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## Research Interests

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Space situational awareness, space object characterization, inverse problems, high-performance computing for astrodynamics.

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## Education

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**Purdue University** – West Lafayette, IN

*Ph.D. Aeronautical and Astronautical Engineering* – 4.0 GPA

May 2027

*MS Aeronautical and Astronautical Engineering* – 4.0 GPA

Dec 2023

*BS Aeronautical and Astronautical Engineering* – 4.0 GPA

Dec 2022

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## Fellowships, Awards, and Honors

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- Best graduate presentation – *Purdue Aeronautics and Astronautics Symposium* 2025
- National Defense Science and Engineering Graduate Fellowship (NDSEG) 2023
- NSF Graduate Research Fellowship (GRFP) 2023
- NASA National Space Technology Graduate Research Opportunity Fellowship (NSTGRO) 2023
- 3<sup>rd</sup> place graduate presentation – *Purdue Aeronautics and Astronautics Symposium* 2023
- Best research talk – *Undergraduate Research Conference* 2022
- Best interdisciplinary research – *Undergraduate Research Conference* 2022
- Best undergraduate presentation – *Purdue Aeronautics and Astronautics Symposium* 2022

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## Peer-Reviewed Publications

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Burton, A., **Robinson, L.**, Frueh, C., “Light curve attitude estimation using particle swarm optimizers”. In: *Advances in Space Research* (2024). DOI: <https://doi.org/10.1016/j.asr.2024.09.008>.

Burke, P. A., Ehlmann, B. L., Steckel, A. V., Masiero, J., Fajardo-Acosta, S., Lazio, T. J. W., Strauss, R., Brozovic, M., Trilling, D., **Robinson, L.**, Lantoine, G., Klima, R., “Determination of Lunar Trailblazer’s Spin State using Ground-Based Optical and Radar Observations”. In: *Earth and Space Science* (2025). Submitted to the Lunar Trailblazer special collection.

Ehlmann, B., Bellerose, J., Lantoine, G., Furlan, E., Scire, E., Fajardo-Acosta, S., Bennett, L., Sanchez Net, M., Lazio, T. J. W., Brozovic, M., Masiero, J., Steckel, A. V., Burke, P. A., Kimura, M., Foxman, S., Zaw, M. P. M., Lee, L. M., Clarke, F., Hauge, M., McDonald, D., Adler, J., Strauss, R., Trilling, D., Edwards, C. S., Nolan, M. C., Lyster, D., **Robinson, L.**, Klesh, A. T., Seybold, C. C., “Lunar Trailblazer Spacecraft Tracking and Mission Recovery Attempt: Characterization of Status and Behavior of a Non-Cooperative Object in Cis-Lunar Space”. In: *Earth and Space Science* (2025). Submitted to the Lunar Trailblazer special collection.

**Robinson, L.**, Frueh, C., “A CCD/CMOS Telescope Digital Twin for Space Situational Awareness”. In: *Advances in Space Research* 76.5 (2025), pp. 3074–3097. DOI: <https://doi.org/10.1016/j.asr.2025.06.053>.

**Robinson, L.**, Frueh, C., “Global Light Curve Attitude Estimation With Noisy Measurements and Inertia Uncertainty”. In: *Journal of Astronautical Sciences* (2025). Revisions submitted.

**Robinson, L.**, Steckel, A., Frueh, C., Ehlmann, B., “Lunar Trailblazer Attitude Inversion from Ground-Based Light Curves with Material Sensitivity Analysis”. In: *Earth and Space Science* (2025). Submitted to the Lunar Trailblazer special collection.

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## Conference Proceedings

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Frueh, C., Burton, A., Kobayashi, D., **Robinson, L.**, “Space Object Characterization from Light Curves”. In: *44th COSPAR Scientific Assembly. Held 16-24 July 44* (2022), p. 3159.

**Robinson, L.**, Frueh, C., “Light Curve Inversion for Reliable Shape Reconstruction of Human-Made Space Objects”. In: *Proceedings of the 32nd AIAA/AAS Astrodynamics Specialist Conference*. Sept. 2022, pp. 1–19.

Burton, A., **Robinson, L.**, Frueh, C., “Attitude Estimation from Scratch for Human-Made Objects Using Light Curves”. In: *The Second International Orbital Debris Conference*. 2023.

Burton, A., **Robinson, L.**, Frueh, C., “Attitude Estimation Using Light Curves: A Particle Swarm Approach”. In: *AIAA SciTech 2024 Forum*. 2024.

**Robinson, L.**, Frueh, C., “Optimal Light Curve Attitude Inversion with Measurement Noise: Two Case Studies”. In: *Proceedings of the 9th European Conference on Space Debris*. European Space Agency. Bonn, Germany, Apr. 2025.

**Robinson, L.**, Frueh, C., “High-Fidelity Measurement Model for Space Debris Laser Ranging”. In: *Proceedings of the AIAA/AAS Astrodynamics Specialist Conference*. In preparation. 2026.

**Robinson, L.**, Frueh, C., “Simultaneous Attitude and Shape Constraints Using Space Debris Laser Ranging”. In: *Proceedings of the AIAA/AAS Astrodynamics Specialist Conference*. In preparation. 2026.

## Symposiums and Presentations

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“Light curve inversion for shape reconstruction of human-made space objects”. In: *AAE Research Symposium, Purdue University*. 2023.

“Non-Convex Shape Inversion from Light Curves”. In: *AAE Research Symposium, Purdue University*. 2023.

“Modeling and Observation Processing for Advanced Shape and Attitude Estimation”. In: *University of Bern, Switzerland*. 2024.

“Optimal Light Curve Attitude Inversion with Measurement Noise: Two Case Studies”. In: *AAE Research Symposium, Purdue University*. 2025.

## Thesis

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**Robinson, L.** “Light Curve Simulation and Shape Inversion for Human-Made Space Objects”. Master’s Thesis. Purdue University, Dec. 2023.

## Industry Employment

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<b>Space Information Dynamics Group</b> – Graduate Research Assistant	October 2021 – Present
<b>Astronomical Institute, University of Bern, Switzerland</b> – Visiting Ph.D. student	May 2024 – Aug 2024
<b>The Aerospace Corporation</b> – Graduate Astrodynamics Intern	May 2023 – Aug 2023
<b>Katalyst Space Technologies</b> – Guidance, Navigation, and Control Intern	May 2022 – Aug 2022
<b>Analytical Graphics, Inc.</b> – Systems Engineering Intern	Jan 2021 – May 2021

## Professional Service

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- Referee: Journal of the Astronautical Sciences

## Academic Outreach

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**Founder of Boilerexams.com** Aug 2019 – Present

- Lead team of 50 develop and maintain website to provide exam studying resources to questions to fellow Purdue students with 8,400,000 questions answered as of July 2025
- Published 80 hours of video explanations covering 500 questions from past Purdue calculus exams
- Aided over 20,000 students through 22 years of cumulative studying time and 750,000 video views to date