Jonah A. Wilkes

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Summary

Aerospace Engineering student at Illinois Institute of Technology pursuing a combined B.S./M.S. in Mechanical and Aerospace Engineering (expected Spring 2026) with a completed minor in Astrophysics. Experienced in Python and MATLAB programming, mission design, dynamics analysis, and technical research. Lead author on a forthcoming astrophysics publication analyzing binary star systems and contributing author on a GNSS-Reflectometry study. Skilled in systems integration, optimization, and multidisciplinary collaboration, with a unique background bridging aerospace engineering and astrophysics. Recognized for developing optimization tools for aircraft design and contributing to NASA L'SPACE mission design programs. Seeking an entry-level role in Systems Engineering, GNC, Propulsion, or related aerospace disciplines where I can apply my technical expertise, research experience, and teamwork skills.

Experience

May 2025 - Current

Aerospace Research Assistant Armour College of Engineering, IIT

- Developed code to process Global Navigation Satellite System - Reflectometry (GNSS-R) signals collected from Antarctic glacial surface study sites using MATLAB, funded through the NASA Illinois Space Grant Consortium.
- Extracted surface reflection characteristics from raw satellite data, applying signal processing techniques to extract SNR from different probe signals.
- Contributing results to an upcoming peer-reviewed publication, demonstrating research dissemination and technical communication skills.

May 2024 - Current

Astrophysics Research Assistant Department of Physics, IIT

- Primary author on a forthcoming publication investigating binarity in stellar systems, building upon Sub-Subgiant research.
- Analyzed stellar spectra in Python to derive radial velocity curves for 98 binary systems, extracting orbital parameters and characterizing system dynamics.
- Applied Monte Carlo simulations to generate synthetic stellar populations, enabling direct comparison between modeled distributions and observed data.

May 2025 - August 2025

NASA L'SPACE Professional Development Training (MCA) NASA

- Performed the duties of the primary Mechanical Engineer and produced a CAD model integrating mechanical, payload, thermal, power, and communications subsystems using Siemens NX.
- Developed a Concept of Operations (ConOps) with four distinct mission phases, coordinating across disciplines to ensure system feasibility.
- Designed a Mars Rover mission under NASA standards, advancing the project through Preliminary Design Review and presented to a Standing Review Board.

August 2024 - December 2024

Aerospace Research Assistant Armour College of Engineering, IIT

- Developed design and optimization algorithms in Python to accelerate conceptual aircraft design, specifically for improving on the design of a Boeing 737.
- Improved the process of generating and evaluating designs, enabling rapid exploration of full design spaces across any number of variables and configurations.
- Consolidated methods into an application that streamlined comparisons, significantly reducing design cycle time while improving coverage of design tradeoffs.
- Awarded the First Place prize, at the Fall 2024 Armour R&D Expo.

May 2024 - August 2024

NASA L'SPACE Professional Development Training (NPWEE) NASA

- Contributed to technical writing and mission design, gaining hands-on experience with NASA proposal standards and review processes.
- Collaborated in a multi-disciplinary team to prepare a full NASA-style mission proposal, reviewed through official NASA channels.
- Participated on a NASA-style proposal review board, evaluating and providing feedback on peer team submissions.

Education

Fall 2021 - Present

Illinois Institute of Technology Chicago, IL

Bachelor of Science in Aerospace Engineering *ABET Accredited*

Master of Science in Mechanical and Aerospace Engineering *ABET Accredited*

Minor in Astrophysics *Completed Fall 2024*

Cumulative GPA: 3.840/4.0

Expected Graduation: May 2026

- **Armour College of Engineering Dean's List:** Every semester enrolled (Fall 2021 – Spring 2025)
- **IIT STEM Scholarship Recipient**
- **Relevant Courses:** Aerospace Propulsion, Spacecraft Dynamics & Design, Aircraft Design, Optimal State Estimation, Navigation Systems, Aerodynamics, Aerostructures, Compressible Flow, Computational Mechanics, Observational & Extragalactic Astrophysics, Geographic Information Systems (GIS)

Technical Skills

Programming & Data Analysis:

- Python, MATLAB, Monte Carlo simulations, data visualization, Signal processing (GNSS-R), Statistical modeling & analysis

Aerospace Modeling & Simulation:

- STK (orbital & mission analysis), AVL, XFLR5, OpenRocket, Simulink, Porkchop plots & Lambert solvers, Optimal state estimation, and spacecraft dynamics modeling

CAD & Mechanical Design:

- Siemens NX (Certified), SolidWorks, Rover subsystem integration (mechanical, payload, thermal, comms), 3D assemblies & mechanical drawings, Siemens NX software

Astrophysics & Remote Sensing:

- Spectroscopy, Photometry, Radial velocity analysis, Population modeling, GNSS-Reflectometry (SNR extraction, surface reflection characterization), Orbital mechanics (binary star dynamics, mission profiling)

Mission Design & Systems Engineering:

- Concept of Operations (ConOps), Systems integration, NASA technical and proposal writing & review (L'SPACE MCA & NPWEE), Trade studies, Sensitivity analysis, Design reviews (SRR/PDR)

Experimental & Lab Experience:

- Wind tunnel testing, Instrumentation, Error analysis, Experimental design & data reduction

Professional Skills:

- Technical writing & publications, Public speaking & presentations, Team leadership & collaboration, Cross-disciplinary communication

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Extracurriculars

Fall 2021 - Present **Illinois Tech Baseball**

Starting Catcher; developed leadership, teamwork, and resilience as a core member of varsity athletics.

Fall 2022 - Present **Illinois Tech Rocketry Club**

Member of the Illinois Tech Rocketry Club