

# Isaac Woodward

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Portfolio: <https://iwnmw.github.io/>

## Education

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### University of Missouri - Kansas City, Kansas City, MO

Master of Science in Mechanical Engineering  
Bachelor of Science in Mechanical Engineering

Expected May 2026  
May 2025 | GPA: 4.0/4.0

## Experience

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### Missouri Institute of Defense and Energy, Kansas City, MO

Nov. 2024 – Present

Graduate Research Assistant

- Designing, building, and testing prototype of robotic manipulator for ship motion simulation
- Developed GUI-based app in MATLAB to analyze kinematic performance of robot designs using dexterity, manipulability, and workspace measures
- Created assembly models of hardware in SolidWorks to ensure successful system integration

### NASA Marshall Spaceflight Center, Huntsville, AL

June 2024 – Aug. 2024

Human Landing Systems Intern

- Performed static structural analysis on an actuation drum in Simcenter Nastran, including CAD model preparation, mesh generation and convergence analysis, and refining boundary conditions/loading methods
- Redesigned rotating detonation rocket engine nozzle extension manifold for additive manufacturing in PTC Creo, and created production-ready technical drawings employing GD&T

### Applied Finite Element Analysis: Wheel Design Project, Kansas City, MO

Oct. 2024 – Dec. 2024

Team Leader

- Performed a series of structural and modal analyses to inform the design of an aluminum wheel
- Prepared models in SolidWorks and used ABAQUS to mesh parts, apply loads/boundary conditions, and run simulations
- Studied the effects of wheel rib angles on maximum stress, location of maximum stress, and maximum deflection

### University of Missouri – Kansas City, Kansas City, MO

June 2023 – Aug. 2023

Undergraduate Researcher – Computational Biomechanics

- Created two finite element models and eight quasi-static simulations of an adolescent knee
- Investigated the growth plate's effects on ACL stress/strain during four modes of knee loading
- Created a variety of material models, including rigid body for bones, Mooney-Rivlin for cartilage and growth plates, and transversely isotropic, fibrous Mooney-Rivlin models for ligaments
- Worked with professor to refine loading/boundary conditions to reduce computational expense
- Discovered approximately 30-50% ACL stress and strain reduction for models with a growth plate during interior tibial rotation
- Presented research publicly on multiple occasions, including at Missouri State Capitol

## Skills

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**Analysis/Simulation:** Siemens FEMap/Simcenter Nastran, ABAQUS, FEBio, Structural Analysis

**CAD:** SolidWorks, Siemens NX, PTC Creo, Basic GD&T, Assembly Modeling

**Programming:** Python, MATLAB, C++, ROS2

**Other:** Technical communication, mechanical testing, leadership, academic research/literature review