# Gautham Jey.

(408)-856-8545
2gauthamj@gmail.com
LinkedIn
Bay Area, CA

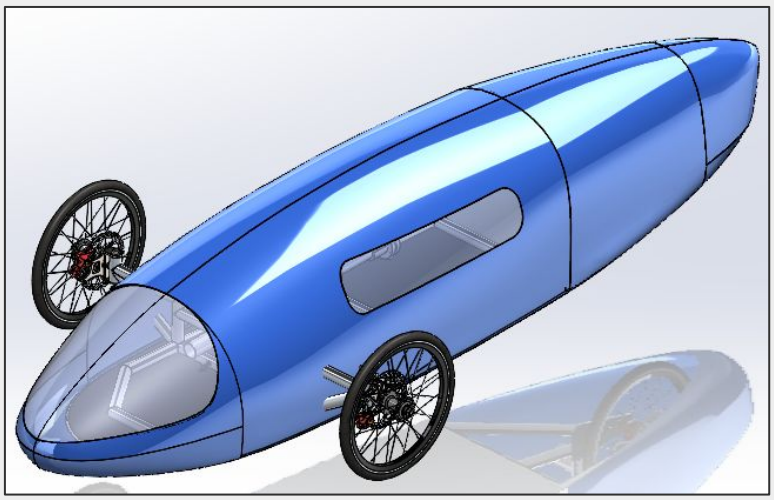
## Prototype Electric Vehicle

## Formula SAE Electric Car

## School Projects

## 3D-Printing

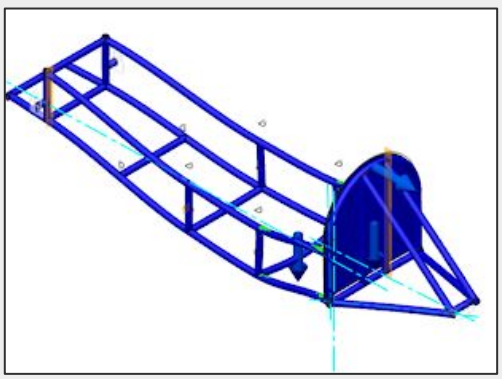
# Prototype Electric Vehicle



*Full CAD Assembly in Solidworks*

From 2019 to 2021, a team of engineering students and I decided to compete in the **Shell Eco Marathon** to design and build an ultra efficient, prototype, battery electric vehicle. From founding the school club to earning 1st place high school team internationally, I have matured in utilizing design softwares like SolidWorks, applying the iterative design process using simulation softwares, learning about different manufacturing technologies, working with manufacturers and sponsors, and managing projects of various scales.

As one of the mechanical leads, I focused on the chassis design as well as shell design and fabrication. The chassis of the car is made of 6061 aluminum tubing, a material that is lightweight and can support loads in multiple directions which were specifically tested in competition. The overall frame has been iteratively optimized by reading relevant research papers, designing a concept in CAD, simulating our loads with Finite Element Analysis, and making changes based on the simulation outcome. To ensure the ergonomics of the frame were sound, we built a wooden prototype and adjusted dimensions accordingly before moving to the final design. After countless iterations, I achieved a lightweight frame design (<30lbs) that would pass the competition's rigorous loads assessment.

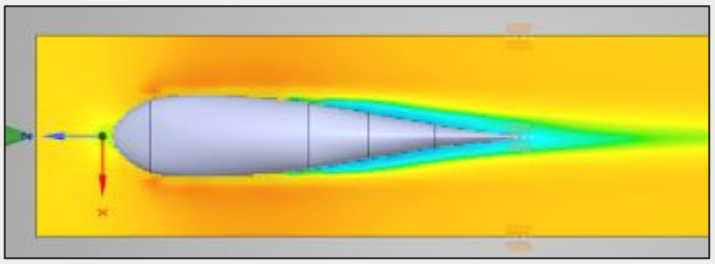


*Stress Simulation of an Early Iteration in Fusion 360*

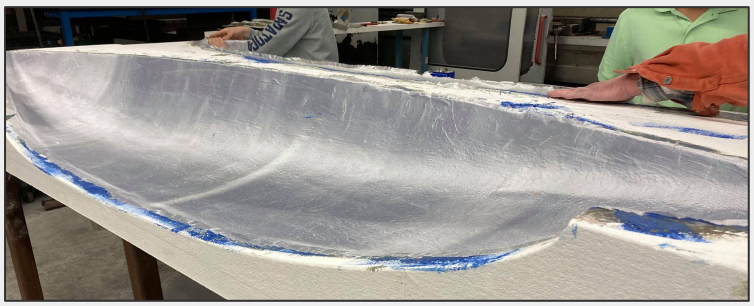
*Complete Frame with Base Plate, Bulkhead, and Rear Dropouts*

# Prototype Electric Vehicle (continued)

The shell design was iterated in a similar way but used SolidWorks Flow Simulation and Ansys to simulate different airfoils aimed to reduce to drag. With the limitation of each body panel taking more time and resources to fabricate, we finalized on a partial teardrop design that would allow us to only make two fiberglass layups, one for each side of the car.

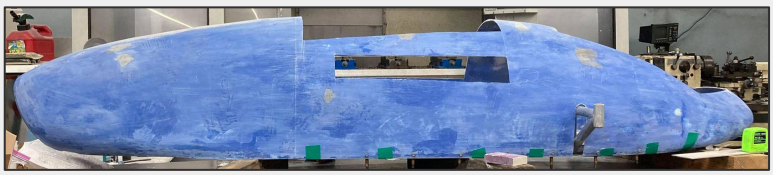


*Flow Simulation of Potential Airfoil of Top Profile*



*Initial Layer of Fiberglass Laid with Resin*

*Left Half Removed From Fold with Plaster from the Mold*



*Final Shell With Halves Bonded Together*

The shell fabrication process was very exhaustive and took multiple months to complete. The process started with producing female molds out of high-density foam, which were 3-axis milled by a local manufacturing firm. We then prepared the mold for the heat-intensive reaction that occurs in fiberglass layups by coating the mold in layers of bondo. After, we laid our layers of fiberglass along with polyester resin and let it cure. Finally, we extracted the two pieces and joined them together to create the full shell.

In the 2021 virtual competition, we placed third among all teams in the Americas region and first among all high schools internationally. We have been commended by Silicon Valley Clean Energy which also sponsored us $10,000 and have been recognized by the City of Saratoga.

# Formula SAE Electric Car

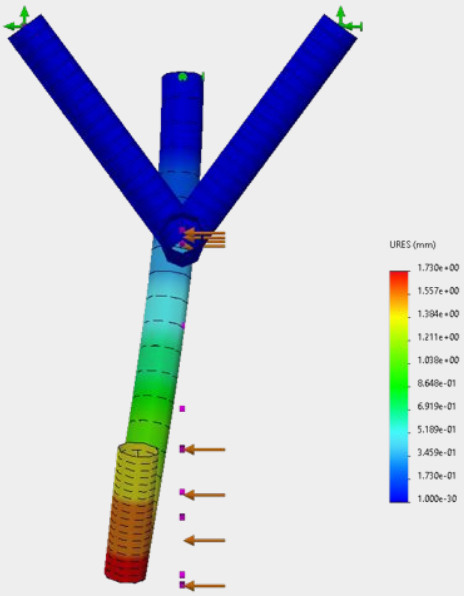
*Previous Year's Car*

*Current Chassis Design With Steering System*

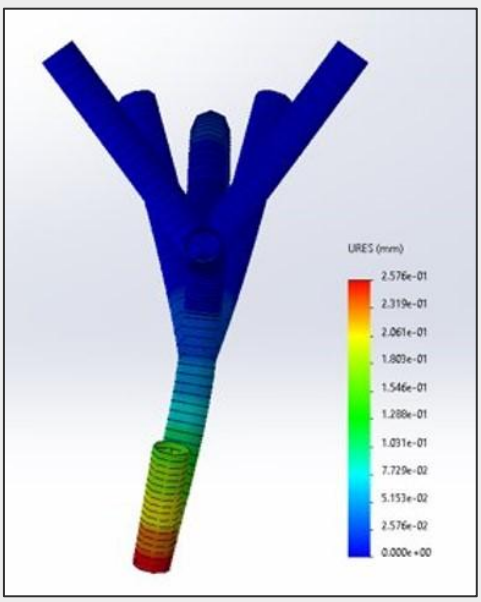
In August 2022, I joined University of Illinois's Formula Electric team. As part of the chassis team, I was tasked to strengthen the steering system support members which wiggled under forces from steering the car. After running Finite Element Analysis on the previous design and looking at displacement and Factor of Safety plots, I created a design that reinforced the steering columns while abiding by the design rules outlined by SAE.

My next steps for this ongoing project is to ensure the manufacturing and assembly of this system, which involves getting the needed tubes profiled and creating a welding jig to align the tubes.

*Improved Steering System*




*Displacement Plot of Old Design: 2mm Max Displacement*

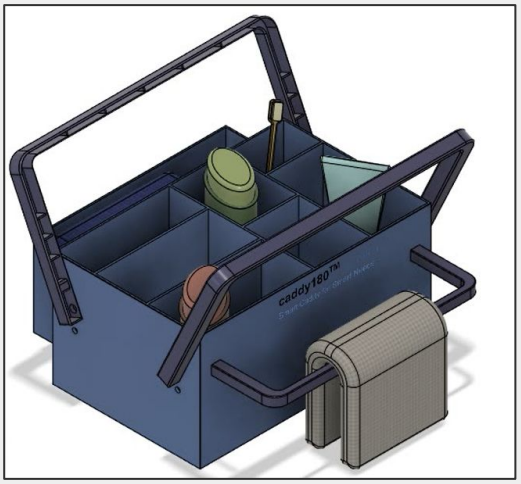



*Displacement Plot of New Design: 0.3mm Max Displacement*

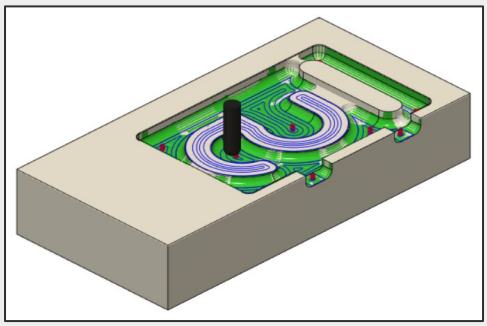
# School Projects

## ME 170: Computer-Aided Design

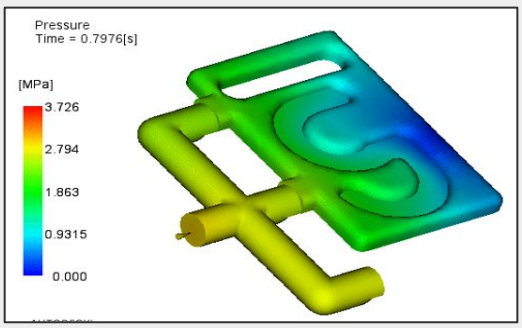
In this college course, a team of myself and two others ideated and designed a consumer product in Fusion 360. Using Human-Centered Design, we made a shower/toiletries caddy that has handles that can turn 180 degrees to act as a stand, which is especially useful to college students using communal bathrooms.




*ME 170 Project: Caddy 180*



*CAM of "g" shaped keychain in Fusion 360*



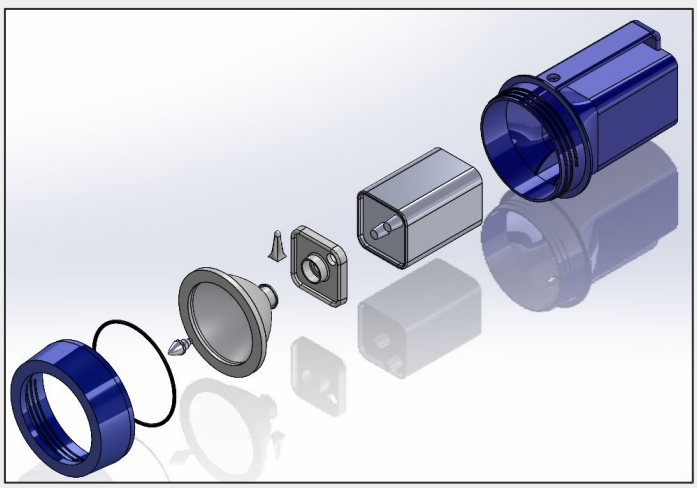

*Pressure Plot of keychain in Moldflow*

## ME 270: Design for Manufacturability

For this college course, we work on multiple labs relating to different manufacturing methods. One manufacturing method we focused on was injection molding, where I designed a keychain, created tooling paths in Fusion 360 CAM and simulated the molding result with different temperatures and pressures in MoldFlow.

## DMT 60: Intro. To SolidWorks

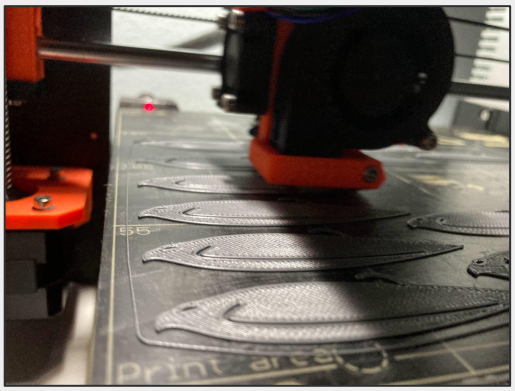
In this summer community college course, I had a formal education of SolidWorks outside of projects. This course guided me to make parts, assemblies, and drawings using a multitude of features offered by SolidWorks.



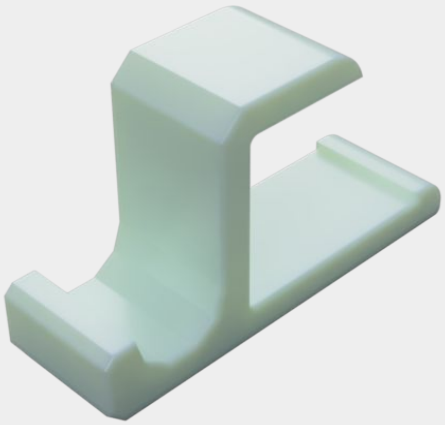
*Assembly of a Flashlight that I Modeled in DMT 60*

# 3D-Printing

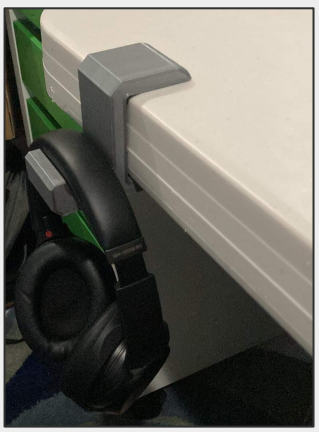
**In my free time, I like to design and 3D print my chaotic creations. Here are just a few of the things I have printed on my Prusa i3 Mk2s.**



*3D-printer Printing Falcon Logos for the Prototype Electric Vehicle Team*

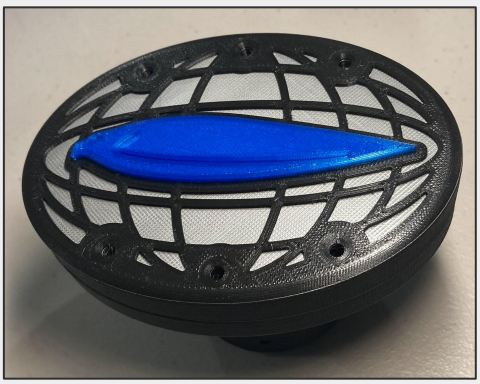


*Design of Headphones Holder*

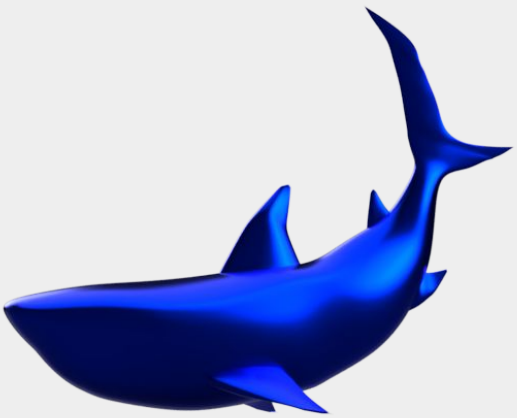


*Headphones Holder In Use*

*Design of iPhone 6 Later Printed in TPU Plastic*

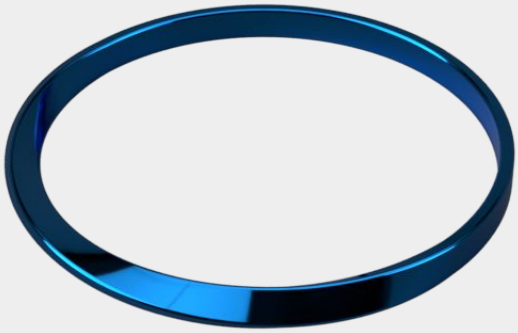


*Multi-Color Print of Steering Wheel Holder for Electric Vehicle*



*Design of Great White Shark With Fusion 360 Form*

*Small Scale Print of Prototype Electric Vehicle*



*Design of Mobius Strip Bracelet*

*Side View of Small Scale Print of Prototype Electric Vehicle*

Gautham Jey.
(408)-856-8545
2gauthamj@gmail.com
LinkedIn
Bay Area, CA