Portfolio

Joseph Ruan

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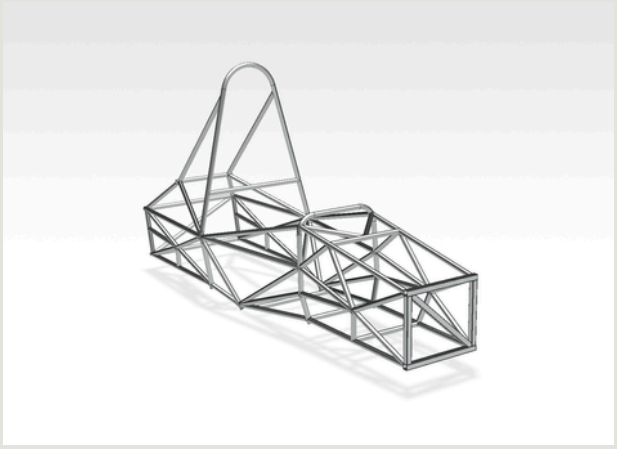
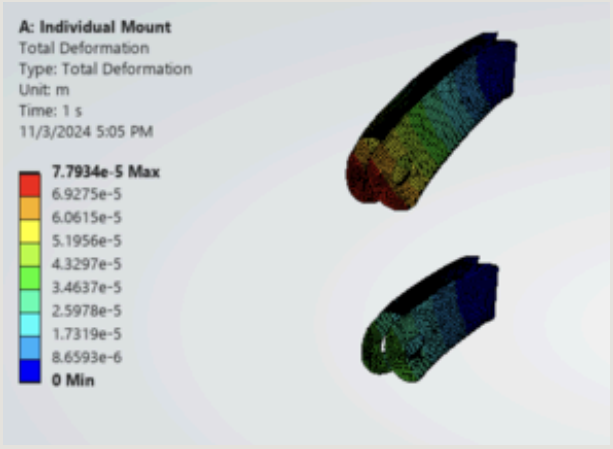
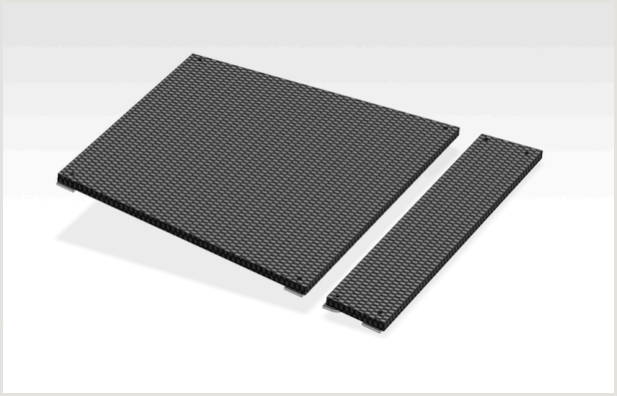
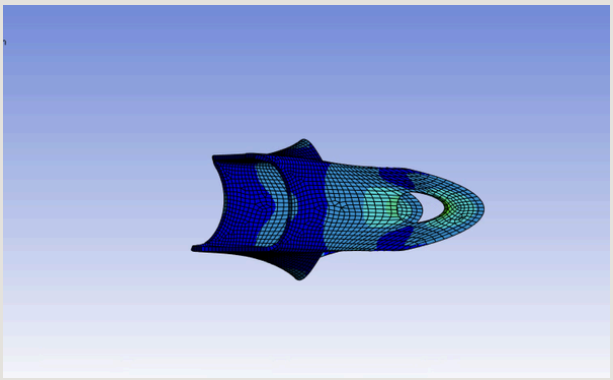
Mechanical Engineering
Purdue 2027

Purdue Electric Racing 2025 Car



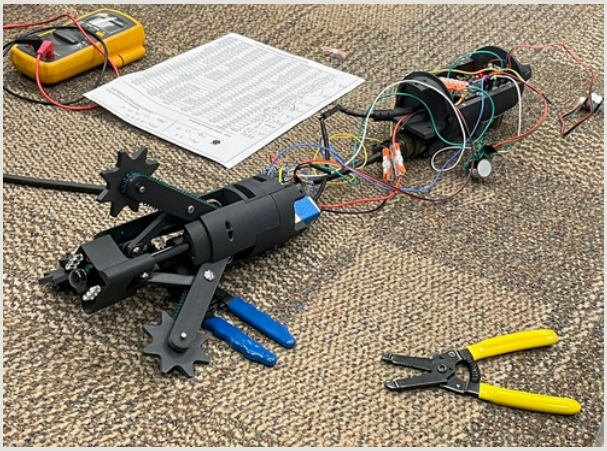


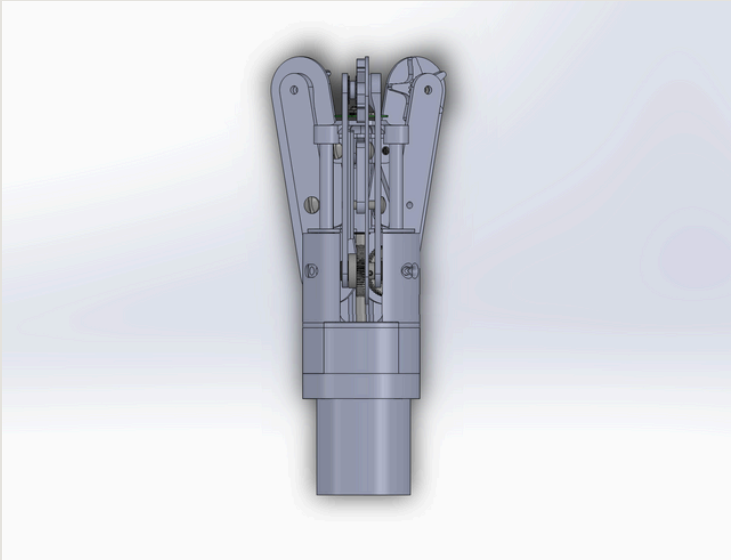




- Designed chassis closeouts using **NX** to isolate cockpit and driver from potentially hazardous road debris
- Validated closeouts/battery mounts using **ANSYS** to **verify compliance** with **rigidity/deformation targets**
- Manufactured chassis using **multi-axis manufacturing methods** and **designed jig/tooling** for assembly
- Utilized **composite manufacturing techniques** (**wet layups** & **vacuum infusion**) to fabricate closeouts
- **Welded** chassis tubes together and validated welds using **ultrasonic non-destructive testing**

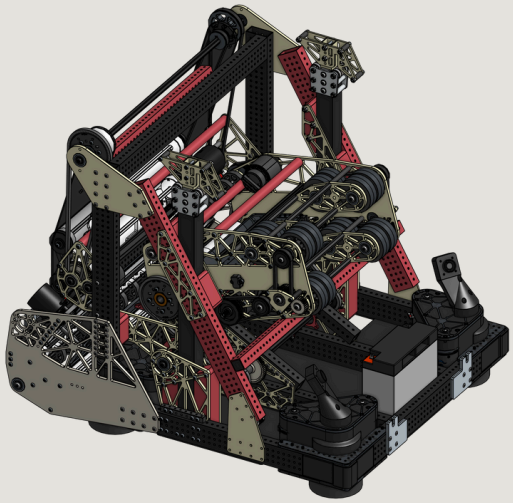
Soil Microbiome Measuring Robot (SoMMR)

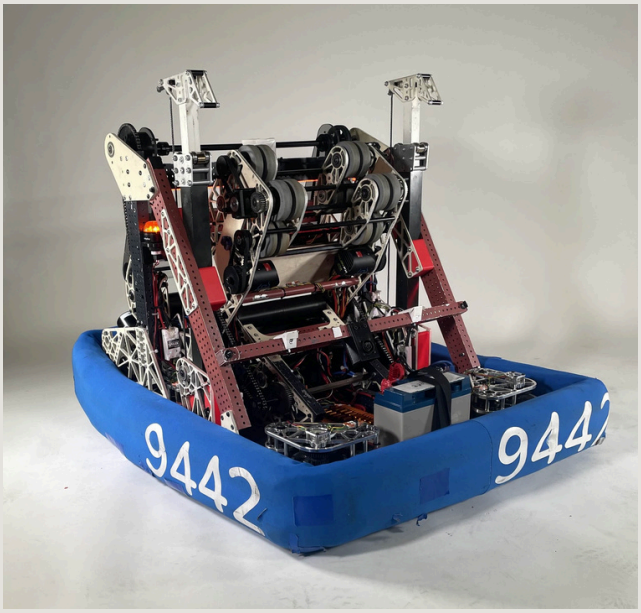


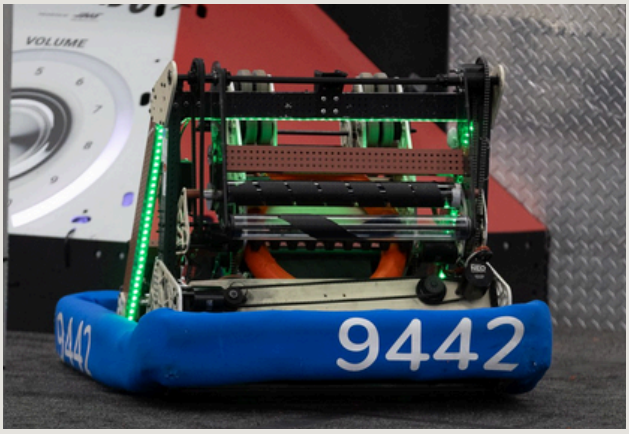


- **Designed** slip ring assembly for tether reel of robot as well as sensor array and module mounting system
- Developed **data parsing** script for timestamp sync to simplify **SLAM/edge computing odometry**
- **Planned** and **executed field testing strategy** at multiple off-site locations, **identified 300% more errors**
- **Presented findings** at the United States Department of Agriculture's Ames National Laboratory

Miso Mechanics 9442 (FRC)







- **Founded** and **led** rookie FIRST Robotics team and **fundraised** over $30,000 USD from sponsors
- Utilized **3D printing** and **laser cutting** for **rapid prototyping** and iteration, **reducing traditional timelines by half**
- Designed multiple subsystems in **Onshape** on competition robot (**peaked at 20th** offensively)
- Developed **computer vision** system using PhotonVision and **custom camera assemblies** to detect game objectives
- Created **motion planning** system for autonomous routines allowing for **real-time decision-making** to aid in gameplay