Engineering Portfolio

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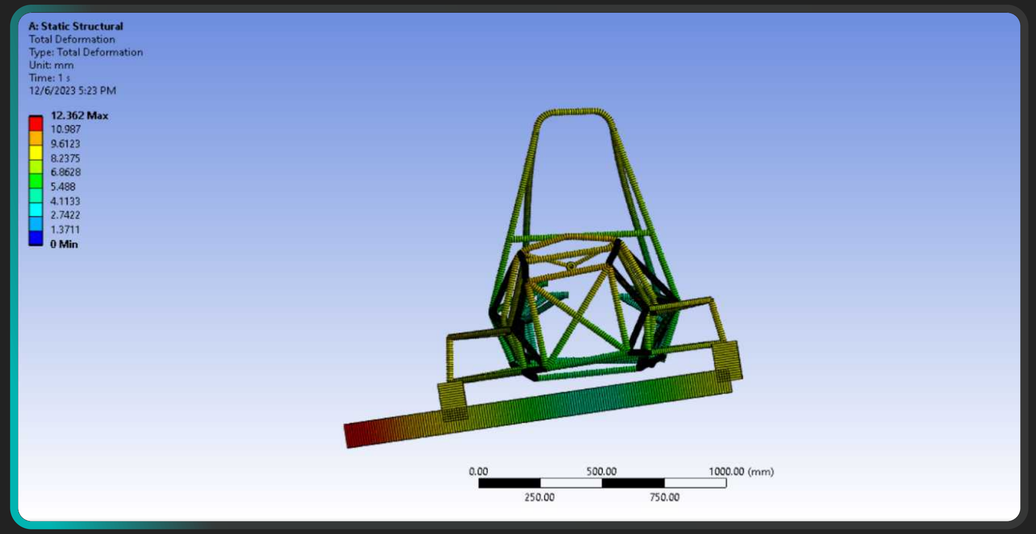
Anteater Formula Racing

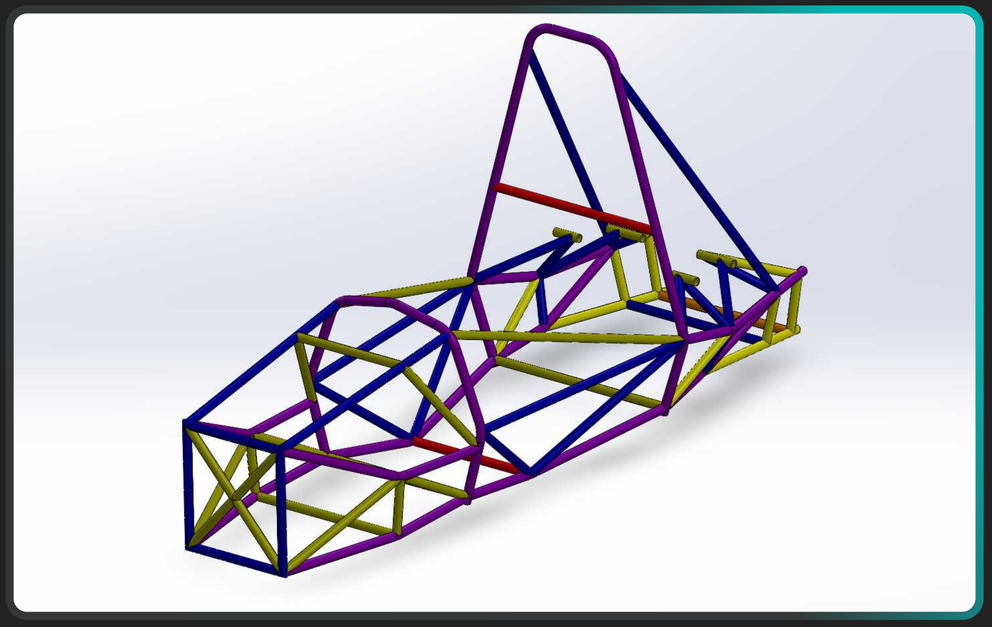
2023-Present

As the Chassis Design Engineer for UCI's Formula SAE team, I used SolidWorks to develop a lightweight and rigid chassis, performed torsional stiffness simulations in Ansys to ensure durability, and participated in the hands-on assembly process, including welding the frame. This experience strengthened my skills in CAD modeling, structural analysis, and hands-on fabrication.

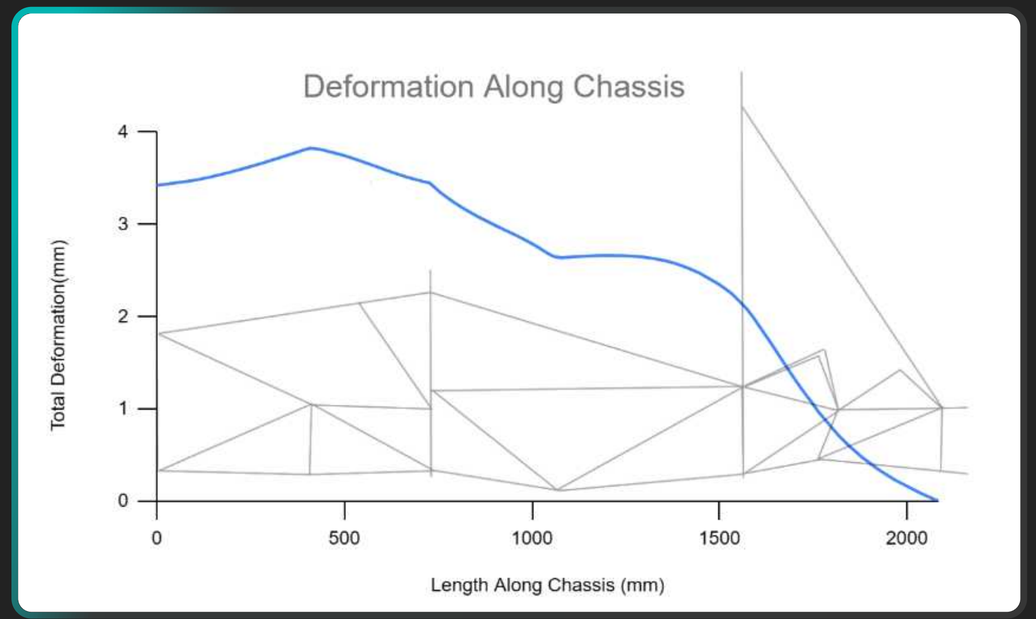
Project Documentation



Torsional sim results



Isometric view of chassis frame



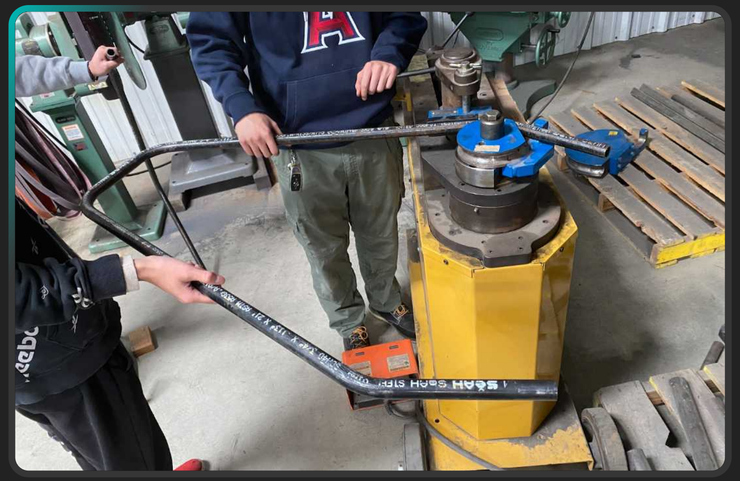
Graph of deformation along chassis

Assembling the chassis fixture

Finished chassis and suspension

Me with the car

Chassis welding



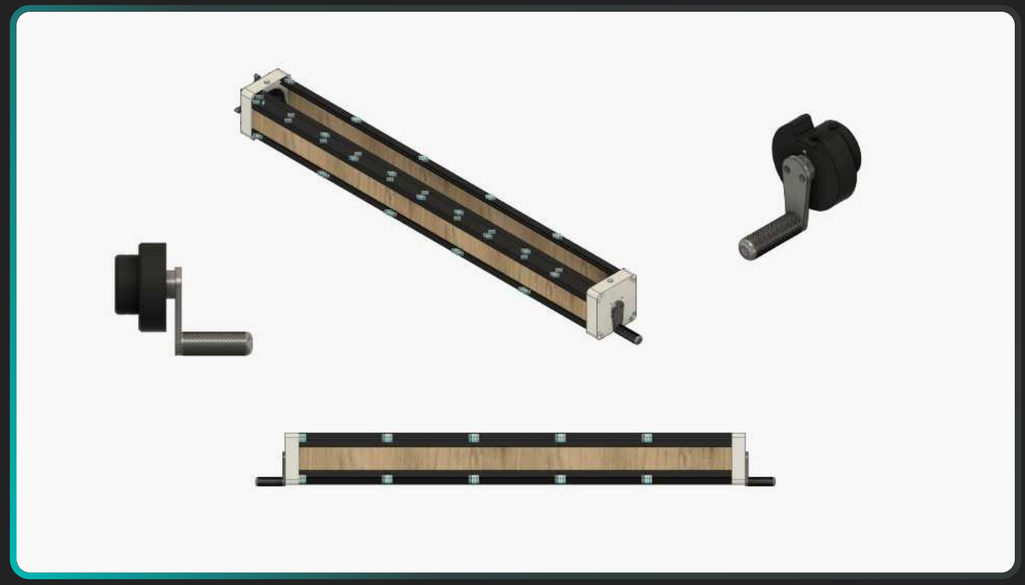
Bending the main-hoop

PLTW Engineering and Development Course Project

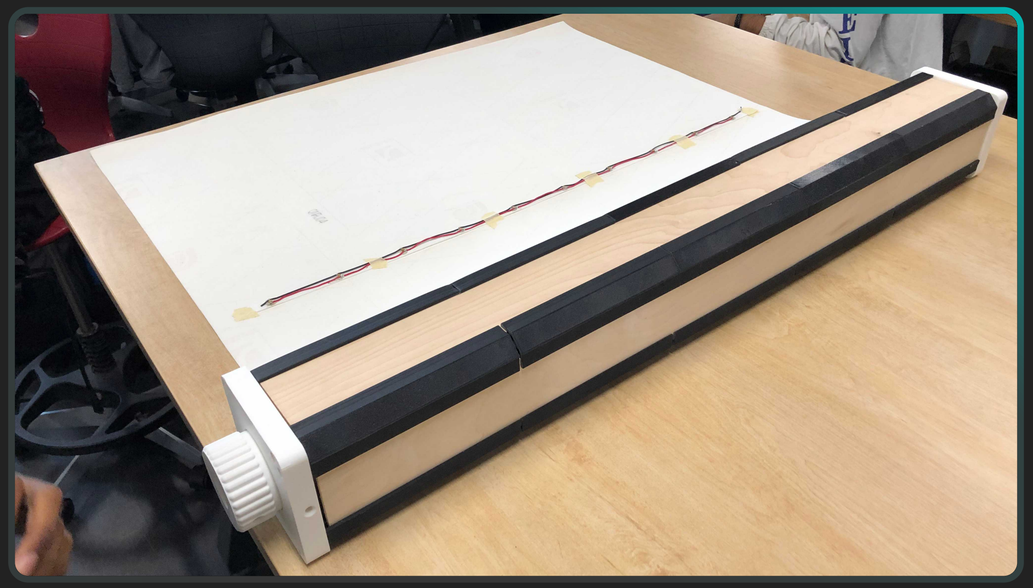
2022-2023

PLTW Engineering and Development is a year-long course in which students work in a group through the entire engineering project life-cycle, from initial concept to prototyping and testing.. As the lead CAD engineer, I designed and prototyped a device with a retractable sheet embedded with UVC LEDs which is used to eliminate dust mites.

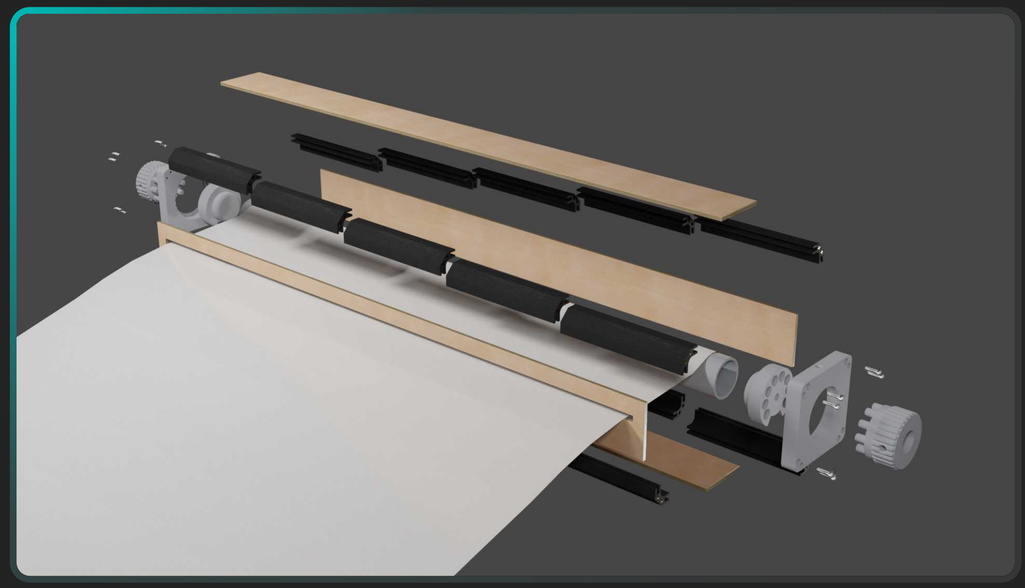
Project Documentation



CAD model



Physical prototype



Exploded view render

Engineering Design Development

Daniel Deng
Zeeshaan Adamjee
Sidharth Mallela
Oscar Shi

TIMELINE

- BUILDING A BUSINESS PLAN — October 2022
- PRIOR SOLUTIONS — October 2022
- DESIGN SPECIFICATIONS — October 2022
- DESIGN CONCEPTS — November 2022
- STEM PRINCIPLES — November 2022
- DESIGN VIABILITY — November 2022
- PROTOTYPING — January 2023
- TESTING PROCEDURE — January 2023
- TESTING — March 2023
- EXTERNAL EVALUATION — April 2023

PROBLEM STATEMENT

Sleep deficiency can cause decreased focus and adverse health effects. Furthermore, poor sleep quality can be attributed to dust mites in bedrooms. Dust mites are common in many households and induce various symptoms that can affect the quality and quantity of sleep. Based on an August 2022 article by the American Lung Association, dust mites are the leading trigger of bedroom allergies and affect up to 400 million people worldwide, 45% of which are people with asthma.

JUSTIFICATION

According to research, people do not get immune to bites; rather, the more bites they receive, the worse the reaction is. Our product aims to solve this problem by providing effective disinfection with minimal effort by the user.

BUILDING PROCEDURES

1. Connect corner pieces
2. Slot in plywood panels into the corner pieces
3. Attach side piece onto the four corners
4. Insert center core with UV sheet attached
5. Pull out sheet from the pre-cut slit
6. Attach the second side piece

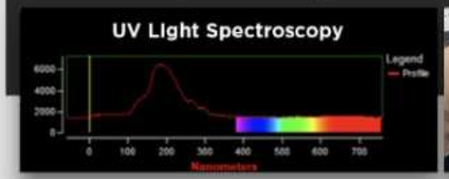
SIMILAR SOLUTIONS

UV Mattress Vacuum
Handheld Vacuum Cleaner high-Frequency Double-tap for mattresses

Patent US11020498B2
A method of destroying pathogens using a hand held device including a grip and a lamp, transmitting far-UVC light through the lamp.

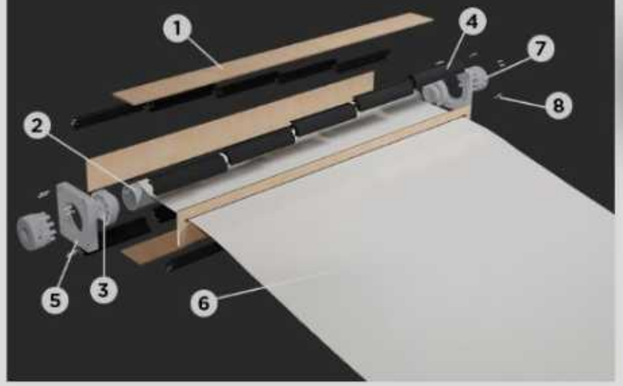
TESTING METHODS

One strip of UV lights connected to a breadboard with 4 AA batteries was used to measure the voltage drop every five minutes. The data points were plotted on a graph and indicated that the device should last more than 60 minutes of usage.



EXPLODED VIEW

1. Plywood
2. PVC Pipe
3. Endcap
4. Corner Pieces
5. Side Pieces
6. UV Sheet
7. Handle
8. M4 Counterbore Screw



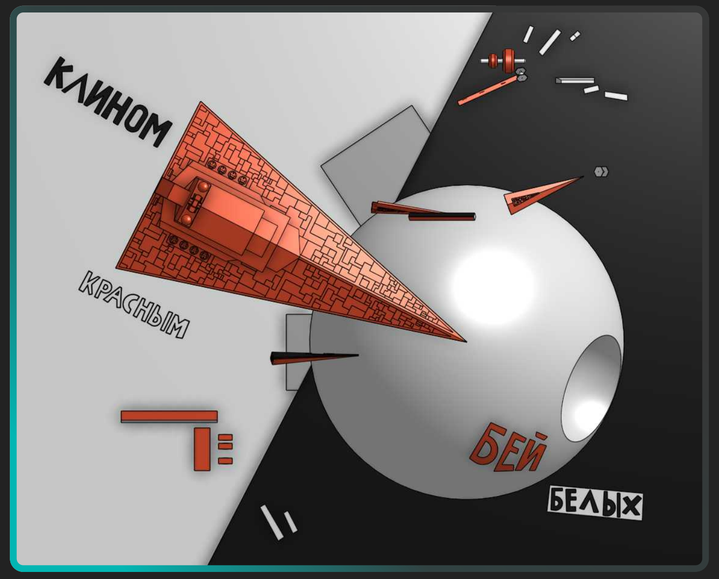
EXPERTS

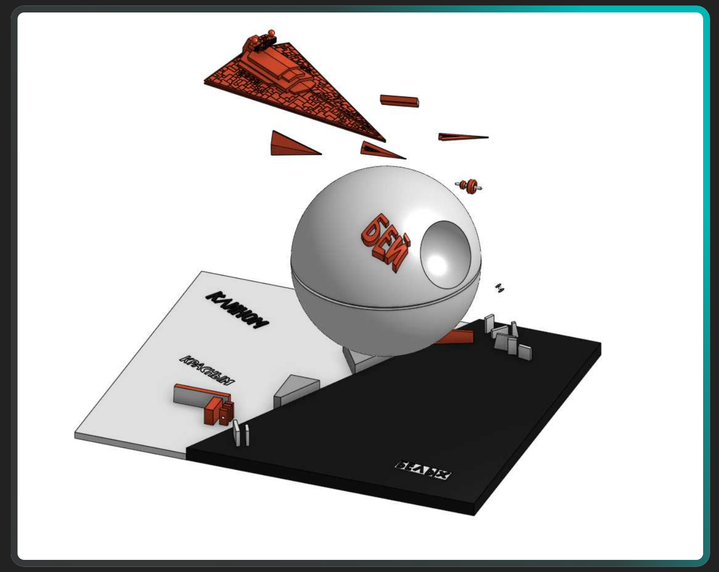
One of our experts is professor Buckley, a molecular biology teacher at Cal Poly Pomona. Professor Buckley provided insightful comments on how we could test for bedbugs as well as offered us to test at her lab at Cal Poly Pomona, however due to time constraints we decided to test by ourselves.

Intro to Engineering Design (IED) CAD Projects

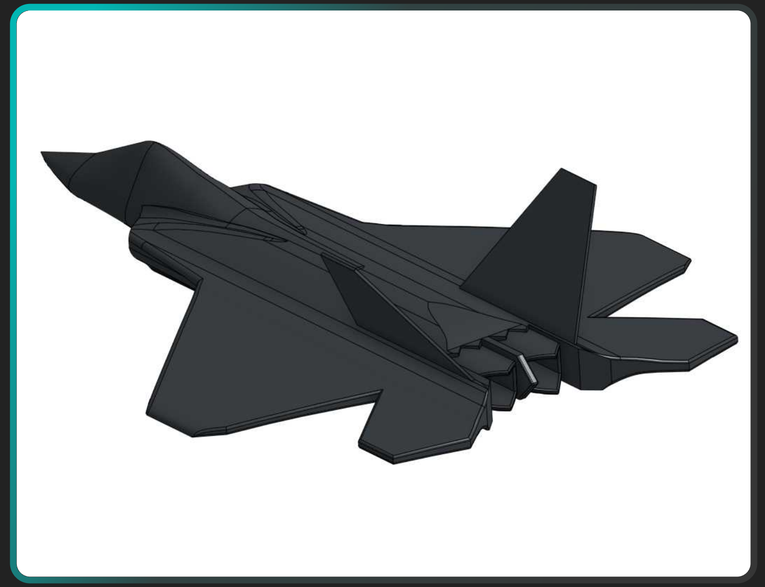
2021-2022

Various CAD projects from my IED class. All models were made with the OnShape CAD software.





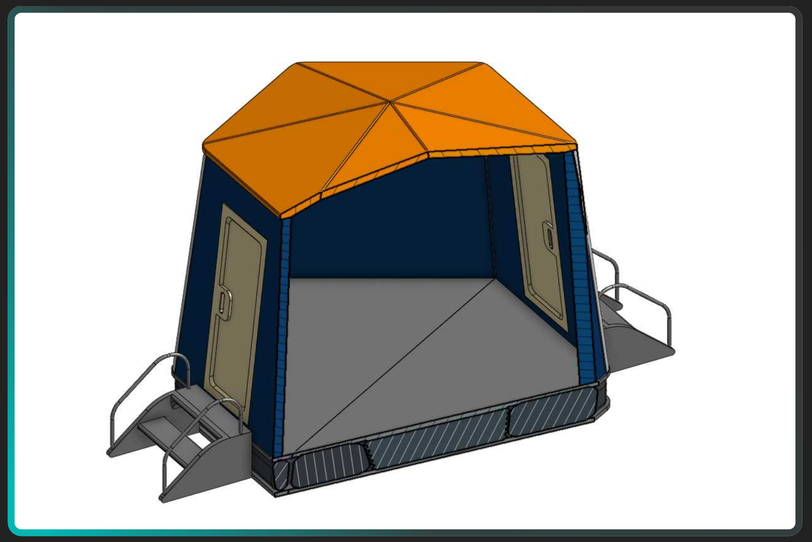
Russian Constructivism project based on the painting
Beat the Whites with the Red Wedge by El Lissitzky



F22 Raptor

Mechanical hard drive

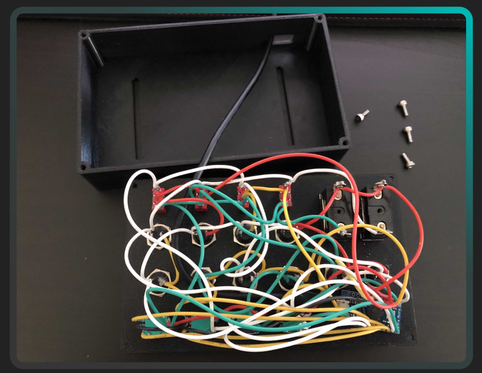
Winter holiday project

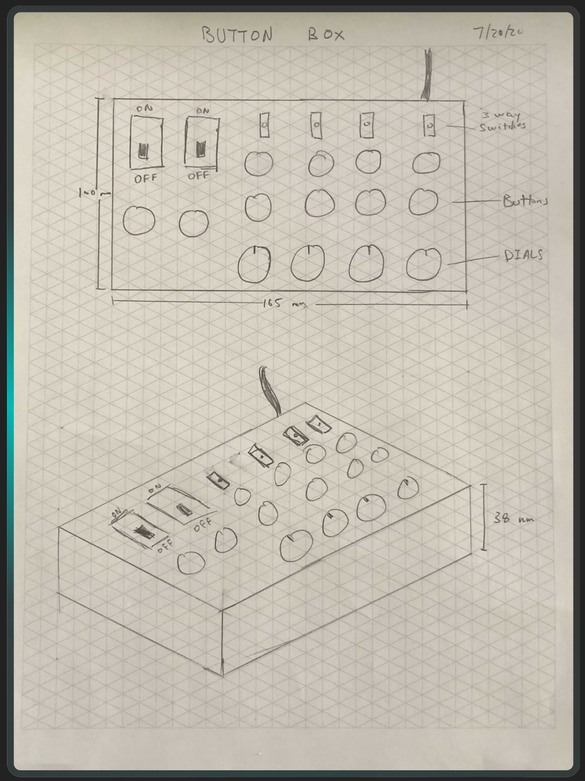


Refugee shelter concept

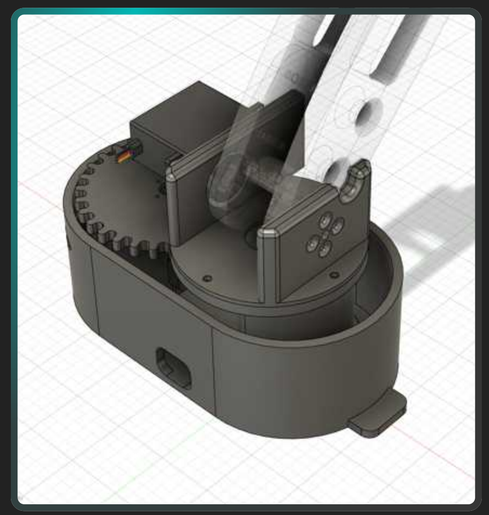
Personal Projects

2020-2021





Button and switch box controlled by an Arduino Micro used for racing and flight sims. The case was designed in Fusion 360 and wiring was soldered together by hand.



Robotic arm designed from scratch in Fusion 360 and manufactured using 3D printing. Uses 3 servos for motion and can move in 3 degrees of freedom.