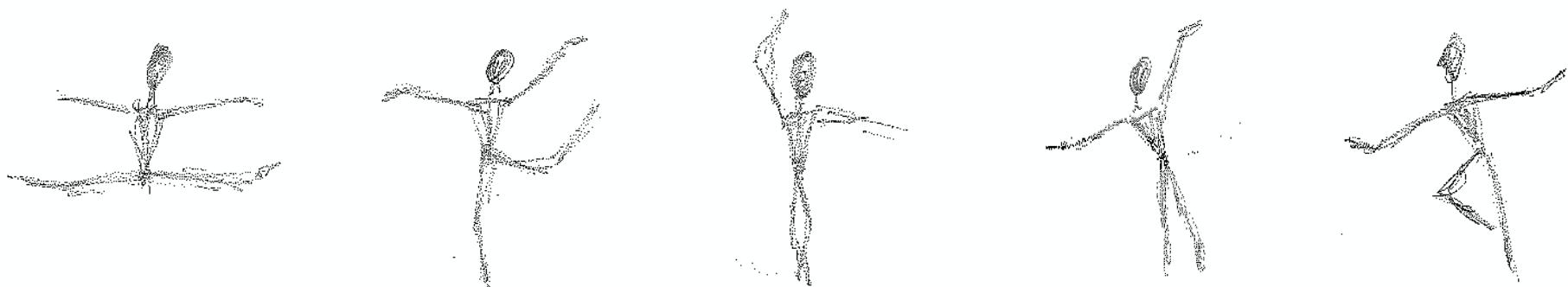


RIKA KO

CREATOR

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ABOUT ME

I'm a sophomore at Northwestern University studying Manufacturing and Design Engineering. I've had a natural inclination to tinker and question things for as long as I can remember, and it led me to fall in love with product design and development. I also love science fiction thriller novels, exploring new places, and anything animal related, but especially my dog, Sunshine.



WHAT DO I BRING TO THE TABLE?



Perspective. From learning the human-centered design process through my interdisciplinary major to creating great designs that optimize function and user satisfaction through working at Tesla, I offer new insight.



Ability to create. I'm a machine shop trainer at Northwestern University. I have used Solidworks and CATIA in professional settings, and I have used Photoshop to design graphics for organizations such as Society of Women Engineers and Entrepreneurs in Action (EPIC).



Collaboration. Being able to discuss ideas with others is an integral feature of any project. Being cognizant of my strengths and weaknesses and combining them with the skills of others creates a result that cannot be achieved with just one person.



A passion for making a change. I am willing to go above and beyond for a project or cause I am passionate about. When I am excited about something, it is loud and clear in the work I do, because the end result inspires me as much as it helps others.

TESLA MOTORS

Summer 2016, I was a Product Excellence intern for Tesla Motors in Fremont, California. That's me in the front row, below the "E"!

What I did in my 10 weeks at Tesla:

- Independently identified reoccurring problems in production vehicles and made direct changes that are implemented on the assembly line today
- Communicated with every step of the supply chain: manufacturers and suppliers, designers, assembly line workers, managers, and engineers of various departments
- Designed changes quickly and presented the results to a board of engineers on my team



TESLA: NOISY VENT ISSUE

Problem: The Model X air vents on the instrument panel were jamming and noisy during final inspections.



- I analyzed the installation process of the vents, discovering that the problem stemmed from poor manufacturing from our suppliers and improper installation

Two opportunities of improvement:

Suppliers

- I complied data in 30 random cars on gap tolerances, force efforts, and percentage of defective parts
- Set up a meeting with the suppliers to discuss quality of parts and manufacturing
- Because Tesla moves quickly, I created a temporary countermeasure to this issue that was implemented on the production floor while the parts were being improved

Installation

- Rewrote the work instructions and taught the new procedure to the assembly workers
- Modified and specified work instructions to lessen chance of error

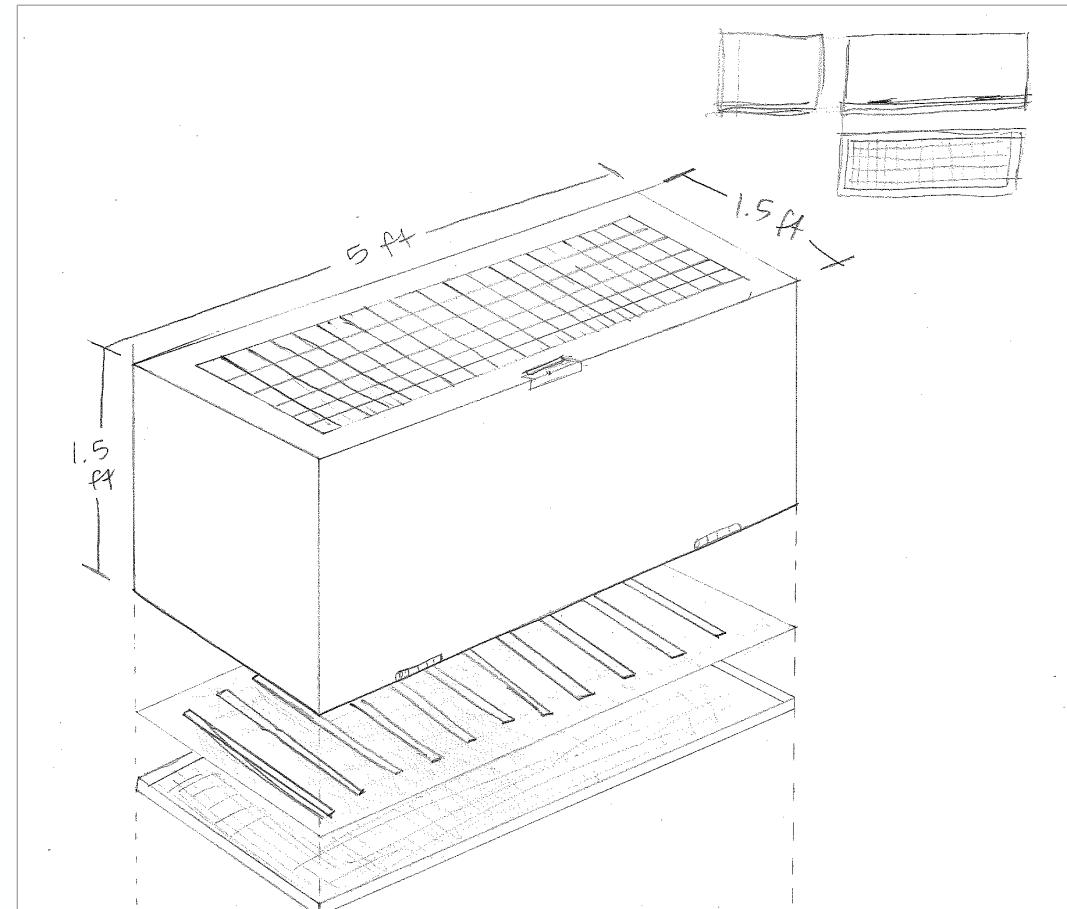
Within 3 days of re-teaching workers and instating countermeasures, the error decreased over 50%. When the reworked parts were introduced, the error was 0-1%.

FEEDER BOX FOR LINCOLN PARK ZOO

Background: In the wild, grazing animals (zebras, camels, horses, etc.) eat from bushes and small trees, and typically spend lots of time looking for their food.

Problem: The grazing animals at the Lincoln Park Zoo (LPZ) eat from the ground too quickly, usually in the same place every day.

- With another Northwestern student, we met with the Behavioral Husbandry and Enrichment Manager to see what efforts have been made to solve this issue
- Currently, we are collaborating with the zoo's main mechanical engineers to build and test our prototype, the drawing of which is to the right



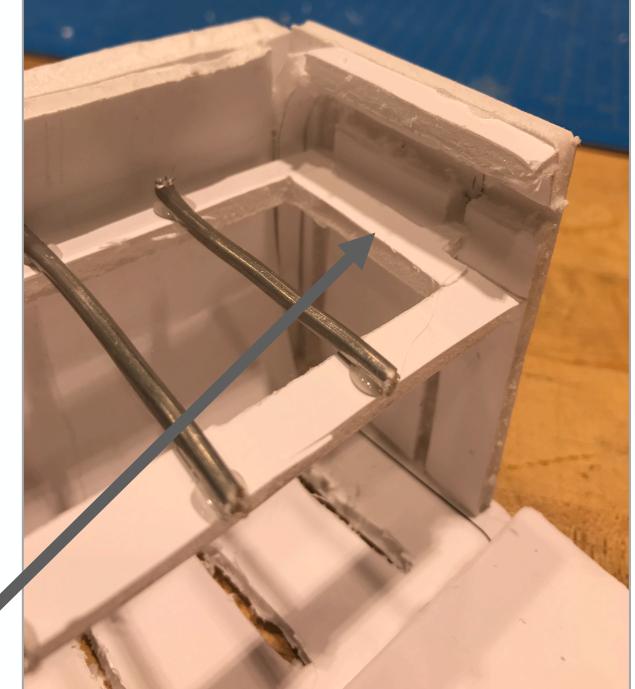
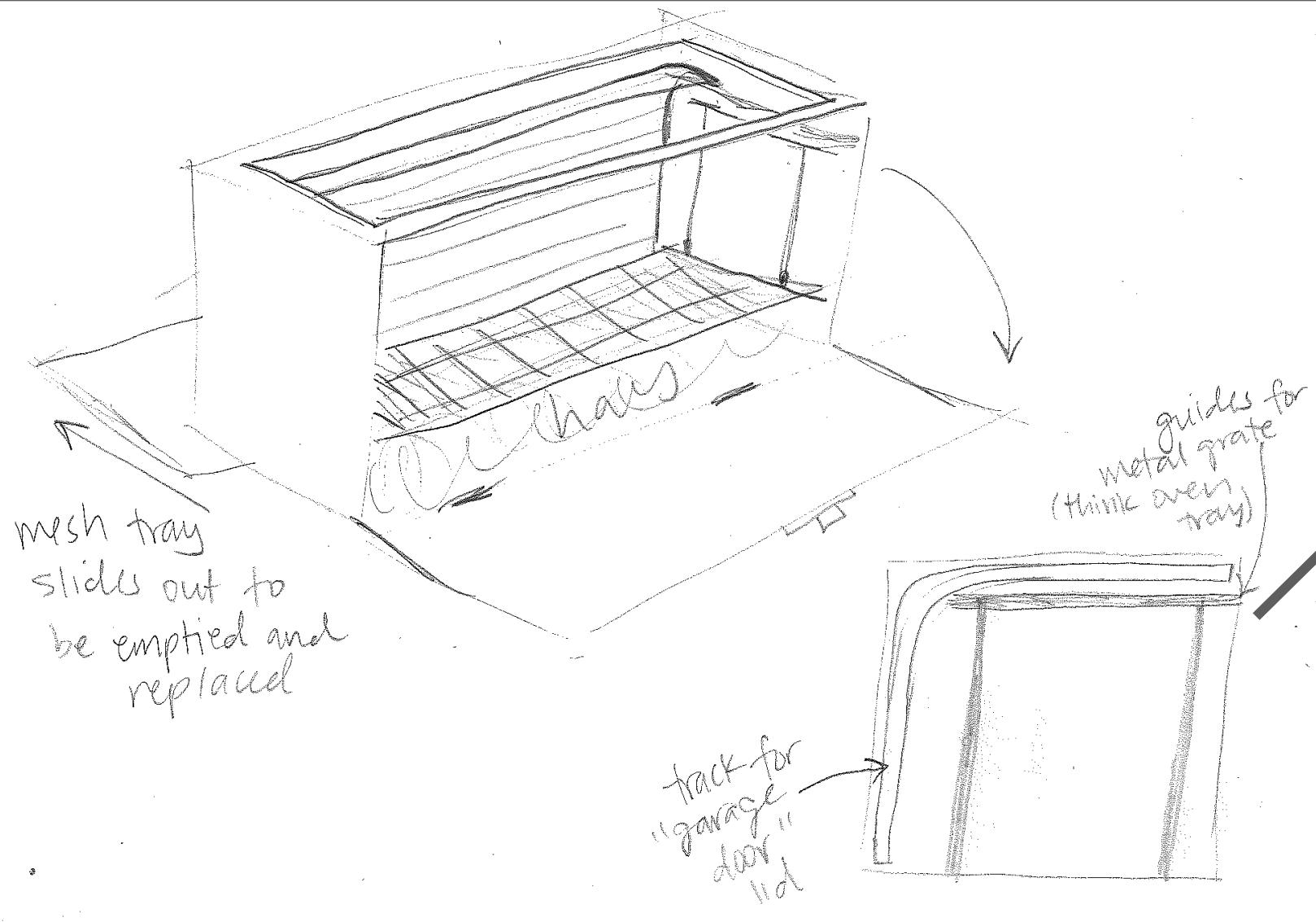
A key feature of our design is an Arduino that will trigger a timed motor connected to a "garage door" which will close the box at random intervals, forcing the animal to find another open feeder box.

Other concerns, such as drainage, accessibility of the food, durability to extremely powerful animals, have been considered while creating our current design.

Currently, we are finding more energy efficient ways to close the box, as the current garage door idea would require a significant energy source.

Stay tuned for more developments on this project!



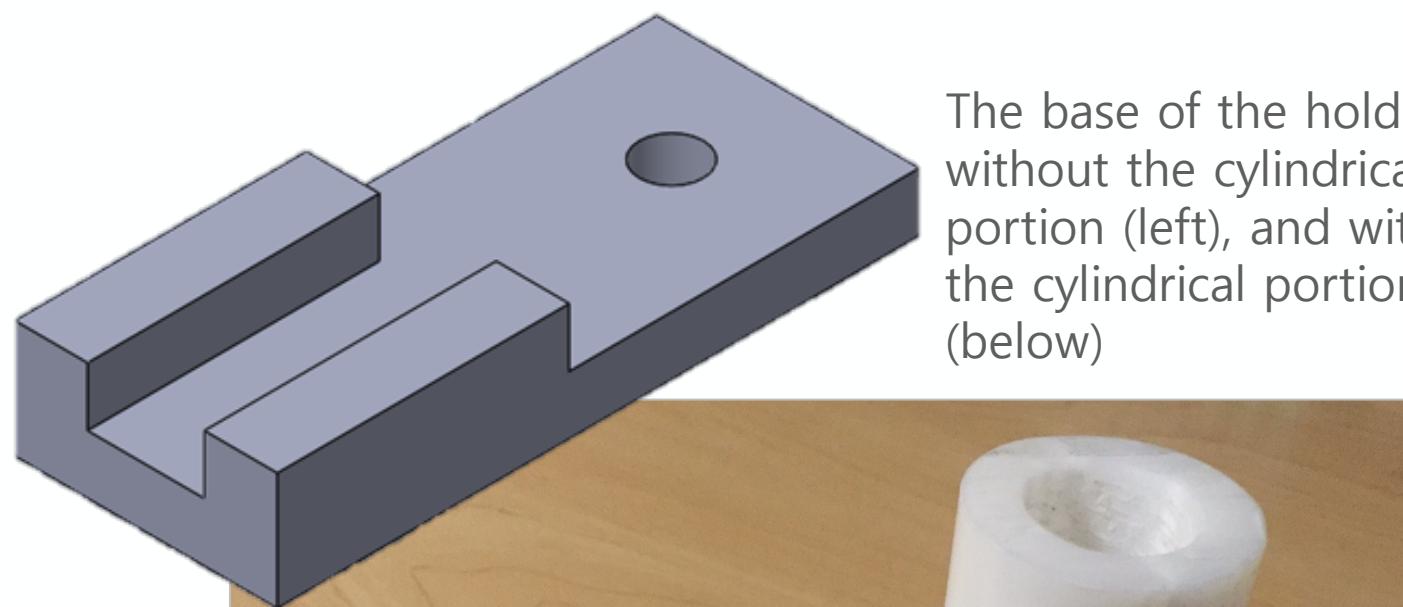
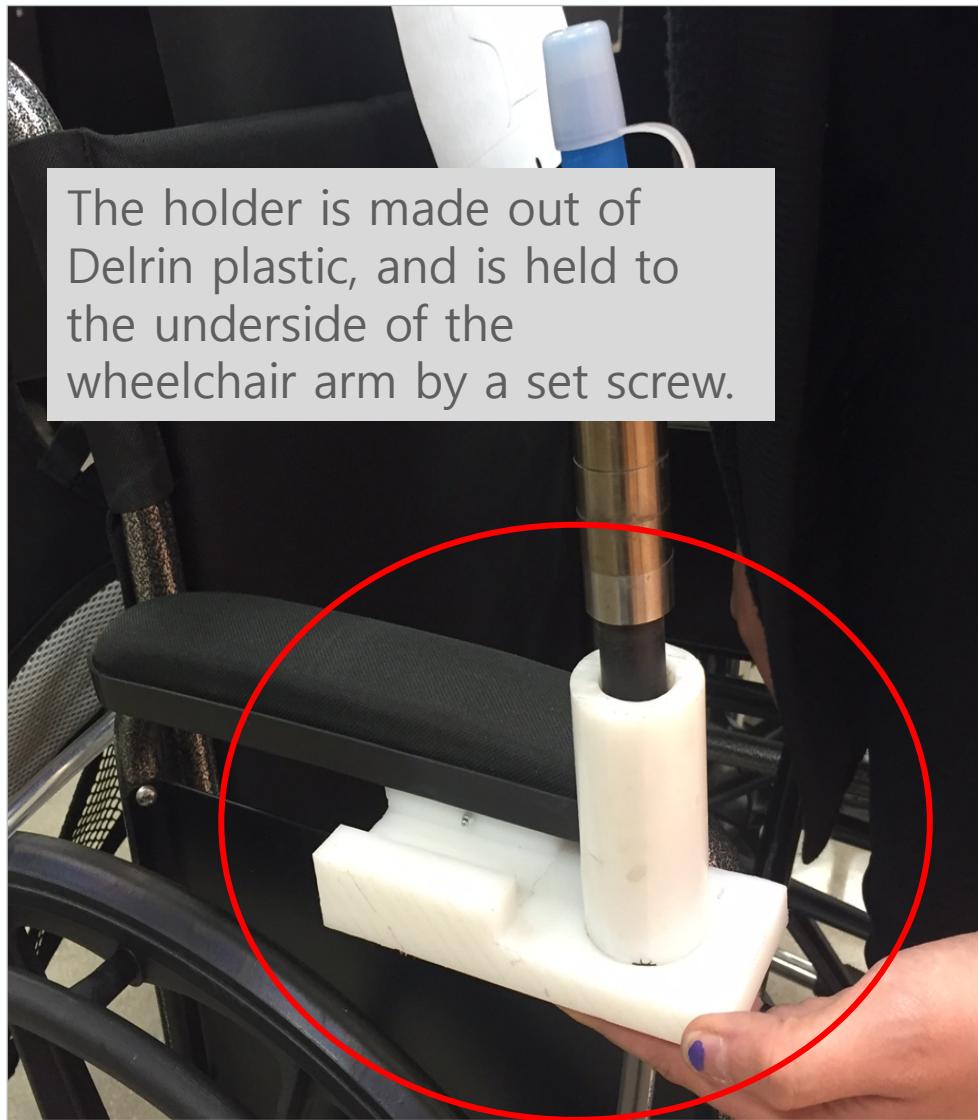


MAGNETIGRIP

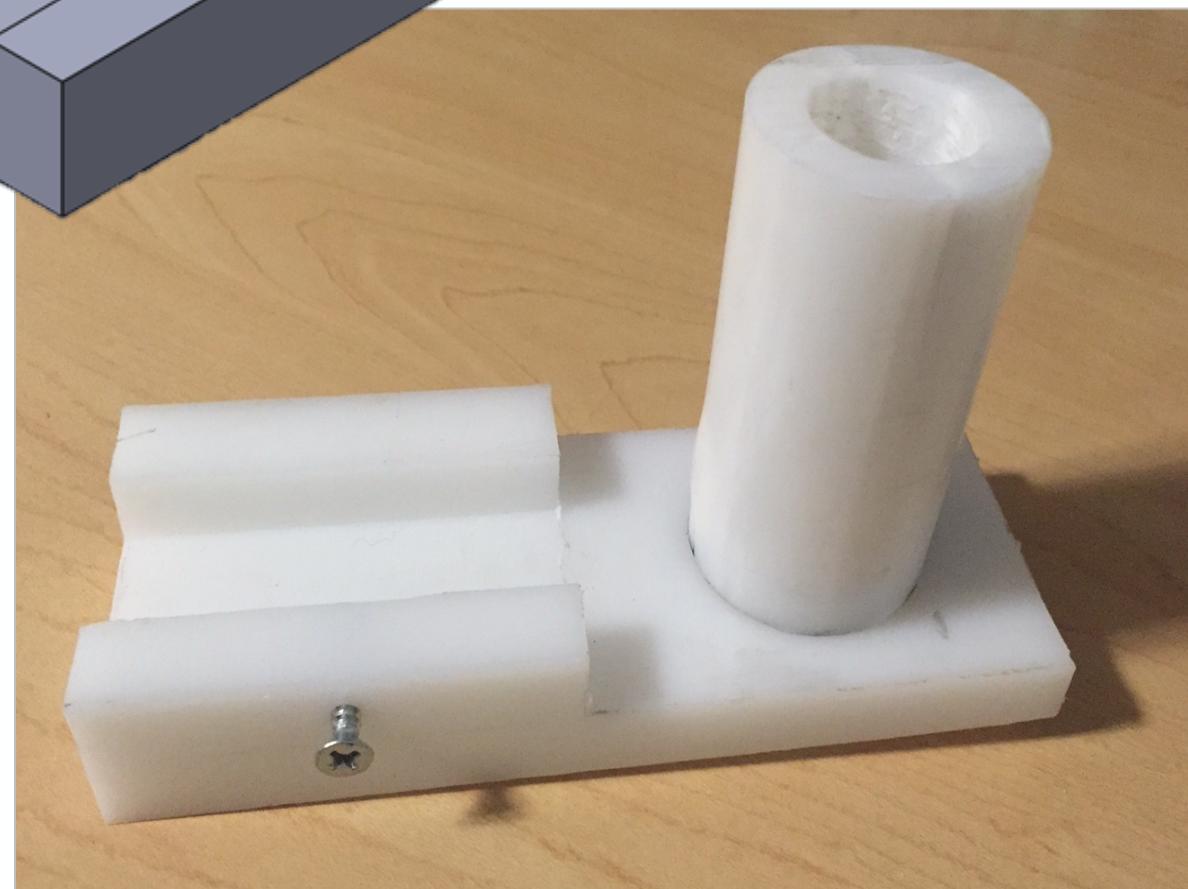


Problem: A man at the Rehabilitation Institute of Chicago (RIC) has a spinal cord injury, which means very limited upper body mobility and grip strength. Among the tasks that he cannot do independently, the most inconvenient is the inability to drink water by himself.

- My partner and I initially thought to create a long straw device for him, but after user observation and research, we discovered he still has strong arm mobility
- Through multiple iterations of user research, we developed multiple design ideas and created physical mock-ups for each one
- A design review found that a system with a magnetic grip and a bite valve was the best solution to our user's immediate problems
- As for materials selection, we mainly considered durability and cost. It led us to Delrin plastic for the white holder, polypropylene for the handle, etc.



The base of the holder, without the cylindrical portion (left), and with the cylindrical portion (below)





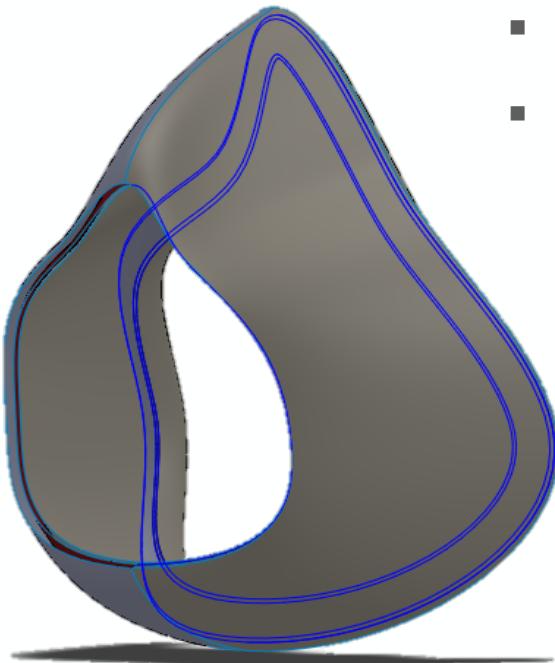
The magnetic bar sewn into the hand strap allowed the magnetic handle to be easily lifted by the user with no need for grip strength at all.



This water pack hangs on the back of the user's wheelchair with a backpack.

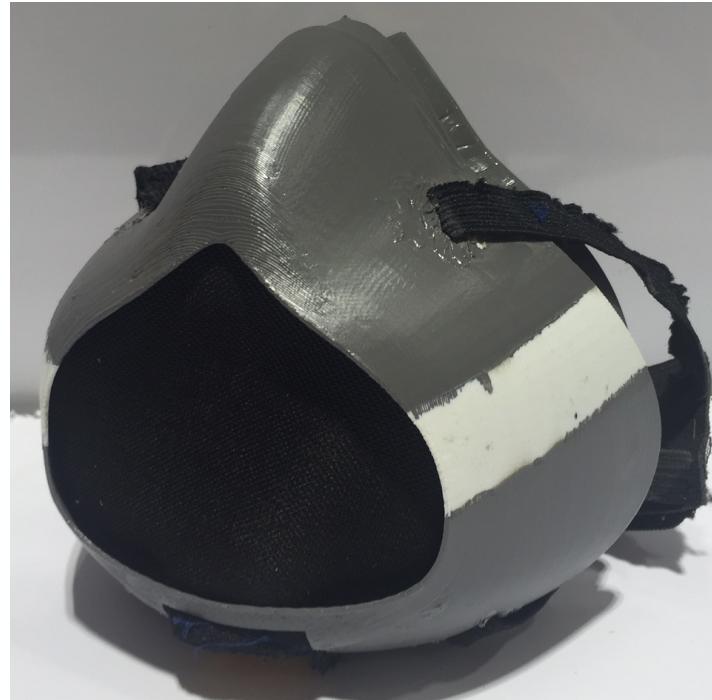
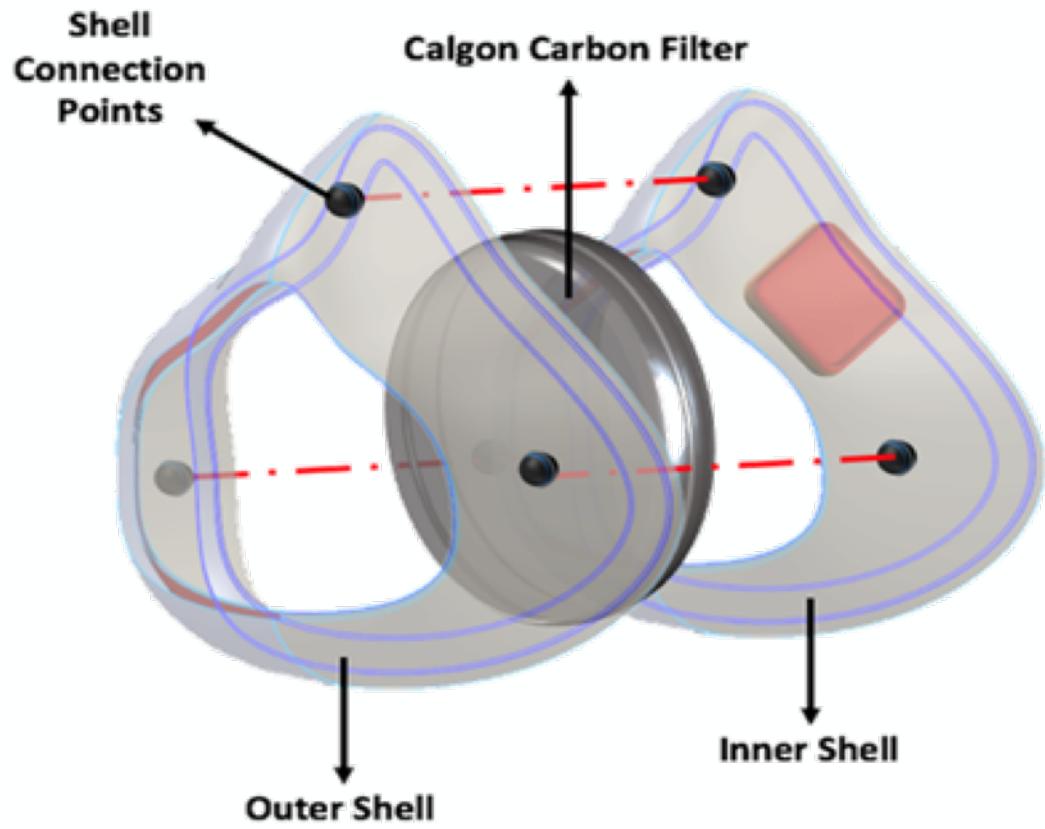
TAKE IT BREEZY

Problem: The pollution in Beijing, China is at an all-time high, yet the citizens choose not to wear breathing masks.



- A giant user survey was taken from
- samples of Chinese adults aged 18-40.
- From this, we determined our areas of focus:
 - Comfort: the contours of the mask were designed to mold to the face, and we added a silicone tubing which acts as a cushion between the mask and the face
 - Ease of use: we implemented a two-shell mask that makes cleaning and filter replacement simple
 - Cost: all the materials are affordable and easily obtained, allowing low market cost
 - Customizability: The material of the mask allowed for color and design customization



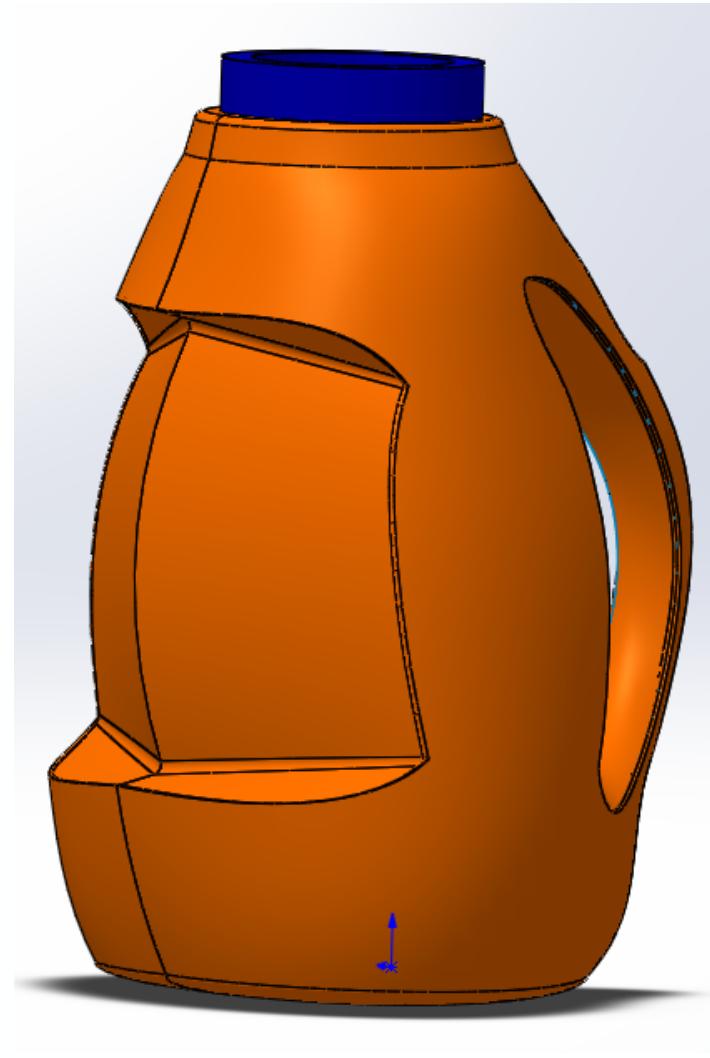
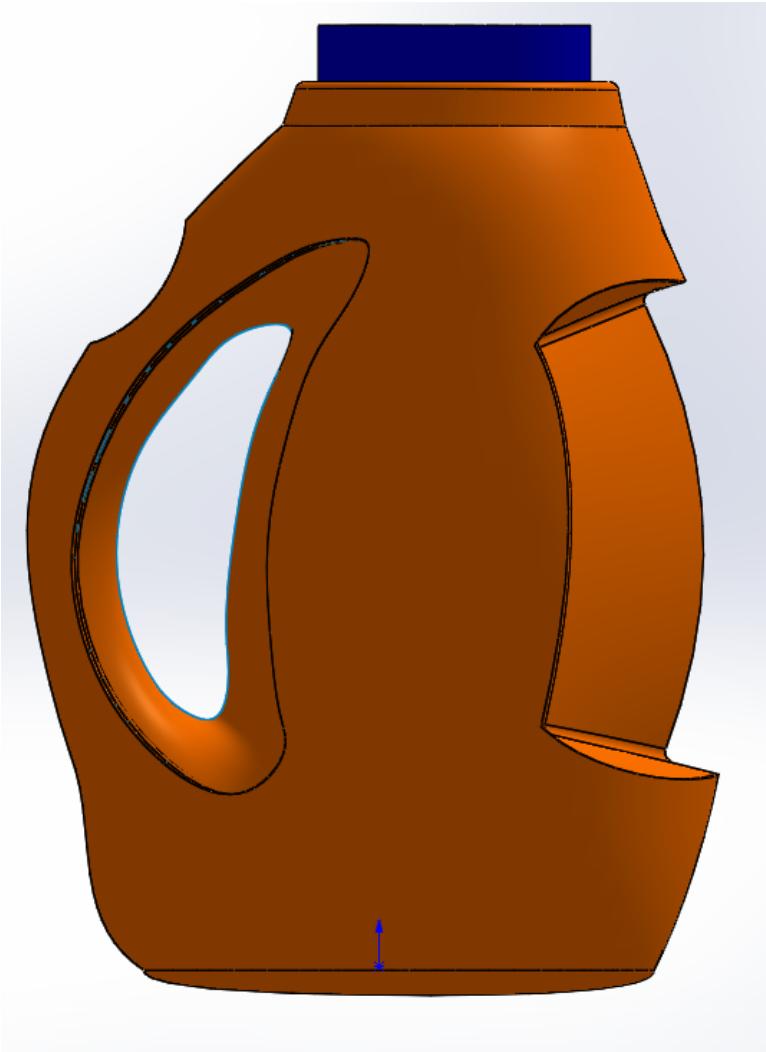


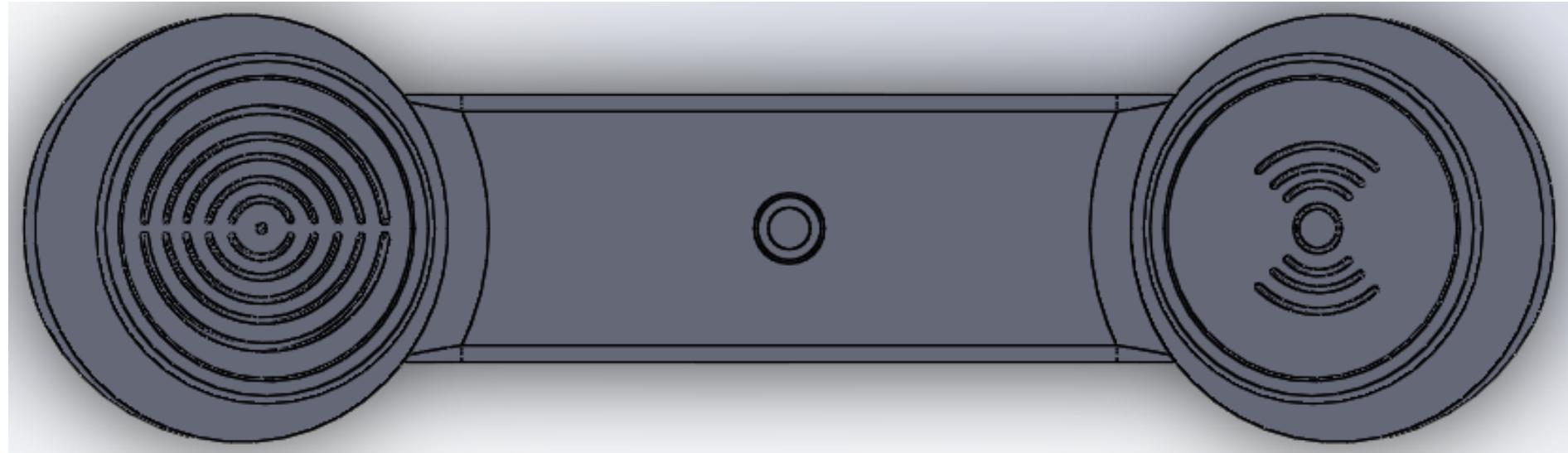
Features

- Two 3D printed mask shells, made of ABSplus thermoplastic for its low density and affordability
- The pollution filter, held between the two shells for easy replacement
- Four fabric elastic straps, attached in the back with a Velcro pad.
- Silicone tubing outlining the inside of the mask, for maximum user comfort
- An exhalation valve, allows easy breathing

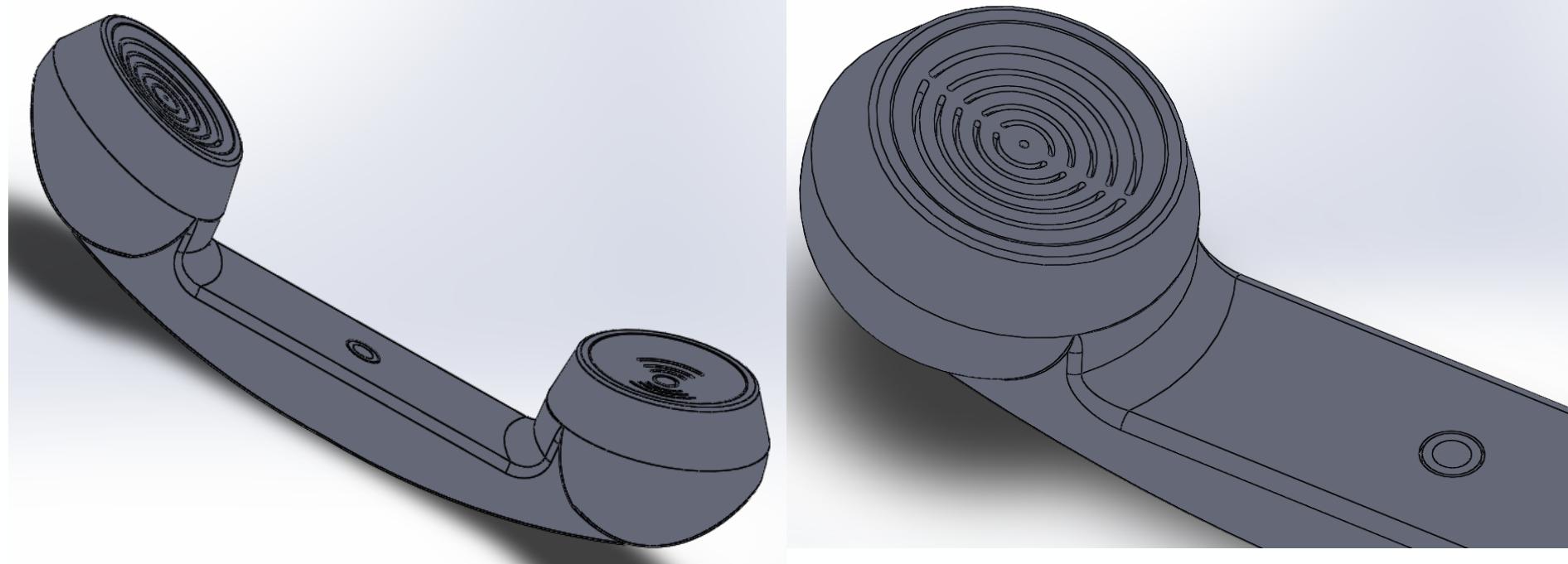
SOLIDWORKS

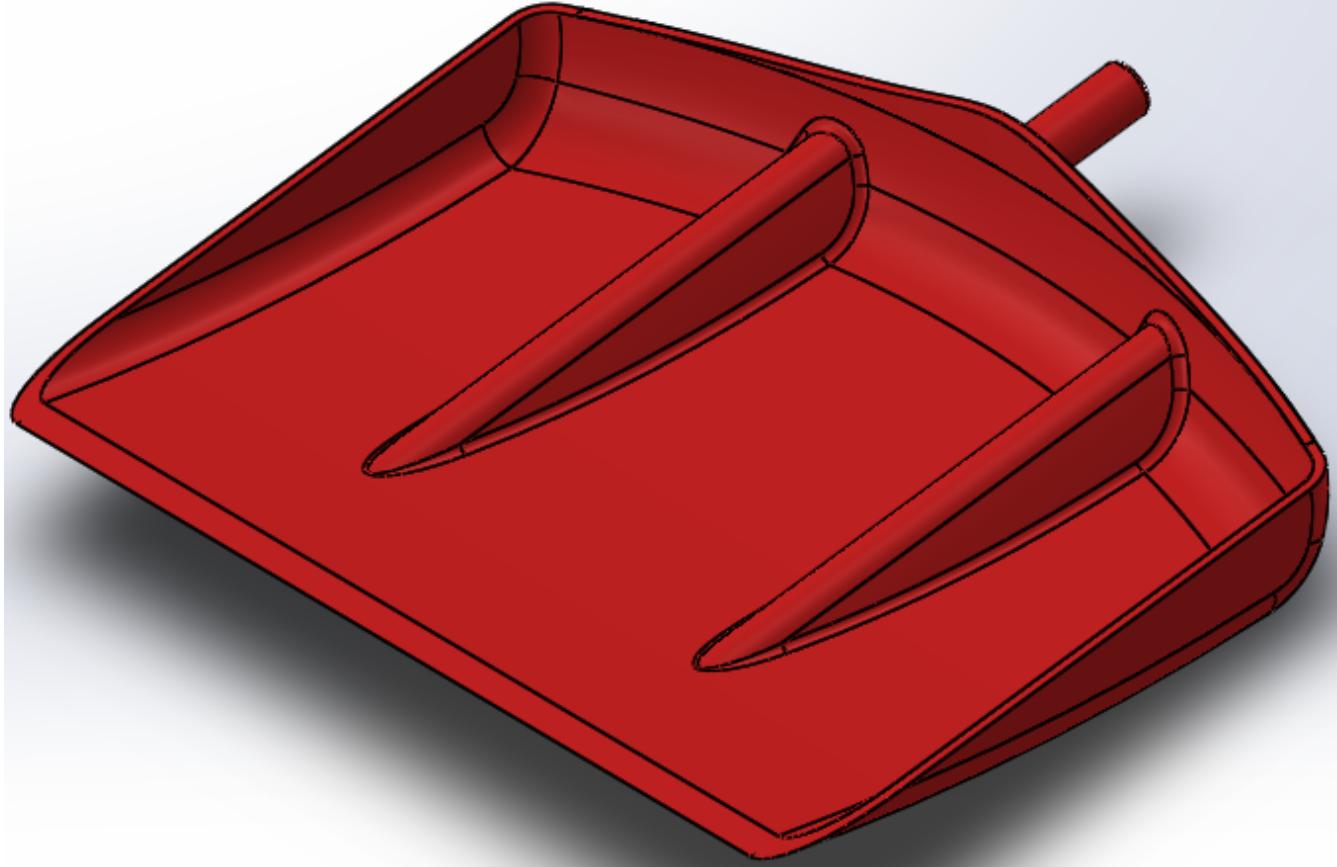
DSGN 325 and 240 are courses where I learned advanced Solidworks and how to render them within the program.



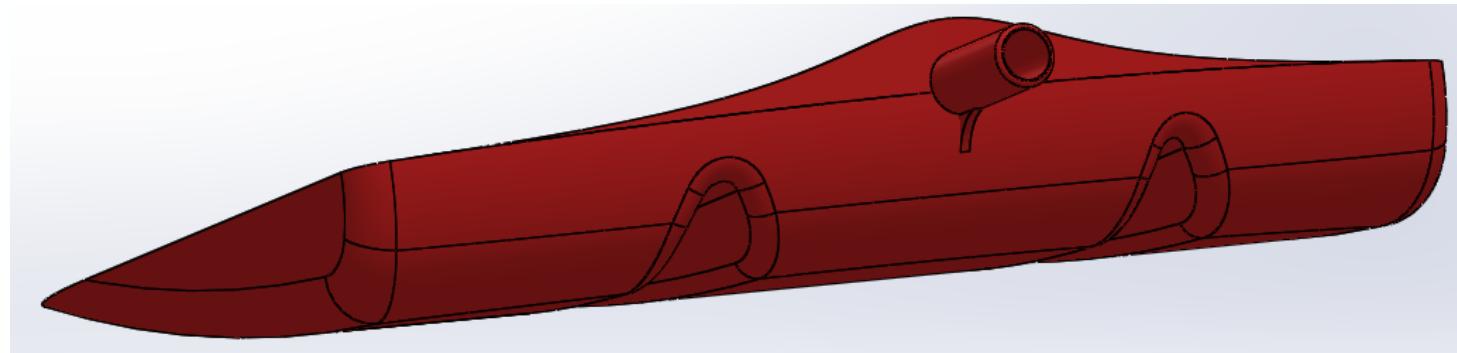


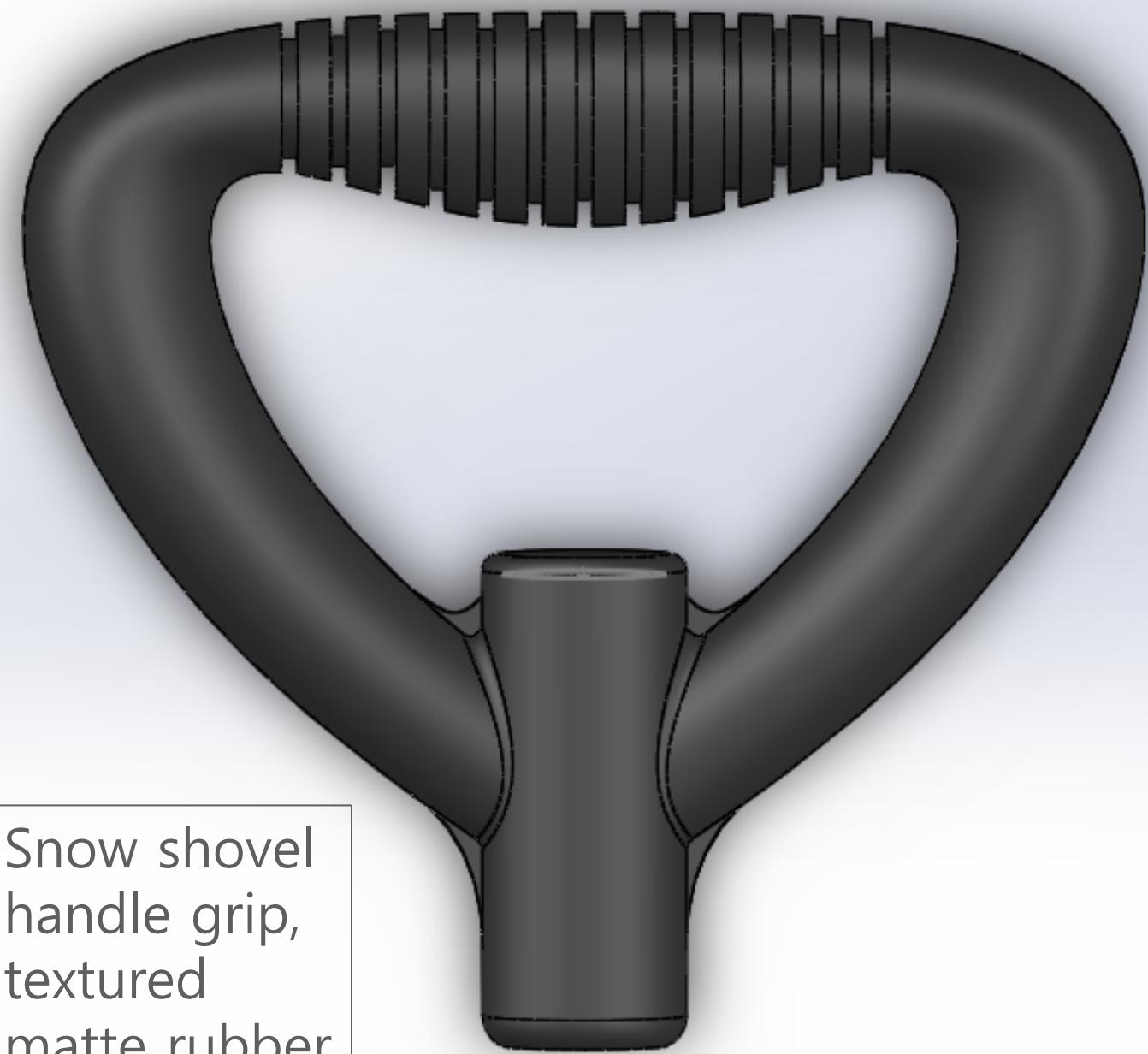
Moshi handset
phone



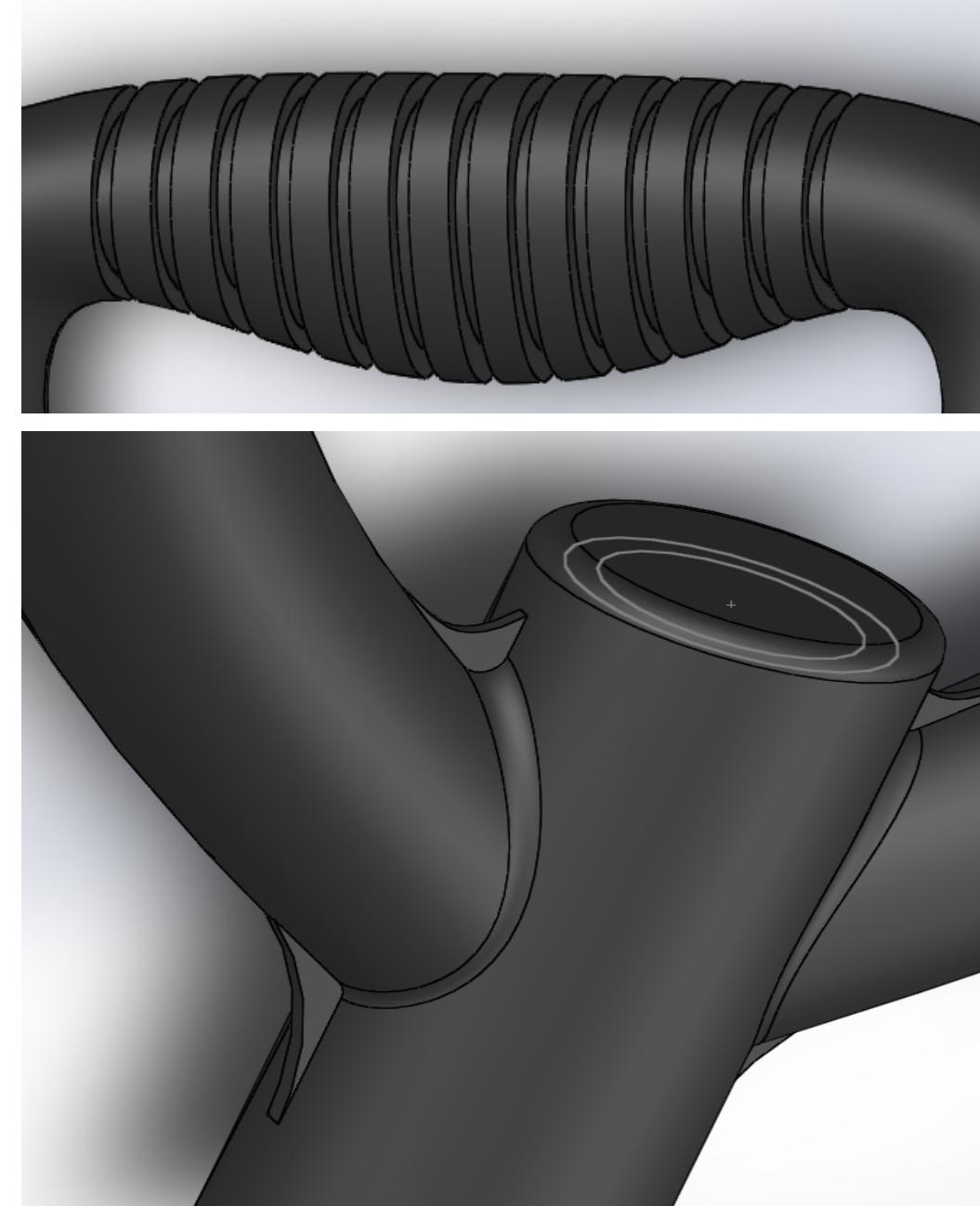


Snow shovel
bucket, red
matte plastic

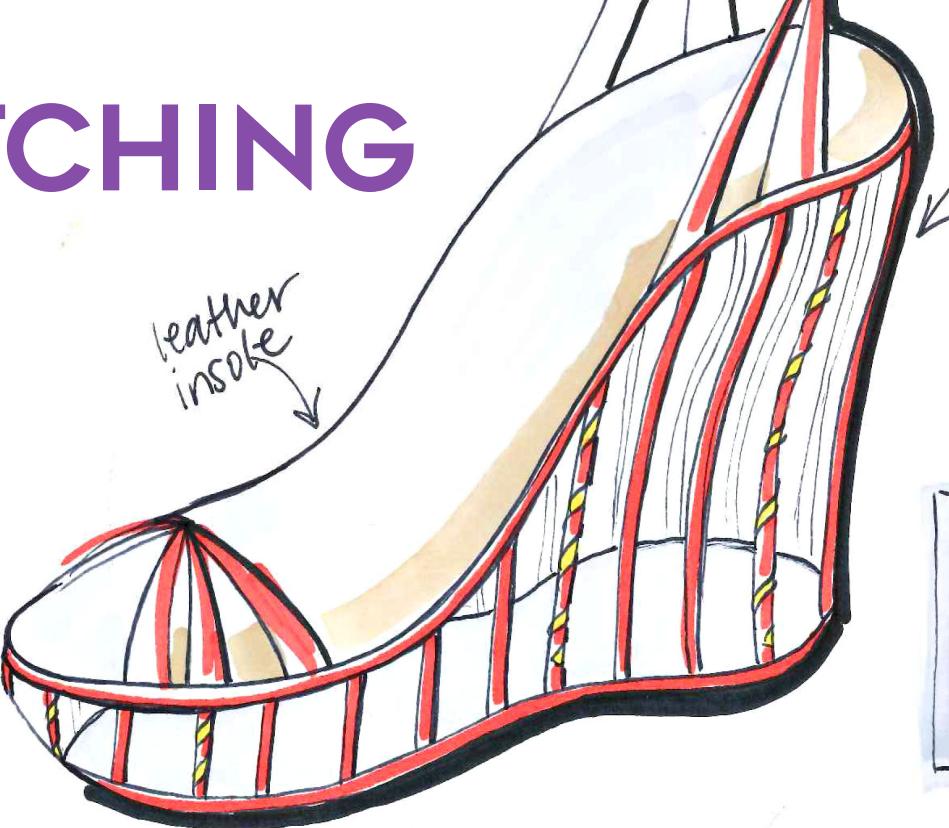
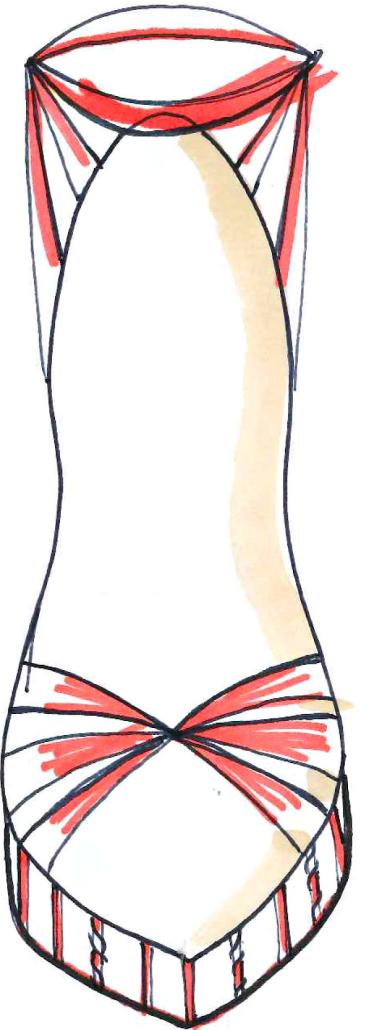




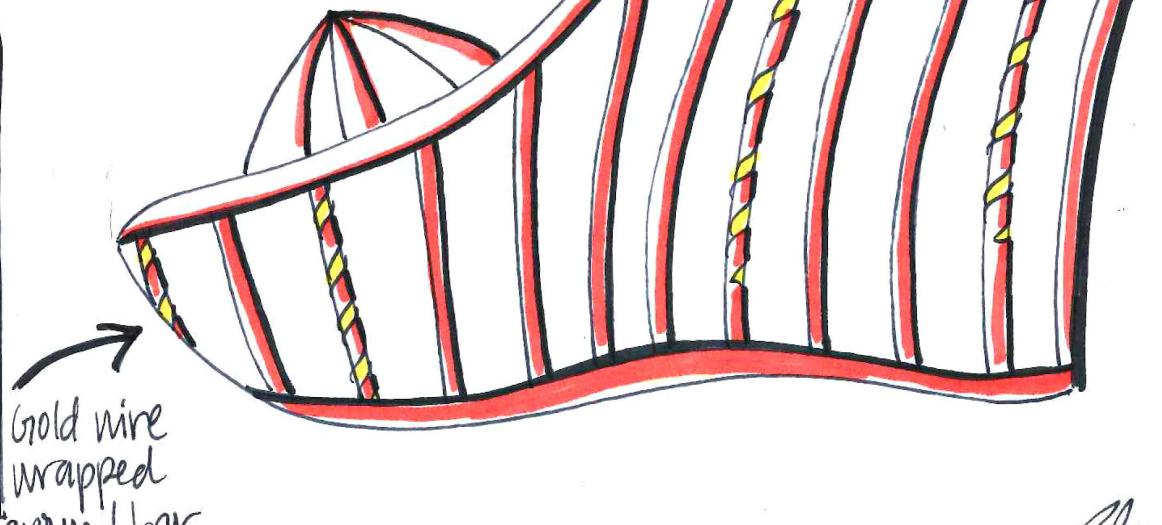
Snow shovel
handle grip,
textured
matte rubber



DESIGN SKETCHING



wrought
metal
bars

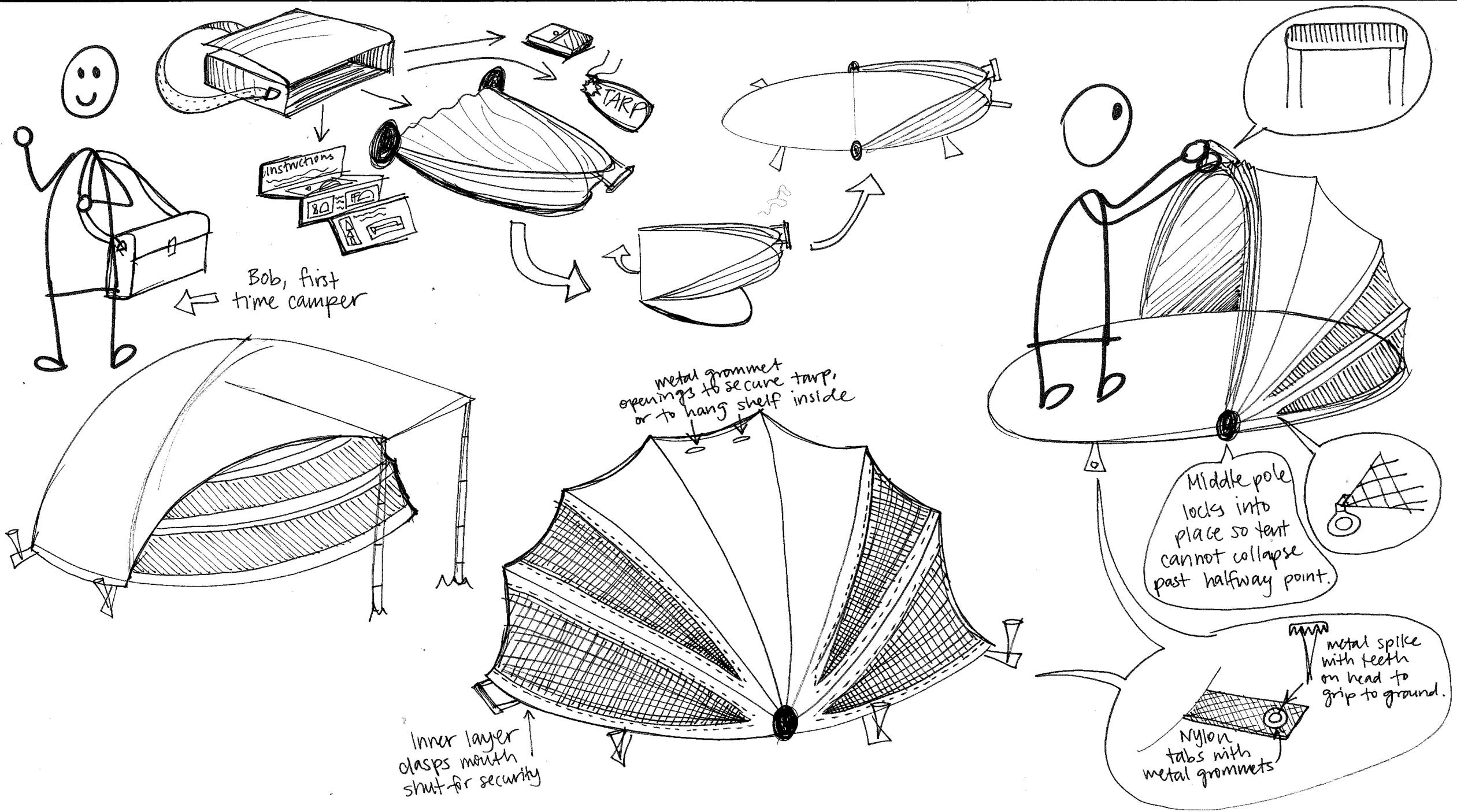


Gold wire
wrapped
around lace

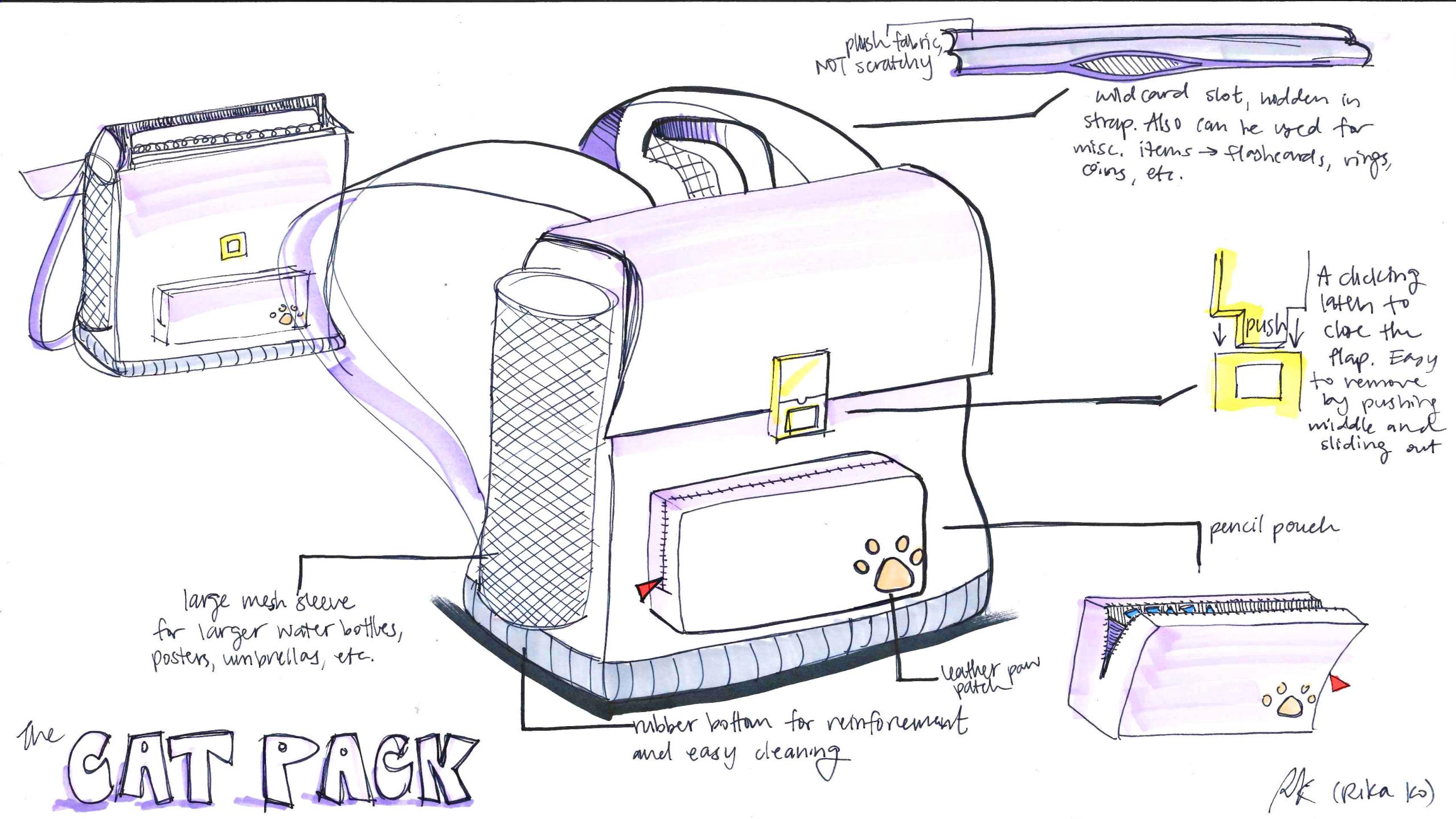


DSGN 320 and 220 were courses that strengthened my drawing, storyboarding, and aesthetic skills.









FEEL FREE TO REACH OUT WITH ANY QUESTIONS!

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