

Anthony Marinov's Portfolio

Physical Design Projects

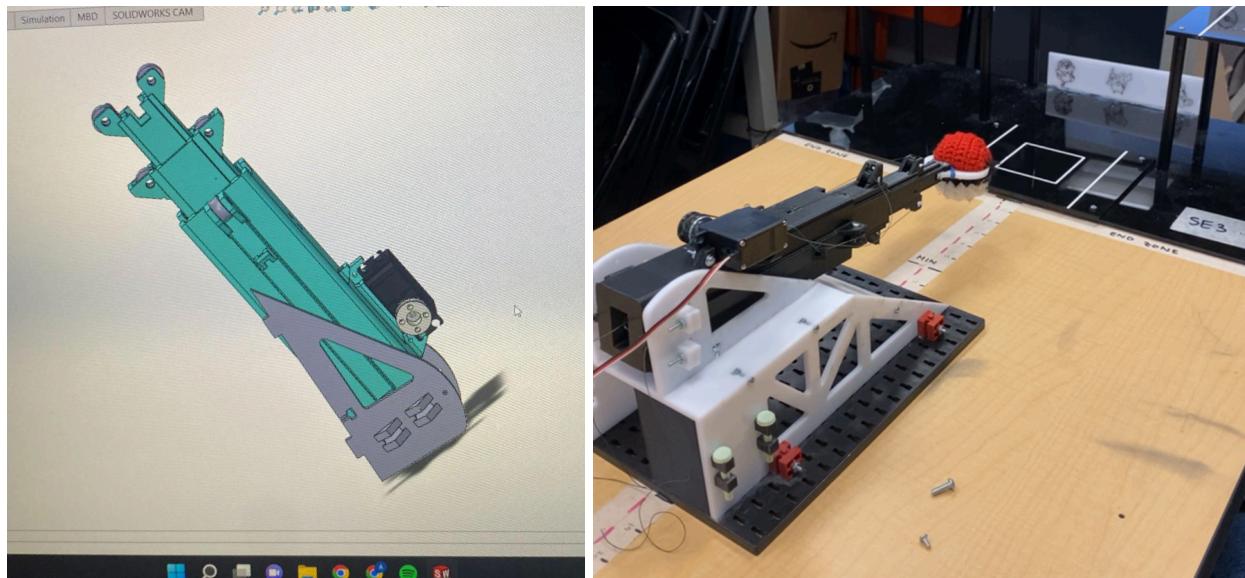
Extending Arm - Design Build Competition

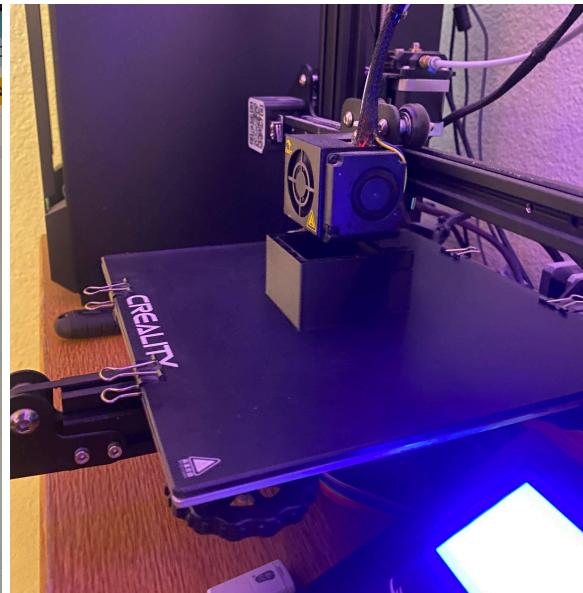
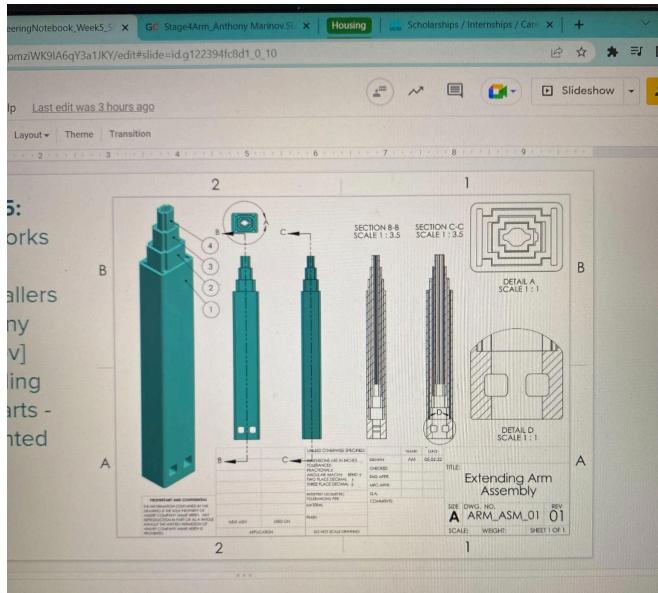
*****WORK IN PROGRESS:** This document is being developed to provide an easily navigable catalog of my physical projects. It is currently in the process of being built, and is continually developed as time permits. My coding projects can be found at my [GitHub](#) :)

Physical Design Projects

Extending Arm - Design Build Competition

Design-build competition completed as a term project for SE3 at UC San Diego. Placed 1st out of 46 teams, with a 73% higher score than the 2nd place team.







Purpose

The goal of this project was to create a structure/mechanism that could take a ball and place it on scoring platforms at least 6 inches away. The mechanism had to be entirely independent of any human interaction and actuated by a servomotor. The project was required to be fully designed in Solidworks, with a complete set of drawings produced in AutoCAD.

Given

Available materials/resources included:

- 3D printing
- Laser-cut polycarbonate sheets
- Servomotor
- Rubber bands
- Prefabricated plastic beams and connectors
- Steel ball bearings
- Aluminum tube
- Braided thread
- Screws and nuts

Solution

We developed a cascading extending arm mechanism powered by the servomotor. The design consisted of four individual 3D-printed arms connected by pulleys with braided thread, laser-cut claws, structural

support, and a ball release mechanism that deployed upon full extension of the arm. Key aspects of the design process included:

- Preliminary servomotor calculations to ensure sufficient torque and rotation range
- Complex Solidworks modeling
- Over 50 hours of 3D printing and 3 hours of laser cutting time
- No rubber bands were used in this design, avoiding a significant score deduction based on the scoring criteria.

Achievements

- 1st Place out of 46 teams, with a 73% higher score than the 2nd place team.
- The only team with a unique design that avoided using a catapult mechanism and rubber bands.