JOSHUA ECKELS

PhD Student in Aerospace Engineering

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EXPERIENCE

Computational Autonomy Lab, Ann Arbor, MI
PhD student, 2021-present

- Modeling and integration lead team in NASA's JANUS institute for high-power electric propulsion testing.
- Applied reduced-order modeling and uncertainty quantification with Bayesian/machine learning methods.
- Developed fluid/hybrid particle-in-cell modeling of electrospray ion thrusters and Hall thrusters.

NASA Jet Propulsion Laboratory, Pasadena, CA
Electric propulsion intern, 2025

- Developed Hall thruster fluid simulation tools.
- Developed and tested reduced-order modeling algorithms for transient detection and data-driven acceleration.

NASA Glenn Research Center, Cleveland, OH
Electric propulsion intern, 2024

- Development of hybrid particle-in-cell models of Hall thruster plume and spacecraft interactions.
- Analysis of transient start-up arcing during vacuum chamber electric propulsion testing.

Tesla, Palo Alto, CA
High-voltage firmware intern, 2021

- Developed Python regression test scripts to validate high-voltage battery firmware.
- Improved and upgraded battery pack testing infrastructure, hardware, software, and automation.

Los Alamos National Laboratory, Los Alamos, NM
R&D engineering intern, 2020

- Improved performance of ultrasonic wavefield imaging software for non-destructive evaluation.
- Developed and automated a new deep learning-based processing method for ultrasonic defect detection.

EDUCATION

University of Michigan, Ann Arbor, MI
PhD in Aerospace Engineering, (expected) 2026

Rose-Hulman Inst. of Technology, Terre Haute, IN
BS in Mechanical Engineering, 2021

SKILLS

	(years)
Python	5+
numpy, scipy, pytorch, etc.	
Open-source	5+
linux, vcs, ci/cd, etc.	
Scientific computing	3
hpc, mpi, slurm, etc.	
Other languages	1-2
fortran, c, c++, js, java	
Finite-element	1-2
cfd, ansys, plasmas, etc.	
Fabrication	1
cnc, laser cutting, etc.	

AWARDS

NSTGRO fellowship, 2023
NASA space technology award

R&D100 award, 2022
Los Alamos patented technology

Heminway prize, 2019
Academic award for top of class

PUBLICATIONS

J.Eckels *et al*, "Hall thruster model improvement by multidisciplinary uncertainty quantification", *Journal of Electric Propulsion*, vol. 3, no. 19, 2024.

J. Eckels *et al*, "Predicting local material thickness from steady-state ultrasonic wavefield measurements using a convolutional neural network", *Ultrasonics*, vol. 123, 2022.