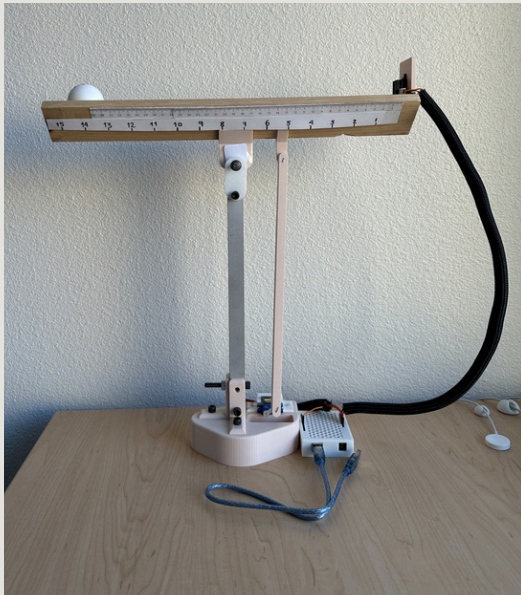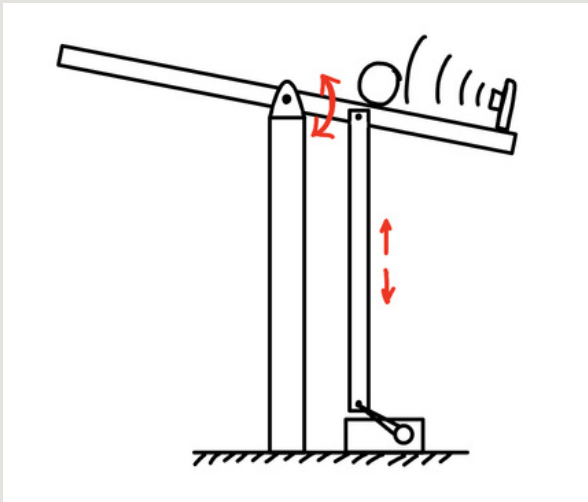# Portfolio

SEBASTIAN
MONSALVO

2022-2025

2ND YEAR GRADUATE STUDENT AT
STANFORD AERO/ASTRO

Ping Pong Balancer

Mar. 2025 - Apr. 2025 | Personal Project

Objective: Design and build a 1-D.O.F. mechanism that displaces a ping pong ball to a desired position.
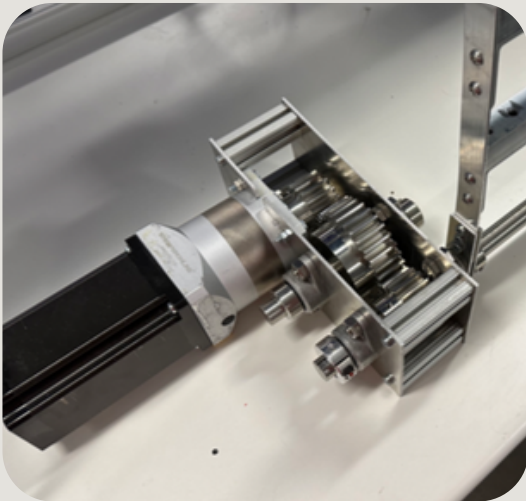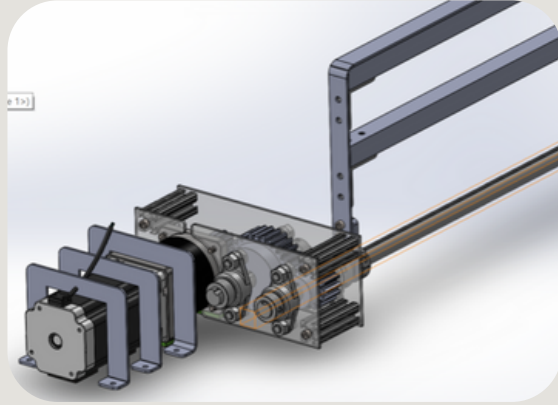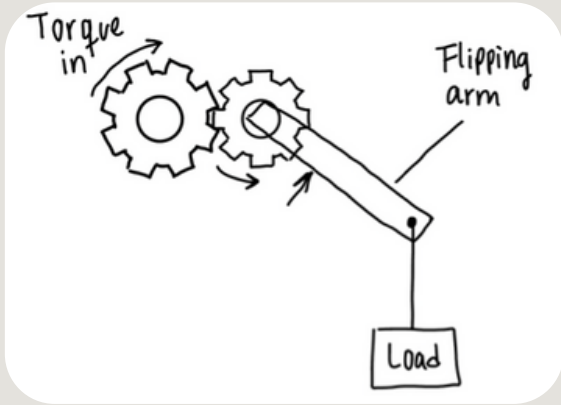
Technical Details: The system uses a servo motor, Arduino Uno, and IR sensor to measure and actuate. A PID controller was programmed onto the Arduino. Low-Pass filter used.

Results: Ping pong ball correctly displaces to the desired location along the canal.

video here

Actuated Oyster Basket Flipping Mechanism

Jun. 2022 - Feb. 2023 | Research MIT Sea Grant

Objective: Design and build a mechanism able to lift 40 lbs. out of the water.

Technical Details: The mechanism consists of a Nema 34 Stepper motor, 3 gears, and a long steel shaft with an aluminum arm.

Results: Testing the mechanism revealed it could lift up to 50 lbs!

Electronics for Autonomous Surface Vehicle (ASV)

May 2022 - Apr. 2023 | Arcturus Robotics Team
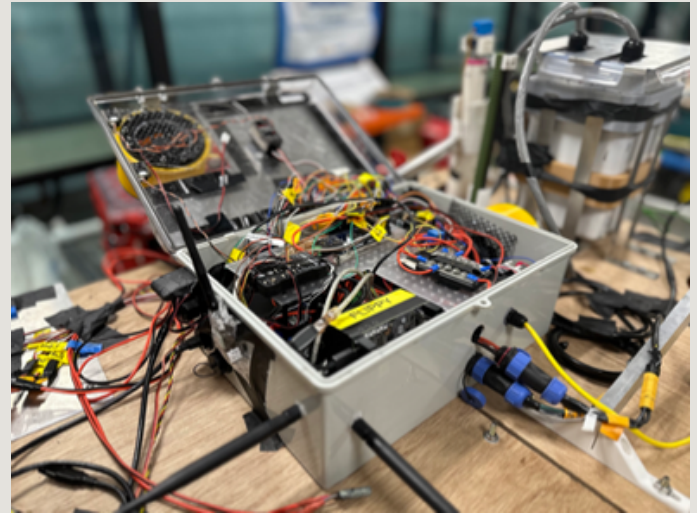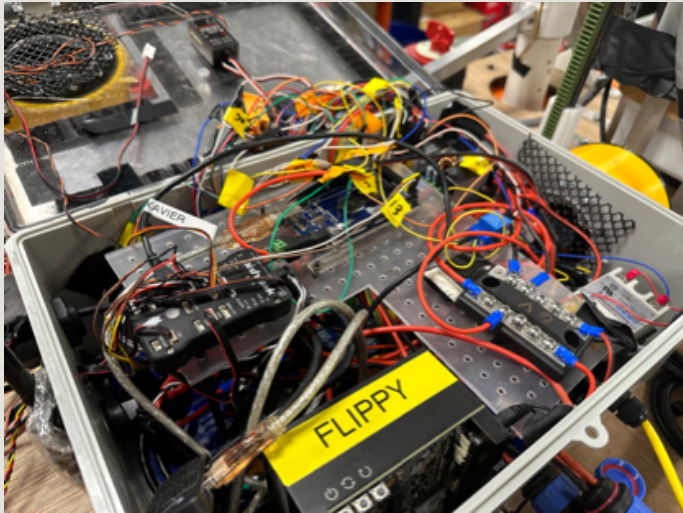
Objective: Make electronics system to control the navigation of an ASV through remote control (RC).

Technical Details: Used a *PixHawk 4* autopilot to read PWM from RC receiver and input into thrusters. Navigation software is MissionPlanner. Also had to step down voltage and power sensors + mechanisms.

Results: ASV was able to be fully controlled through RC on the lake up to ~30m away. Electromechanical systems and sensors were powered as needed.

Manufactured 100 yo-yo's

Sep 2023 - Dec. 2023 | 2..008 Manufacturing Class

Objective: In a team of 6, mass produce 100 yo-yo's in 3 months

Technical Details: Used Fusion360 CAD and CAM to design injection molding molds for 2 of the 3 parts of yo-yo. CNC milled molds and injection molded ourselves. The last part was thermoformed, so we also had to design and make the mold for thermoforming.

Results: We made upwards of 180 yo-yo's. Our process was so accurate that the standard deviation of the yo-yo radiuses was of 0.025 mm.

Line-Following Robot
Feb. 2022 - May. 2022 | 2.S007 Class
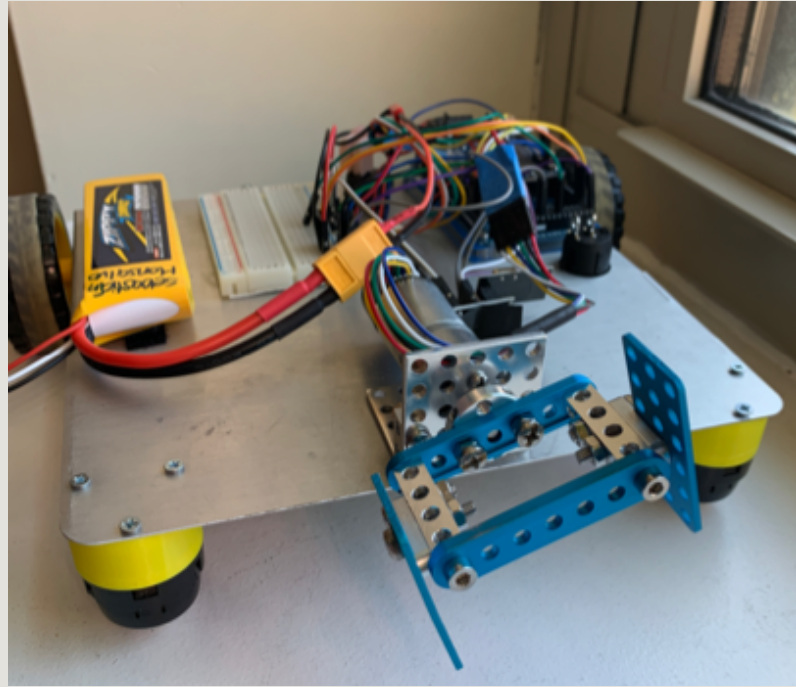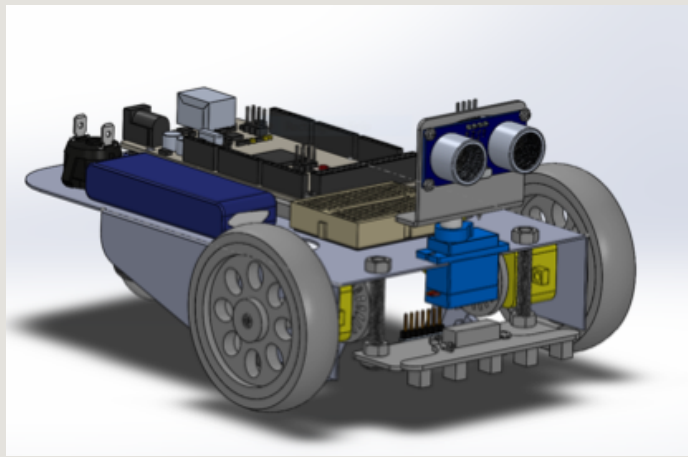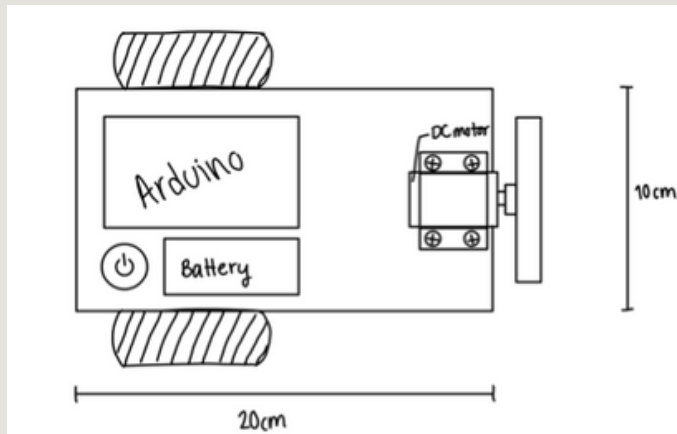
Objective: Build a robot able to follow a black line drawn on the floor.

Technical Details: The main body was a chassis made from sheet metal. Parts such as wheels, sensors, and batteries were bought/provided. Robot is powered and controlled by Arduino Mega and AdaFruit motor driver.

Results: Robot was able to succesfully follow a black line on white and colored background.