CASEY FRANTZ

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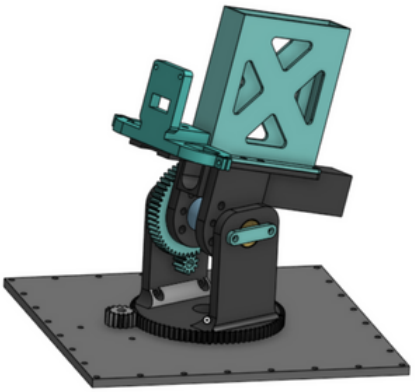
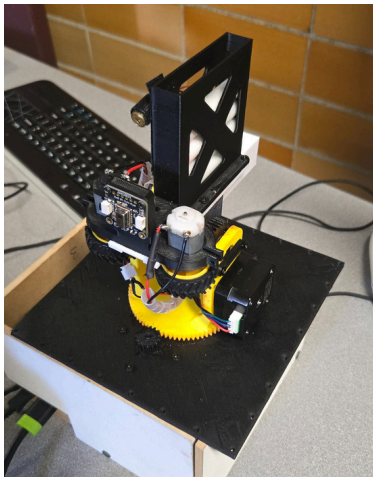
2 DOF NERF TURRET- GROUP HACKATHON PROJECT

What?

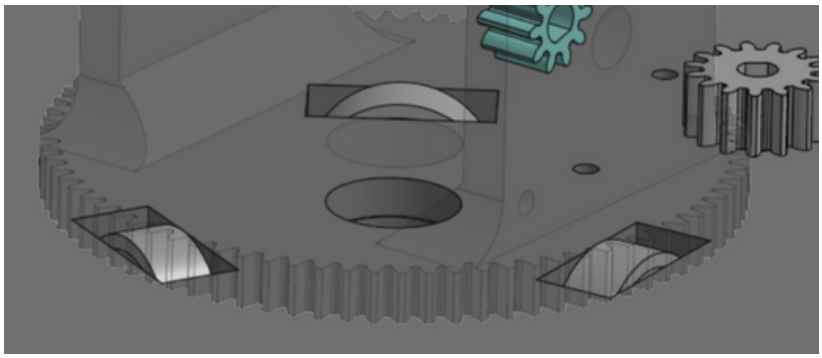
A 2 degree-of-freedom nerf turret with custom thrust bearing (bottom image) controlled with user input. This turret had the capability to shoot nerf bullets with a complete 360 degree xy range of motion with a gravity fed magazine design. This was controlled by multiple motors, servos, an Arduino and Raspberry pi.





How?

This project was fully designed in CAD, printed, and built within 24 hours. I made multiple iterations of indexer designs for the servos and base structure to improve rigidity and tolerances.



Result

My team won 2nd place out of 40 teams with high scores in complexity and completeness. We made multiple design considerations for the next iteration of this project such as improved motor and mounting for the shooting mechanism

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FIRST ROBOTICS COMPETITION - MENTORSHIP EXPERIENCE

What?

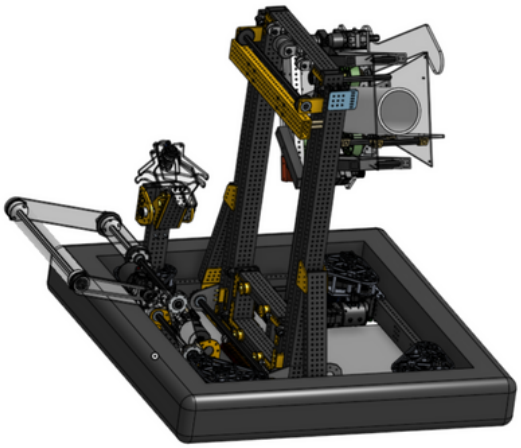
This is is 100lb robot built for the FRC 2025 season. It features a 2 stage cascading elevator, intake mechanism for both game pieces, and a climber for an additional game objective.

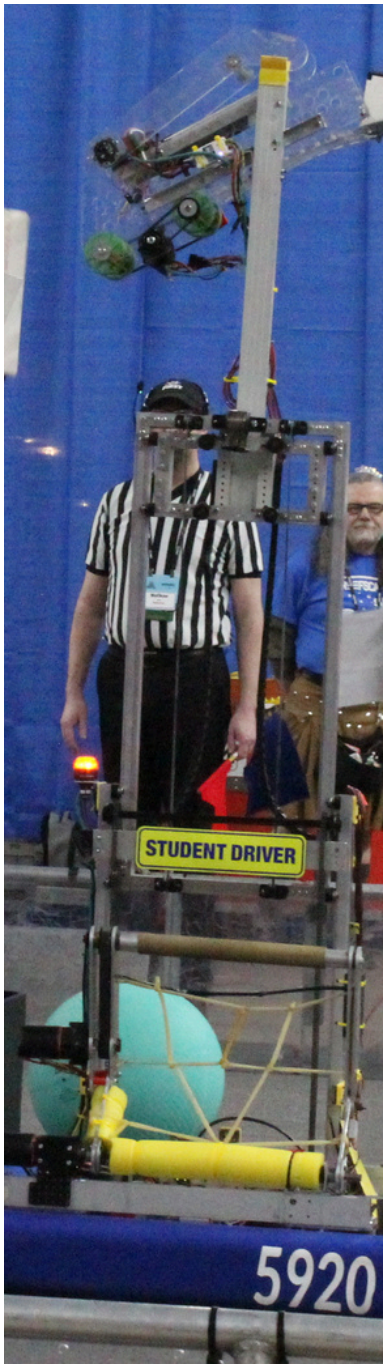
How?

My purpose for this team was to oversee and mentor the design and CAD of the intake and climb mechanisms. I helped high school students learn CAD fundamentals and we significantly improved the quality and performance of the the slap-down intake mechanism (Showcased on the bottom left image)

Result

The teams robot faced issues at the beginning of the competition season but we swiftly pivoted and became one of the most reliable game piece scorers of the PNW. The team placed top 5 in number of game pieces scored at one of the competitive regional competitions. This robot was outstandingly reliable, high scoring, and robust.





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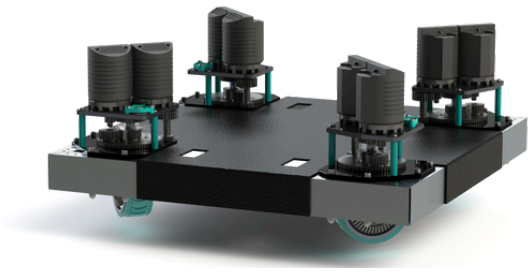
REVERSE ENGINEERED SWERVE DRIVE - PERSONAL PROJECT

What?

Fully functional, manufacturable CAD model of a drive system that allows for omni directional movement. Model was inspired and modified from West Coast Product's Swerve X model.

How?

Model is fully designed in SolidWorks and includes an animation for function and exploded view. Numerous advanced features were used including wraps, sheet metal, weldments and surfaces.



BEETLEWEIGHT BATTLEBOT - CLUB GROUP PROJECT (CRIMSON ROBOTICS)

What?

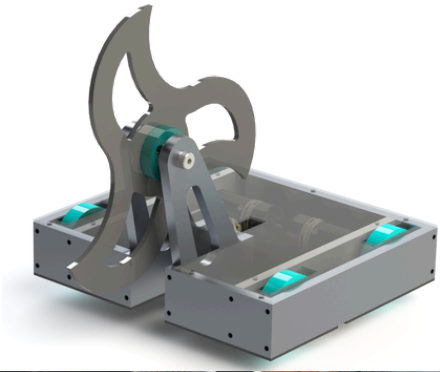
3 lb battlebot which was designed, built, and programmed all within limited time over 2 months. I have developed most parts of the CAD model which includes drive and weapon functionality.

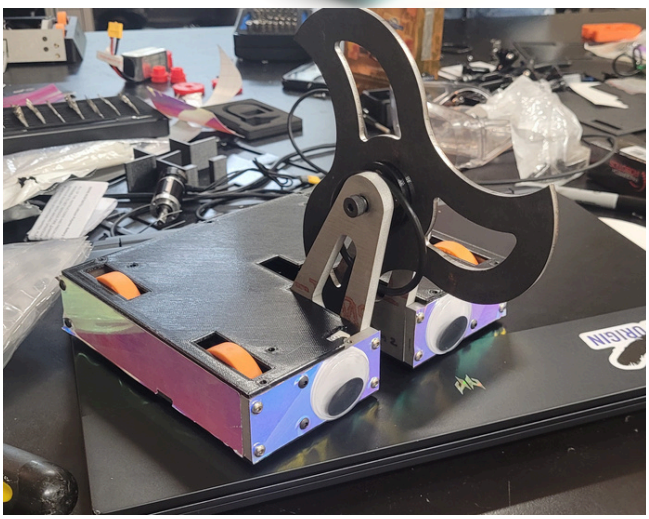
How?

Robot concept was first drafted using Onshape which then was converted over to Solidworks. We looked over 3 itterations of drive base and a weapon design before arriving upon our final design choice.

Result.

Robot was entirely functional but had issues particularly with interference of motors and electronics along with fragility of motor mount design. This experience was a great learning opportunity.





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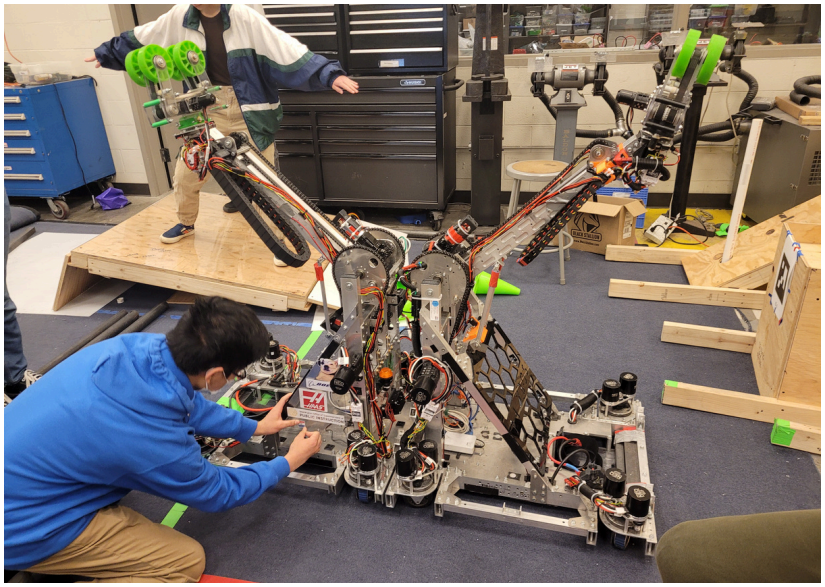
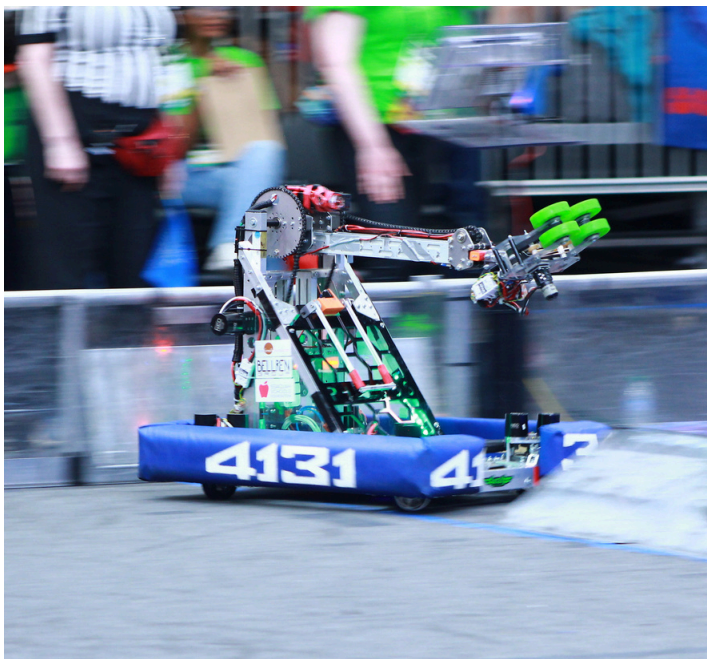
FIRST ROBOTICS COMPETITION - CLUB GROUP PROJECT (TEAM 4131)



What?

Two fully functional competition robots for FRC's 2023 game. Both have a swerve drive base with a telescoping arm and two action intake which can pick up both cubes and cones securely to complete the game's objective



How?

Designed by our groups design subteams, it was sent off to me to lead the manufacturing of all aluminum, polycarbonate, and 3D printed parts. All parts were either manually milled, turned, or CNC routed with our machines.

Result.

Our robots performed outstandingly, leading us to the world championships, winning us engineering awards, and becoming top 40 of 3000 teams in the world in regard to placement. This was possible from fantastic integration of design, hardware, electronics, and software. Particularly, my impact was driving the robot and ensuring that the robot was entirely robust and reliable throughout multiple high-contact competitions.