

Kevin Michael Lewis

Personal Summary

I am a graduate engineering student who holds a Bachelor of Science in Mechatronics Engineering. My current goal is to break into the space industry by becoming an expert in modern guidance, navigation and control (GNC) for deep space missions at Purdue University's graduate aeronautical and astronautical engineering program. I have had multiple industry experiences in software development and robotics, and I'm currently working on expanding my professional network within the aerospace industry as well as gaining hands-on experience in research and development of new technologies pertaining to space travel.

Education

Purdue University – 3.54/4.0

May 2026 – Master of Science in Aeronautics and Astronautics

Northern Illinois University - 3.56/4.0

May 2024 – Bachelor of Science in Mechatronics Engineering, Minor in Applied Mathematics

Research Experience

Master's Thesis Graduate Research - *Model Predictive Control for Small Body Missions using Sparse Model Identification in highly irregular gravitational environments*

Research Advisor: Andrea Capannolo, PhD

October 2024 – Present

The research I chose for my thesis project. The objective of this project is to study the application of the Sparse Identification of Nonlinear Dynamics (SINDy) in the context of spaceflight in small body gravitational environments. My work involves literature review of the state of the art in small body missions as well as modern model predictive control theory. I have designed simulations and experiments to explore the performance of SINDy-MPC for missions to asteroids like 433 Eros. My results to date have been accepted to the 2025 AAS/AIAA Astrodynamics Specialist Conference in Boston, MA. The preprint for this conference is in preparation and is expected to be published in the conference proceedings. The thesis submission is expected by May 2026, and many more aspects of the project are an ongoing area of research.

Molecular Dynamics Undergraduate Research - *Thermophysical and Dynamical Response Characteristics of High Aspect Ratio Nanoparticle Suspensions in the Presence of an External Electric Field*

Research Advisor: John Shelton, PhD

August 2023 - May 2024

A formal undergraduate research project under Dr. John Shelton, Mechanical Engineering. We investigated the dynamical characteristics of graphene nanoplatelets suspended in a polymer resin. My role in the research is using Large-scale Atomic/Molecular Massively Parallel Simulator (LAMMPS) to collect insightful data on the microscopic scale of the nanoplatelets' behavior subject to a magnetic field. The research aims to lead to more work in the application of the composite material in additive manufacturing applications.

Publications

Lewis, Kevin M. and Capannolo, Andrea, "Sequential Sparse Regression and Model Predictive Control for Missions to Small Celestial Bodies" (2025). Preprints. 394535017.
<https://www.researchgate.net/publication/394535017>

Lewis, Kevin M., "Summonable Construction Delivery Robot" (2024). *Honors Capstones*. 1495.
<https://huskiecommons.lib.niu.edu/studentengagement-honorscapstones/1495>

External Funding

NASA Breakthrough, Innovative, and Gaming-changing (BIG) Idea Challenge

December 2020

Project Title: *Dust Mitigation Technologies for Lunar Applications*

Project Participants: Di'Quan Ishmon, Danielle Ho, Kaylen Platt, Caeden Keith, Ivan Recendez, Carlos R. Cano, Cindy Gomez, Collin Uveges, Daniel O'Dette, Edgar Rodriguez, Etiemana Ikipidungise, Jorge Fernandez, **Kevin Lewis**, Lauren Marc, Marcus Mims, Matthew Metz, MengFan Shi, Miranda Hahn, Mitchell Jones, Nickolaus Thiesen, Sam Pauling, Zulfiqar Ahmed, Stanislaw Bryja

Proposal Period: 02/15/21 - 11/19/21

Proposed Funds Requested: \$131,051

Proposal Summary: This was a student-led group submission to the design competition hosted annually by the National Aeronautics and Space Administration (NASA). The competition was composed of an initial design prompt, followed by university teams led and administered by undergraduate and graduate students coming up with a design proposal that addresses the prompt. The proposal included ideation, design specifications, proposed testing procedures, a thorough budget of up to \$131,051 and a proposed schedule for the completion of a prototype and testing procedures. My role in the team was researching alternative materials for the electrical dust mitigation system on the space suits' boots, as per the design prompt of that year. I researched carbon nanotube as a potential alternative for electrical conductivity and developed a budgeted request for such a material in the final proposal.

Teaching Experience

College of Engineering and Engineering Technology – Engineering Tutor

August 2022 – May 2024

Classes Tutored for: MEE 212 (*Mechanics of Materials*), CSCI 240 (*Computer Programming in C++*), MEE 322 (*Dynamic Systems and Control I*), MEE 380 (*Computation Methods in Engineering Design*), other engineering and STEM courses included.

Summary:

I have worked as an undergraduate tutor in the College of Engineering and Engineering Technology since my junior year. In that time, I worked in person for part-time hours, providing tutoring services in a wide variety of subjects from mathematics, physics, programming, and other engineering disciplines. Through tutoring, I have met many other like-minded students and learned the skill of conveying technical and conceptual information clearly and in a helpful manner. I have helped many other students with challenging coursework, general coursework guidance, and studying strategies and approaches. I have gained invaluable experience in this job by being able to talk to large groups of students about engineering topics and learning ways in which my own communication skills could be improved.

Service Experience

- Society of Automotive Engineers (SAE) Aerospace Club

May 2023 – December 2023

Summary:

A group of tutors from the College of Engineering decided to revive the SAE Aerospace Club at NIU based on the framework from the group I started, SET Club. This process happened the summer before my senior year, and I took the role of Treasurer in the group. I have planned out the spending budgets for the semester, requested research funding from the university, and applied for other external funding opportunities as well during the Fall 2023 semester.

- Space Exploration Technologies (SET) Club

August 2021 – January 2023

Summary:

During my time at NIU I participated in the NASA BIG Idea Challenge. I found that this competition was popular but there was no real structure for it in our school. I decided to start a new organization that specifically addresses the interest of space travel for students at NIU. In serving as the President of this organization for a year, I've learned about leadership through meeting planning, acquiring funding, and working on group projects with other students. Our team returned to the BIG Idea Challenge to submit another design proposal the year it started. Although the club didn't catch on, it was transformed into a more general aerospace interest club in the College of Engineering and Engineering Technology.

Honors and Scholarships

- **Northern Illinois University Honors Program** **August 2020 – May 2024**
NIU offers an advanced study program called the university honors program. This allows highly successful students to network with each other, take honors-level coursework and have access to honors-specific scholarship opportunities and other benefits within the university such as early class registration. The full university honors award requires extensive hours of honors courses taken during the undergraduate experience as well as external research and leadership experiences. There is a GPA requirement of 3.30/4.0 and a capstone project requirement as well.
- **Northern Illinois University Merit Scholarship** **August 2020 – May 2024**
Due to early career success and being able to maintain a GPA of 3.30/4.0.

Professional Experience

- **Caterpillar** **May 2023 – August 2023, May 2024 – August 2024**
Summary:
I completed an internship at Caterpillar as a corporate engineering intern. In this role, I work alongside engineers from different backgrounds such as mechanical and software engineering, as well as other developers that work on the excavator product line at Caterpillar. My main role was embedded software development, where I addressed bug fixes submitted from customers, created new libraries and simulation automation tools. I also did hands-on work in the field by deploying novel software versions on excavators and tuned them for better performance.
- **HCC** **June 2022 – August 2022**
Summary:
An internship experience completed in my hometown. The role's responsibilities included CAD design of sheet metal components, and quality control of the reel products we sold to larger agricultural brands such as John Deere and Case New Holland. I learned about different metal fabrication and manufacturing processes on an industrial level. I also learned the basics of quality control and engineering management.