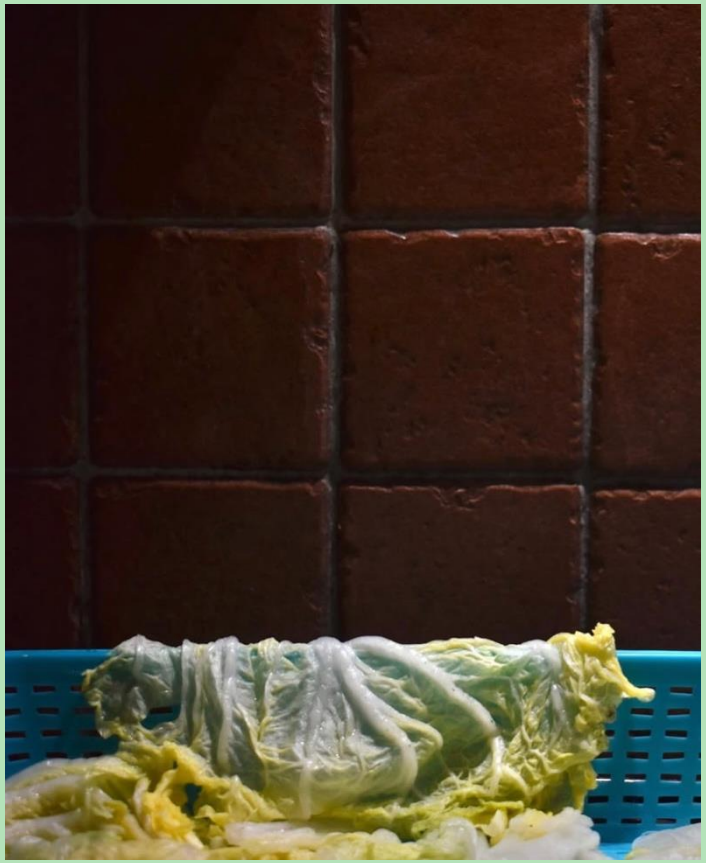

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Table of Contents

Turf Wars Claw Robot

Class Project (Jan 2025 – May 2025)

Competition field

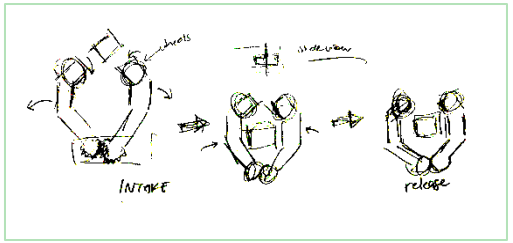
CONTEXT

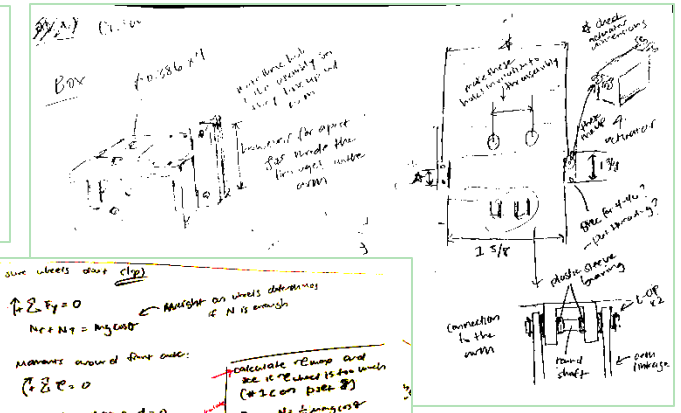
Robot challenges for competition:

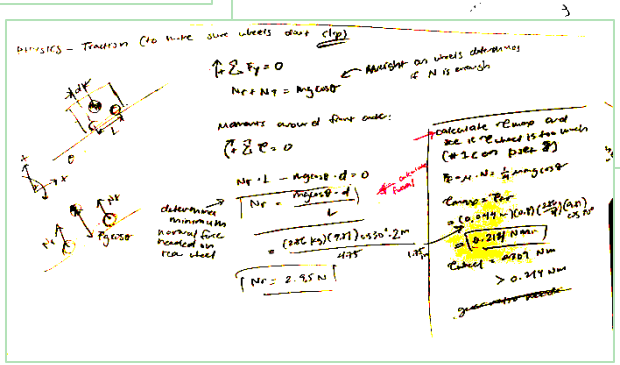
- Pick up blocks, hockey pucks, and dog toys and place in tic-tac-toe board
- Traverse synthetic grass and 15 and 30 degree inclines

CONTRIBUTIONS

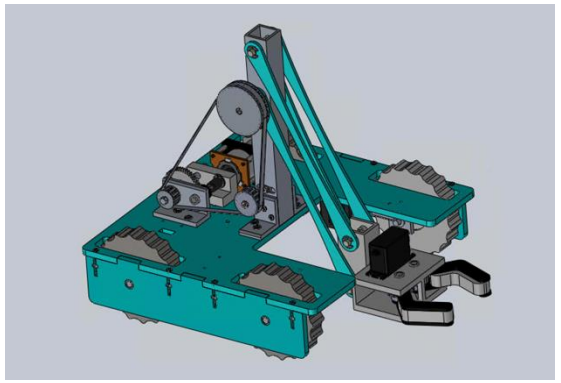
- Managed project tasks and reviewed all designs
- Designed drivetrain and assembled final robot CAD
- Calculated torque, motor, COM constraints
- Manufactured and assembled gearbox, arm, and claw components

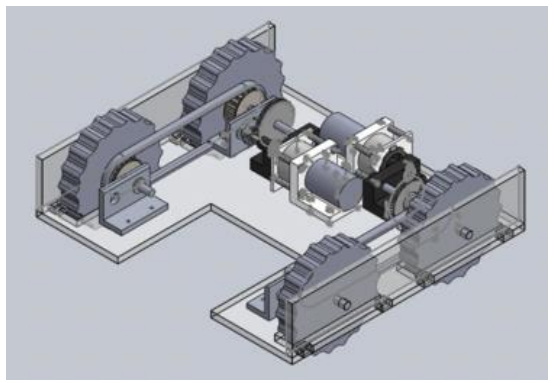


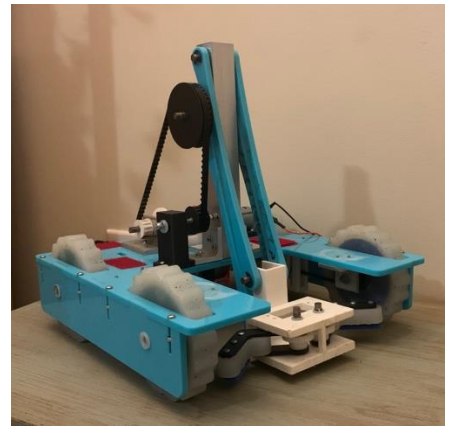




Initial designs and prototypes







SKILLS

- Mechanical Design
- Solidworks
- CNC Milling
- Manual Lathing
- Bandsaw, Drill Press

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Research

Bertoldi Group - *Undergraduate Researcher* (Jan 2025 – present)

Harvard 2025 PRISE Fellow

CONTEXT

Research Question: Can kirigami-patterned textiles enhance convective cooling relative to a bare surface?

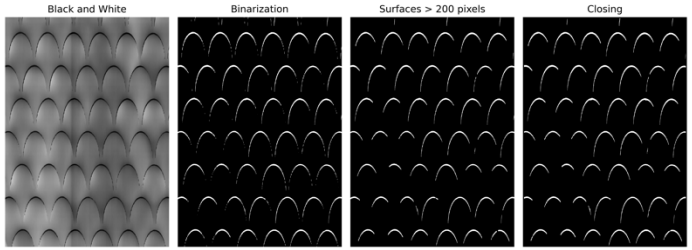
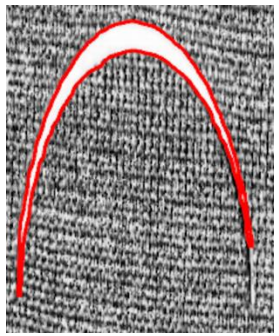
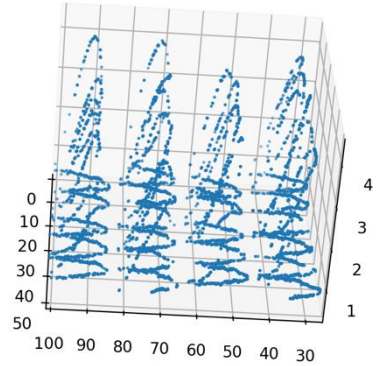


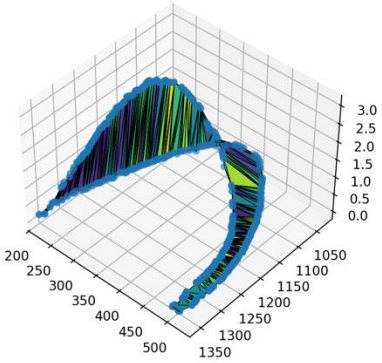
Image processing



Detecting contours



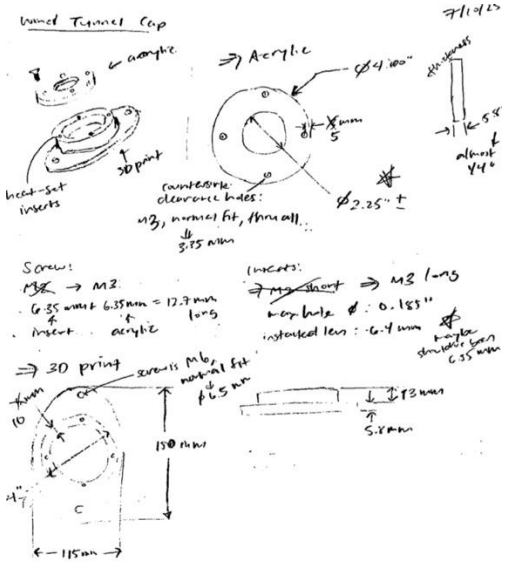
Adding height data

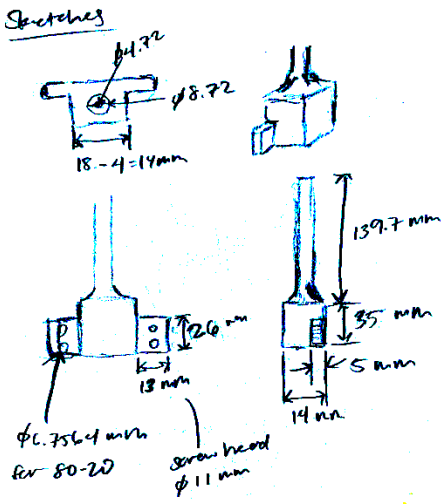


3D area

CONTRIBUTIONS

- Develop post-processing script to track contours as textile is stretched and calculate 2D area, 3D area, and volume
- Designed parts for experimental setup
- Conducted Instron experiments to collected luminance and height data using laser profilometer





SKILLS

- Python
  - OpenCV, SciPy
- Mechanical Design
- Solidworks
- Instron

**Details and pictures of the textile are excluded due to ongoing research*

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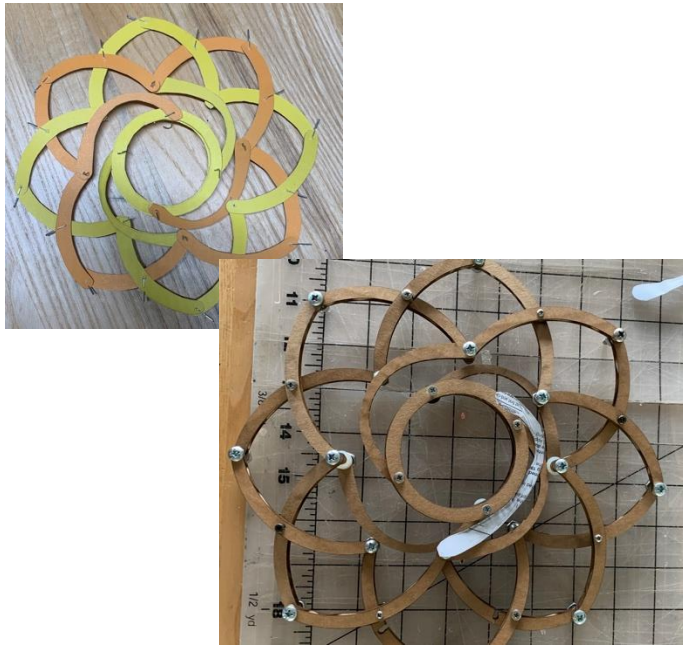
Solar-Powered Mechanical Flowers

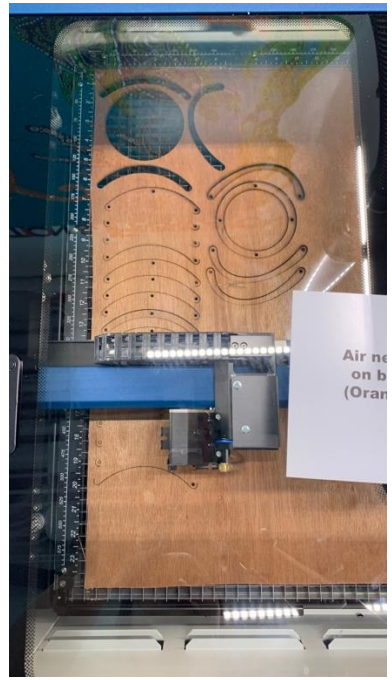
Conflux Collective - *Mechanical Team Member* (Jan 2025 – present)

CONTEXT

- Public art installation about agrivoltaics
- Mechanical flowers powered by above solar panels

Initial setup (from the previous year)





*Prototypes (paper and cardboard) to final product**

CONTRIBUTIONS

- Designed Hoberman-inspired flower
- CAD flower parts with Fusion360
- Laser cut and assembled flower

SKILLS

- Mechanical Design
- Fusion 360
- Laser Cutting

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Water Distribution in Dominican Republic

Engineers Without Borders – *Revit Team Member, 2025 Travel Team Member*
(Jan 2025 – present)

CONTEXT

- 9 year long project in Dominican Republic to build water distribution system
- Gravity-fed water system with borehole well and two tanks

CONTRIBUTIONS

- Revise Revit models
- Communicated with community about experience with water system
- Conducted water quality and water flow tests
- Compiled detailed notes of each travel day

Measuring water level

Upper tank

Upper tank valve box

SKILLS

- Humanitarian Design
- International Development
- Revit
- Water Engineering

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From Amazon to Atelier: Violin Workshopping

Class Project (Jan 2025 – May 2025)

CONTEXT

Improve the sound of a cheap, unfinished violin

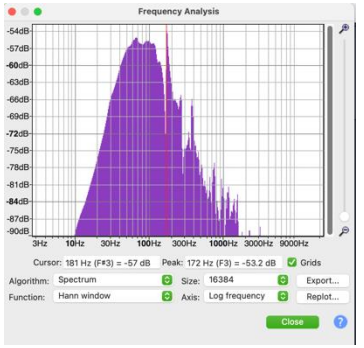
Beginning product

CONTRIBUTIONS

- Tested modes 2 and 5 using Audacity frequency analysis and tea
- Carved top plate to adjust modes
- Shaved bridge
- Adjusted soundpost to fit perfectly
- Assembled violin

Mode 2

Mode 5



End product

SKILLS

- Woodworking
  - Planes
  - Handsaw

Voted best sounding violin in class of 6 (through anonymous recordings)

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Repairs: Bikes, Instant Pot

BIKE INNER TUBE LEAK

Problem: Holes in bike inner tube




Solution:

- Located hole in bucket of water and soap
- Sealed hole with bike repair patch

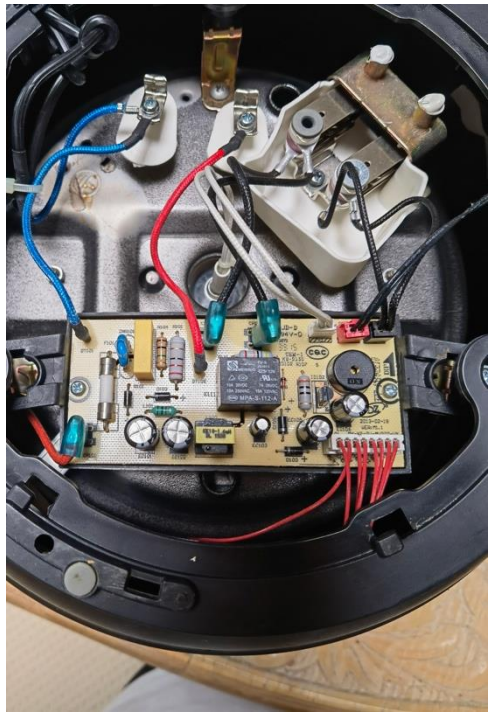
* Did not work: continued to leak after a few rides

Solution:

- Used multimeter to test resistance and discovered higher value on low pressure sensor
- Removed tiny piece of lint from sensor contacts

INSTANT POT PRESSURE SENSOR

Problem: “C6” error: pressure sensor malfunction



SKILLS

- Problem & Solution
- Multimeter

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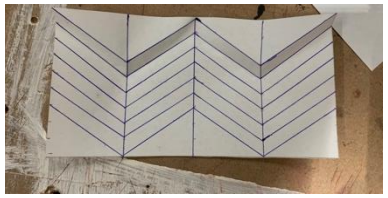


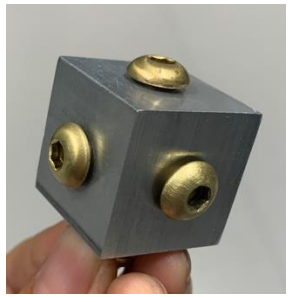
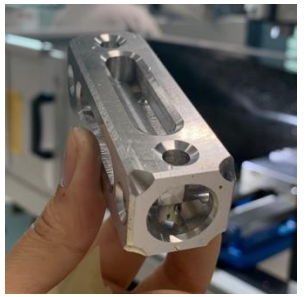

Art, Photography, Machining, Origami






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