Kasey Moomau

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Education

University of Nebraska-Lincoln | Lincoln, NE — Expected Graduation: May 2023
Bachelor of Science in Mechanical Engineering — GPA: 3.90

University of Nebraska-Lincoln | Lincoln, NE — Expected Graduation: May 2026
Master of Science in Mechanical Engineering and Applied Mechanics — GPA: 3.8

University of Nebraska-Lincoln | Lincoln, NE — Expected Graduation: May 2027
Doctor of Philosophy in Mechanical Engineering and Applied Mechanics — GPA: 3.80

Relevant Engineering and Research Skills

- Professional Communication | Expert
- Project Planning | Proficient
- Experimental Design | Intermediate
- Grant Writing | Intermediate
- Engineering Graphics (Solidworks) | Proficient
- Analysis and Modeling (MATLAB) | Intermediate
- Additive Manufacturing (FDM) | Proficient
- Circuit Design (Altium, LT Spice) | Beginner
- Coding (C, Python, JavaScript) | Intermediate
- Machining (milling, welding) | Beginner

Engineering Research Experience – University of Nebraska-Lincoln

Undergraduate Research Assistant, *Smart Materials and Robotics Lab* — Feb 2022 – Present

- Characterized the electrical conductivity in liquid-metal-embedded elastomer**. Demonstrated programmable, resettable electrical conductivity in elastomeric composites** at the Summer 2022 Research Symposium.
- **Designed and led outreach effort** in collaboration with a high-school intern, providing 2022 UNL Summer Camp high school students a **hands-on introduction to designing their own flexible, wearable electronics.**
- Assisted 4 new undergraduate research peers in project startup and lab orientation during Summer 2022.
- **Wrote NE Space Grant mini-grant proposal ($7,000 awarded**) to self-fund senior design project.
- **Awarded NSF GRFP** for 2023-2028 **(~$150,000 awarded)**
- **Applied for NE Space Grant Fellowship** to support research in 2022-2023 **($4,500 awarded**).
- **Applied for UCARE Grant** to support research in Summer 2022 and 22-23 AY (**$4,800 awarded**).

Undergraduate Research Assistant, *Bio/Flow Lab* — Sept 2021 – Feb 2022

- **Iteratively designed, built, and tested a vacuum chamber** to facilitate droplet coalescence characterization.
- **Awarded Woollam Scholarship** to pursue undergraduate research for 2021-2022.

Engineering Team Experience – University of Nebraska-Lincoln

Robotic 3d-printing end-effector designer — Summer 2025

- **Collaborated with 2 instructors and 4 students to facilitate device fabrication, testing, and student projects.**
- **Designed and tested custom end effector hardware** to use an E3D RotoRevo extruder, hot end and toolboard with a Duet Wifi and UR-5e robot for 6-dof 3d printing research and class projects.

Team Member, *Bicycle Advanced Driver Assistance System* — Spring 2024

- **Worked with 2 graduate student** engineers to develop a sensor, control, and lighting package to detect rear-following automobiles and provide brake lighting and turn signals on a bicycle.

Integration and Electronics Lead, *Collaboration with NASA JPL, Senior Project* — Fall 2023 – Spring 2023

- **Led team of 4 student** engineers in collaboration with NASA JPL (PI: Ryan McCormick, JPL) in a year long project to update and test stereo cameras, lighting, landing debris shielding, and associated mechanical supports for the COLDArm, for use in dark-side NASA Artemis lunar ops.
- **Developed a custom circuit board** and mechanical package to power illumination with existing Artemis electronics package.
- **Consulted with UNL EHS and developed an approved testing plan for using lunar simulant** to test device performance in simulated lunar conditions.
- **Led integration of all systems** before testing and shipping to JPL.

Mechanical Team Member, *Advanced eXperimental Payloads, Aerospace Club* Spring 2021 – Present

- **Led design and fabrication of 3D-printed, multipart, compliant fixtures** to secure four 2-kg scientific payloads to an aluminum frame. The compliant fixture protected them through the parachute-opening shock and landing impact of a high-altitude balloon (HAB) mission, and **the payloads were successfully recovered**.
- **Designed a compression-testing rig** to compare performance of 3D-printed landing strut prototypes for mitigating landing impact on the above HAB mission.
- **Mentored middle-school participants** in problem solving, iterative design and testing, Solidworks, and coding.

Excavation Team Member, *NASA Lunabotics, Aerospace Club* Spring 2021 – Present

- **Led design of auger assembly (21-22 AY)** using aluminum framing and tapered roller bearings to support auger and protect powertrain against axial thrust and bending moment loads applied while excavating lunar regolith.
- **Designed powertrain requirements and selected motor and gearing (21-22 AY).** Estimated required torque and likely thrust/deflection loads in competition arena by researching lunar soil conditions and comparing them to terrestrial civil engineering best practices**.**
- **Our robot successfully recovered simulated lunar regolith during the 21-22 AY competition.**

Related Work Experience

Mentor for the Highly Gifted, *Lincoln Public Schools* Oct 2017 – May 2021

- Worked with Gifted students, parents, and other educators to increase student learning and engagement.
- Taught robotics/electronics, art, astronomy, physics, chemistry and coding to develop student curiosity and interest in STEM, emphasizing persistence and problem solving.

Interests and Achievements

- Served as president of UNL/UNO Tau Beta Pi Chapter (May 2021 – May 2023).
- Designed, tested and tuned a 3D-printed, naturally articulating **prosthetic pinky finger** and palm harness to fit user conformation, strength and range of motion (Feb. 2020).
- Qualified on metal fabrication equipment (end mills, welders, drill press) at UNL Innovation Studio (2021 – 2022).
- Designed and tested FDM printer part-cooling modifications to improve bridging and overhangs (2015 – 2021).