

About Me

Team Wheelers & The Engineering Design Process in ENGI 120



Electrical and Computer Engineering Major
Engineering Design Minor

Hello,

My name is Antony Saleh. I am a student at Rice University, graduating in 2029. Last year, I took a gap year with Baret Scholars, during which I travelled across five continents and explored global approaches to innovation, technology, and international politics. Currently, I am continuing my studies at Rice, where I plan on majoring in Electrical Engineering and minoring in Mechanical Engineering. In regard to extracurriculars, I really enjoy swimming, but I have also developed a liking for rock climbing recently.

I am currently working on Wheelers, an engineering design project that will build the ideal set of wheels to represent Rice University for the University Rover Competition, where the Rover will traverse rough terrains like gravel and sand in a race with other rovers.

Skills

- **3D Printing and CAD proficiency** developed through hands-on prototyping and Fusion 360 modeling
- **Material research and selection** with focus on balancing physical properties, manufacturability, and budget constraints
- **Testing methodology development** including Pugh Matrices, vehicle traction tests, and iterative prototype validation

Working in Teams

Collaboration was central to our prototyping phase. I worked closely with my teammates, **Connor and Hong**, to build and structure the wheels, specifically focusing on implementing and testing different permutations of spikes to maximize traction. Additionally, I partnered with my teammate, **Luke**, to research viable materials (for our wheel design) that fit within our budget and procurement capabilities.

Role & Responsibility

My primary role extended beyond material research to include hands-on fabrication and assembly. I not only identified viable materials but also actively physically put the pieces together, integrating the custom spikes into the wheel structure and helping with assembling the final prototypes for testing.

Overcoming Challenges

Our team sometimes faced difficult decisions about which technical approaches to pursue, especially when resources and time were tight. When disagreements arose, I helped by encouraging open discussion and seeking advice from more experienced mentors. By working together and drawing on expert feedback, we were able to find practical solutions that fit our team's constraints.

Engineering Design Skills

The **Engineering Design Process (EDP)** guided our decisions throughout the semester. We utilized an iterative process to dictate our design steps, determining which options to explore further and which to abandon. This iterative approach was particularly crucial in finalizing our spike pattern design, allowing us to test, observe, and refine until we achieved optimal performance.

Key Improvements

I saw the most significant improvement in my understanding of **real-world testing**. I learned how to identify specific tests required to validate a product's reliability—moving beyond theoretical design to understanding how a product performs (and fails) under actual operating conditions.

Technical Skills

Throughout this project, I developed a versatile toolkit of hard skills essential for prototyping:

3D Printing (PLA)

Hand Tools

Fusion 360 (CAD)

Material Research

Pugh Scoring

Traction Testing

I entered this project with no prior experience in using hand tools, but I successfully learned to use them for fabrication. I also developed a basic proficiency in **Fusion 360** for CAD modeling. On the testing side, I utilized formal methodologies like **Pugh Matrices** for decision-making and conducted specialized Vehicle and Physical Traction Tests to validate our wheel grip.