Madison Schaaff

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EDUCATION

Cornell University, *College of Engineering*   August 2022 - May 2026

Major: B.S. Mechanical Engineering; Minor: Aerospace Engineering | Major GPA: 3.7 / 4.0

Activities: P&G Manufacturing STANDOUT, Society of Women Engineers, First Gen Student Union, Cornell Ski & Snowboard Club

Relevant Coursework: Differential Equations, Electricity and Magnetism, Statics and Mechanics of Solids, Dynamics, System Dynamics, Thermodynamics, Fluid Mechanics, Mechanical Synthesis, Mechanics of Materials, Aeronautics, Uncertainty Analysis

PROFESSIONAL EXPERIENCE

Xylem, Inc.   Baltimore, MD

Quality Assurance Engineering Intern   May 2024 - August 2024

- Conducted pipe inspections on transmission mains with a team using acoustic fiber optic (AFO) and electromagnetic technology to detect and locate inline leaks, gas pockets, and identify pipes with broken prestressing wire wraps.
- Performed soil analysis and structural evaluations to determine if the pipeline was operating under safe conditions based on design standards using stray current testing and three-dimensional non-linear finite element analysis for the pipes.
- Modeled pipe design in Fusion360 then subjected it to internal pressure, pipe and fluid weights, and external loads in Abaqus FEA to determine the response of a PCCP pipe under different loading conditions.
- Analyzed data from transient pressure monitoring to generate recording plots and calculate the change in kinetic to the potential energy of the flow momentum to determine the rise in pressure and strain energy acting on the pipe.
- Wrote comprehensive condition assessment reports for clients based on inspection and test results, giving them pipe recommendations that saved them from hundreds of thousands of dollars in irreparable pipeline damage.

NASA L'SPACE Mission Concept Academy   Remote

Lead Thermal Engineer and Secondary Mechanical Engineer   May 2024 - August 2024

- Designed a thermal control system for a lunar rover, ensuring temperature ranges to support sensitive instruments and payloads using heat transfer calculations and Siemens NX, receiving the NX CAD Design Associate Certification.
- Adjusted to budget descope by designing a passive cooling system, saving over $10M in costs and 100W in power.
- Conducted trade studies on potential heating and cooling systems, balancing cost, weight, temperature, technology readiness levels, and heat dissipation requirements to meet mission objectives.
- Acquired comprehensive knowledge of NASA mission protocols, procedures, and best practices through hands-on experience and training under the guidance of NASA scientists and engineers, enhancing mission development skills.
- Collaborated with a team of ten engineers to write and present key reports on our lunar rover, including a Systems Requirements Review, Mission Design Review, and Preliminary Design Review to NASA engineers.

PROJECTS

Symbiotic Engineering and Analysis Lab   Ithaca, NY

Wave Energy Converter Engineer   January 2024 - Present

- Compile specifications of commercial motors of electric vehicles for integration into a wave energy converter, comparing the tradeoff between cost, efficiency, and technology readiness of custom versus commercial generators.
- Research fields that share key design requirements with wave energy and could offer commercial generators that could also be used in wave energy converters by performing literature reviews of electric machine technology.
- Write Python scripts that estimate generator performance of different metrics such as power, torque, and speed, converting it to MATLAB, and using LaTeX to present and discuss the results at the 2024 IEEE Energy Conference.

Cornell Hyperloop Project Team   Ithaca, NY

Braking Engineer   January 2023 - Present

- Redesign frictional braking system by optimization for mass and complexity and automation of the pneumatic system.
- Design an electromagnetic braking system from concept to assembly by modifying transformers to act as electromagnets.
- Test the braking strength of different electromagnets per layer of coil by applying a voltage through the copper and reading the corresponding current and Hall effect, using Microsoft Excel and MATLAB to plot and track data.
- Model and integrate mounts for electrical components by using SolidWorks and testing the forces acting on them using Ansys Mechanical, creating over 50% more efficient parts and ultimately fastening the components to the pod's chassis.
- Apply hand calculations to verify Ansys results of the net force, stress, and deformation on frictional braking components.
- Use machine shop training to create mechanical drawings and machine components required for pneumatic braking.