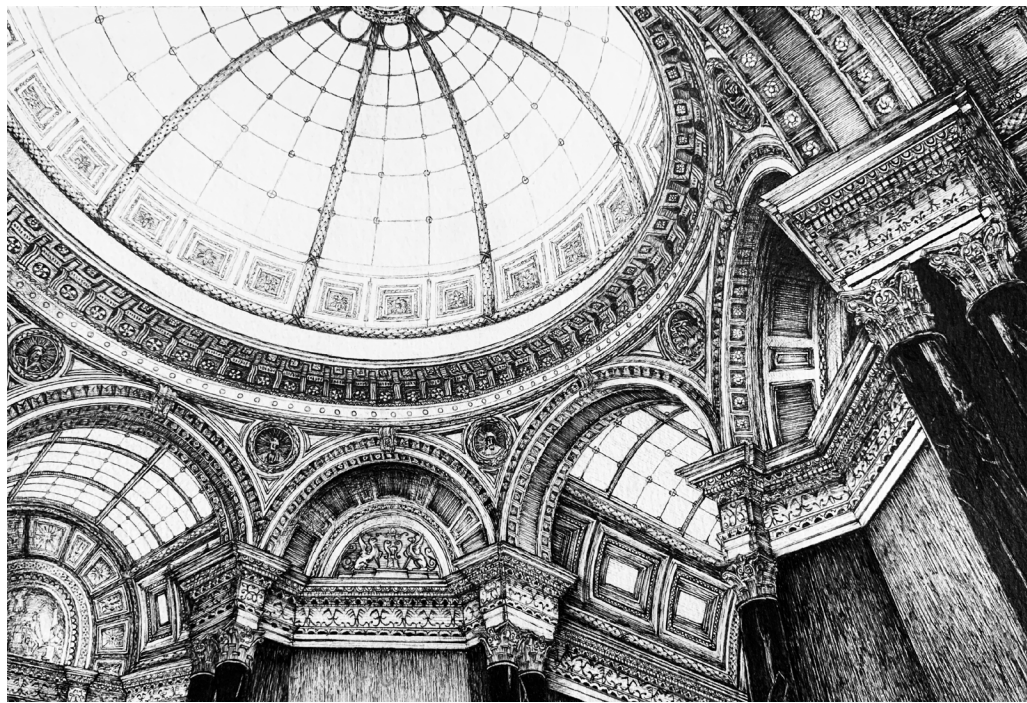
Only one out of the eight user testers have minimal discomfort. Everyone else provided positive feedback.



Final Render Image



Artworks



The National Gallery

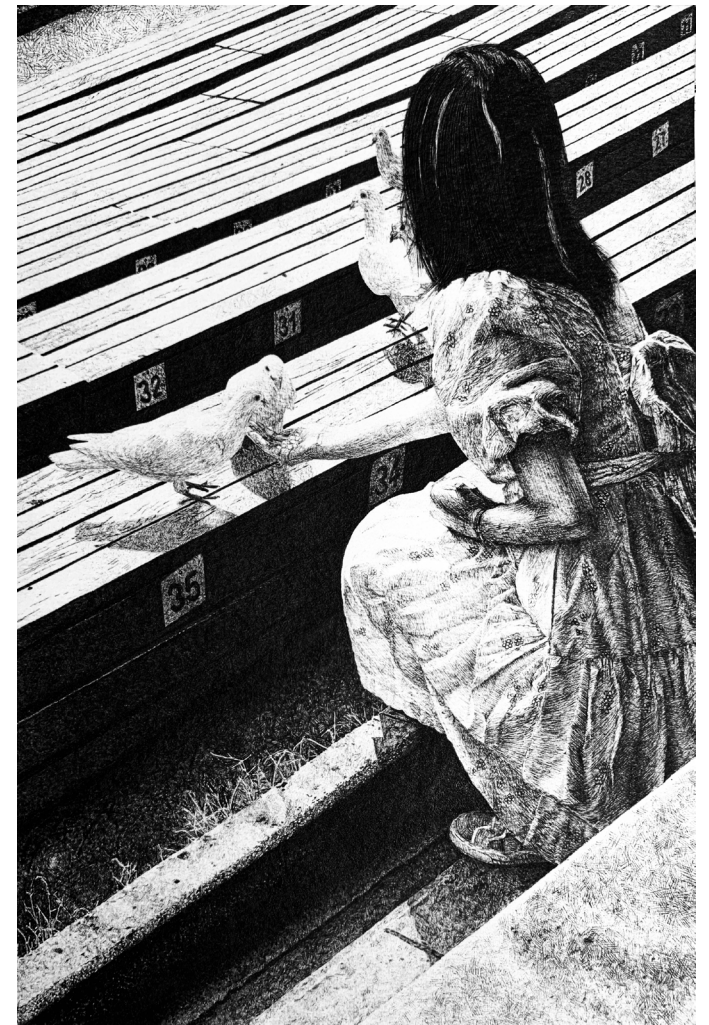
21 x 14 cm

Fineliner on Paper

No Name

14 x 21 cm

Fineliner on Paper





Cathedral of Santa Maria del Fiore

16 x 14 cm

Fineliner on Paper

The Campbell Sisters Dancing a Waltz

21 x 14 cm

Fineliner on Paper



