Amelie Nguyen

Design Portfolio

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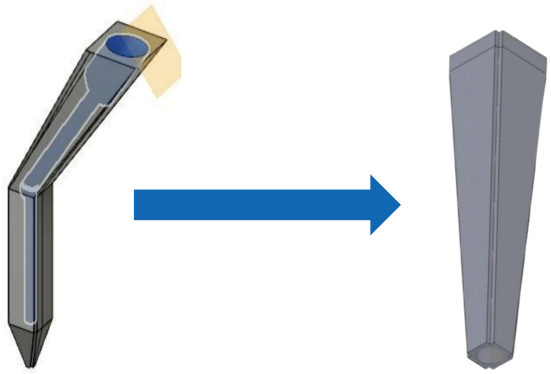
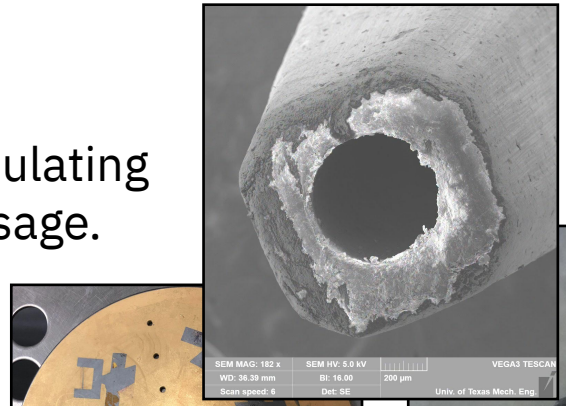
Feedback Controlled Manipulation System for Precision Positioning of Nanorod Pens

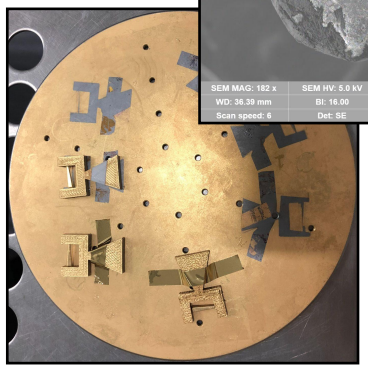
Goal: we iterated on a previous nanorod design for manipulating nanoparticles to improve visibility of the particle during usage.

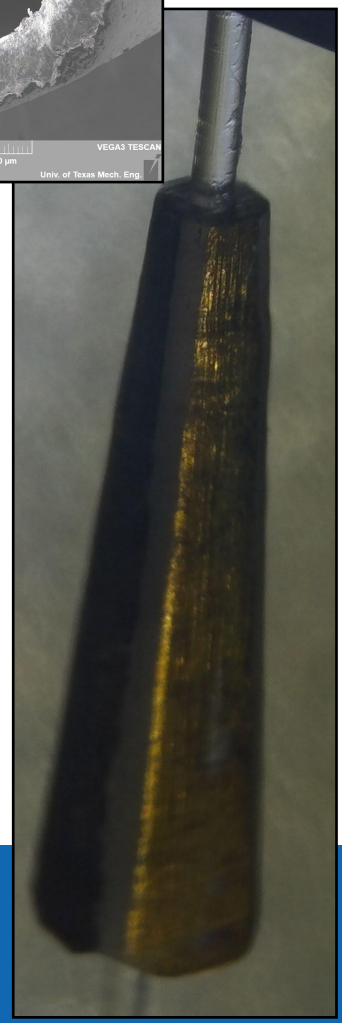


Before After

We touched several fabrication methods including small scale SLA printing and vapor deposition.







We brainstormed a nanorod design with a bore hole to allow ambient light through.

We later threaded a fiber optic cable through the hole to control the light passing through the nanorod.

Link to Presentation
Link to Technical Paper

FSAE Onboard Data Collection Methods

I dove into FSAE and vehicle dynamics with a project to determine which sensors to use on the car. I determined which datapoints we needed and researched which sensors were necessary to collect raw data and calculate the datapoints.

Data	Sensor(s)	Purpose	Notes
Lateral & longitudinal acceleration	Accelerometer/Gyroscope (A/G)		• Very Cool Link - Summit • Cheaper Option - Random (Seems best to me?)

Body roll angle	A/G		• FSAE FORUM
			  • "LPF" to get rid of noise?
			  • Another Link from Forum
			  • Gyroscope (Bad Review on FSAE Forum)

Yaw rate	A/G		^(From 3-Axis Angular Rate Sensors)^
Suspension travel	Linear potentiometer (already have)	Rate of damping	Already have, but here's a link for a similar sensor
Steering wheel position	Angular potentiometer	-	Already requested by body/dynamics
Wheel speed sensors	Hall effect sensors (already have)	Determine slip ratio	Electric Team's Sensor (maybe)

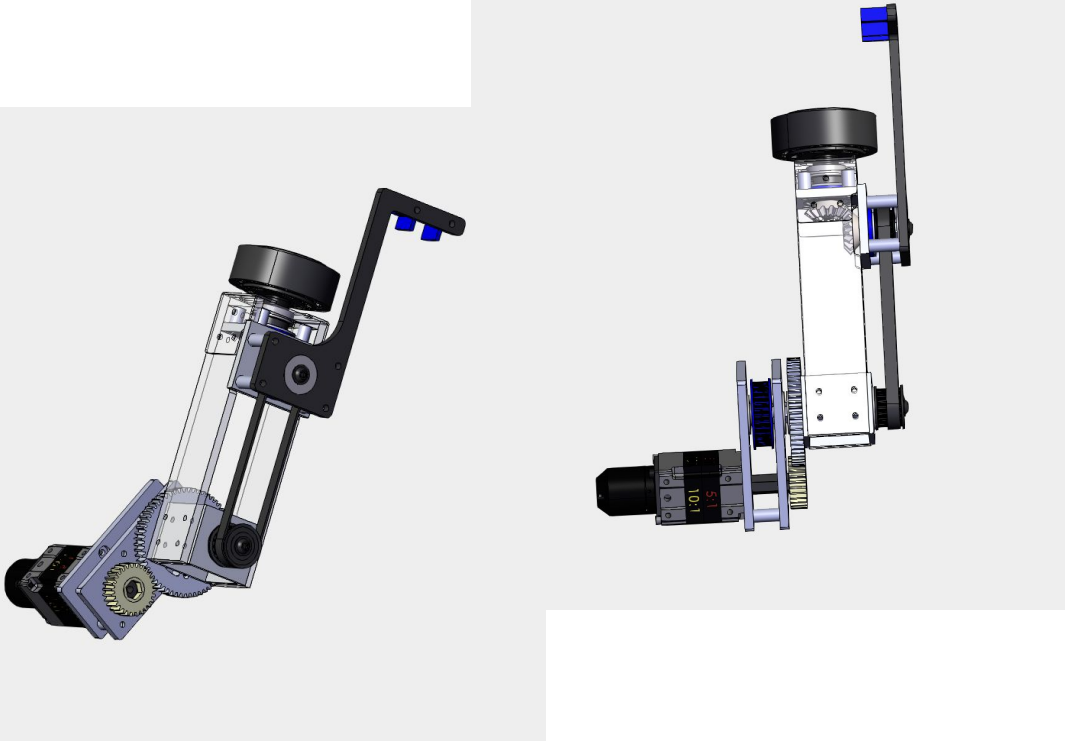
Chart of sensor selection

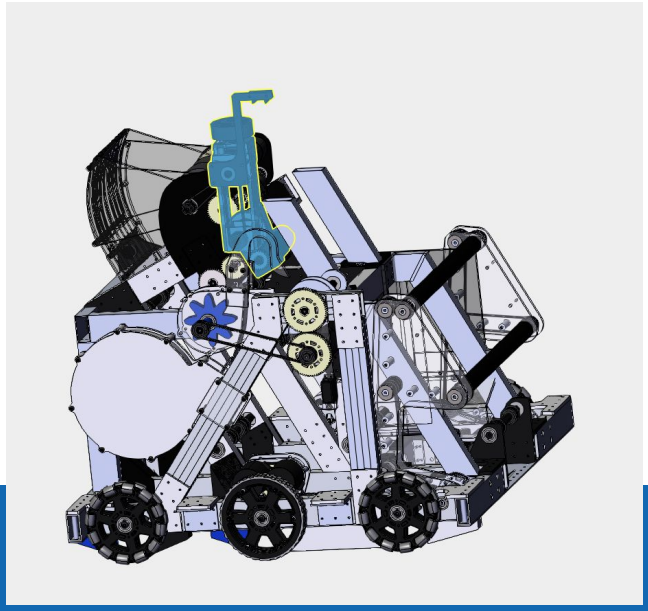
I later implemented the hall effect sensors which included making CAD for the gear plate sensor trigger using sheet metal tools

FRC 2020 Wheel Manipulator

Goal: design a mechanism to spin a horizontal wooden wheel to a specified range of degrees within the constraints of a pre-existing robot.

Allotted only one motor for two functions, the design features a “dead axle” and bevel gears to pivot the mechanism and spin the rubber wheel.



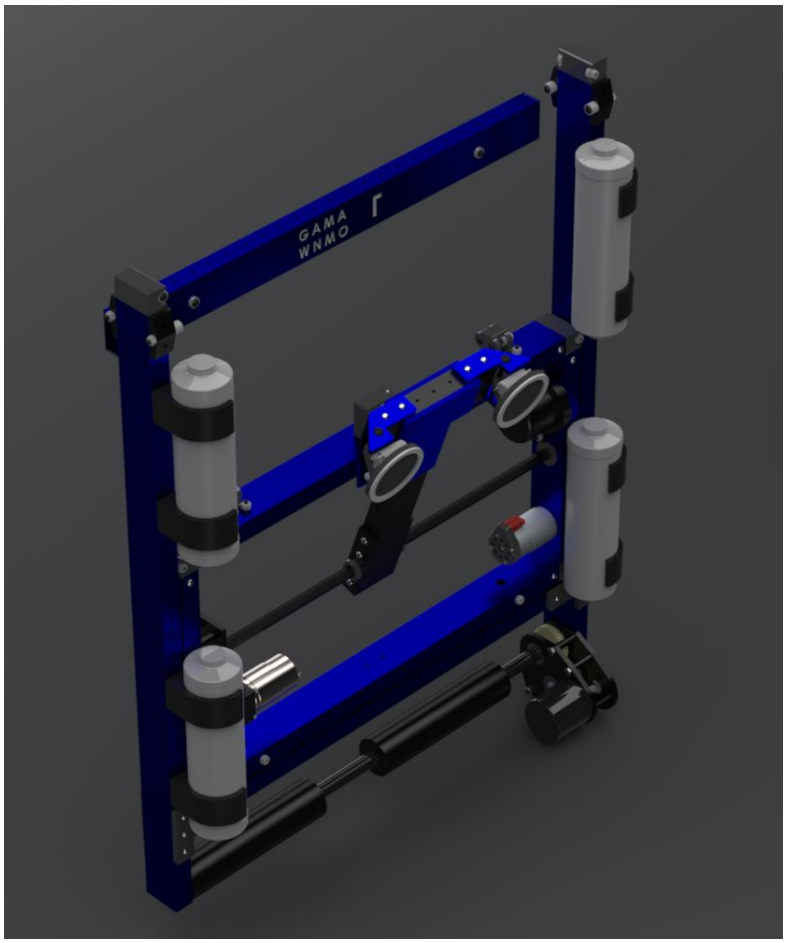


Some parts designed were CAM intensive and I learned about part orientation and tolerances while manufacturing this subsystem

F4 CADathon 9

Goal: design a robot for a proposed game within 4 days to win the 9th F4 CADathon

In our first CADathon, I was in charge of the elevator and electronics.



I designed the elevator frame, carriages, and packaging for bearing blocks

I learned about all of the necessary electronic components and placements to run an FRC robot