

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

Bachelor of Science in Aerospace Engineering

Chicago, IL

Master of Science in Mechanical and Aerospace Engineering

ABET Accredited

Minor in Astrophysics

ABET Accredited

Completed Fall 2024

Cumulative GPA: 3.824/4.0

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

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