About Me

Team Wheelders & The Engineering Design Process in ENGI 120

Mechanical Engineering Major

Engineering Design Minor

Hello,

I'm Hongyu Guo, a freshman at Rice University planning to major in Mechanical Engineering with a minor in Engineering Design. I'm interested in transportation and data science. I hope to work in vehicle or transportation engineering, building systems that move people safely and efficiently.

My interest in engineering started in high school, where I got hands-on experience and built my own prototypes. I use Rhino for basic CAD, and I'm learning SolidWorks. I'm also learning Python out of my interest in data sciences. Outside of class, I enjoy photography and can work fluently in Adobe Illustrator and Photoshop.

Skills

- **CAD modeling (Rhino)** for basic design work, currently learning SolidWorks
- **Fabrication methods** including laser cutting, woodworking, welding, and 3D printing (Bamboo)
- **Digital design proficiency** working fluently in Adobe Illustrator and Photoshop for photography and visual projects

Working in Teams

In EDES 120, my team, "Wheelders," designed rover wheels for the Rice Robotics Club to handle sandy terrain for the University Rover Challenge. I documented test plans and results, brainstormed concepts with the teammates, and helped build prototypes. When facing problems, I recorded failure points and how we fixed them. This habit helped us learn faster and avoid repeating the same mistakes.

Engineering Design Skills

Two skills stood out in Engineering Design: brainstorming and iteration. Bold ideas sometimes led to the best solutions, so we aimed for quantity first, then filtered using morphing, Pugh Screening, and Pugh scoring. During the rover wheel project, I saw how steady iterations improved performance. After each test, we identified one or two changes, improved the design, and tested again. This cycle made our prototypes stronger and more reliable.

Technical Skills

Throughout this project, I relied on several technical skills that were essential to producing our prototypes:

Material Selection **Tread & Spike Patterns** **3D Printing** **Test Development**

From technical skills, material selection was key. We compared materials such as TPU, rubber, and metal parts to balance traction and durability. We also worked on materials and patterns for tread and spikes, tried to 3D print the wheel, and set up different test methods. These steps connected our design to real data and results.