Linyi (Tiger) Hou

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Education

Ph.D. in Aerospace Engineering, University of Illinois Urbana-Champaign — Jun 2021 - present
B.S. in AE, Minor in CompE, University of Illinois Urbana-Champaign — Aug 2017 - May 2021

Work Experience

University of Illinois Urbana-Champaign

Teaching Assistant (AE 202, AE 443, AE 483) — Jun 2021 - present

- Assisted in developing firmware and software for a quadrotor-based control systems course in C and Python.
- Taught fundamentals of orbital mechanics, flight mechanics, and systems engineering to undergraduates.

Collins Aerospace

Software Engineering Intern — May 2019 - Aug 2019

- Expanded OS compatibility and upgraded UI for an avionics data interpreter tool using Python and C++.
- Automated weekly builds using Python with TortoiseSVN, reducing manual labor by one hour per week.

Research Experience

Astrodynamics and Planetary Exploration Group (APEX) — Advisor: Dr. Siegfried Eggl

Lost-in-space-and-time Navigation using Variable Stars — Nov 2022 - present

- Developed an optical navigation technique for autonomous spacecraft navigation without knowledge of time and position using only commercial off-the-shelf (COTS) star trackers.
- Assessed algorithm performance using Monte Carlo simulation, demonstrated feasibility of reestablishing Earth contact using the proposed method.

Aerospace Mission Analysis Laboratory — Advisor: Dr. Zachary R. Putnam

Lost-in-space X-ray Pulsar Navigation — Jun 2021 - present

- Developed an ambiguity resolution algorithm for identifying spacecraft position, with considerations for geometric and relativistic time delays in pulsar timing.
- Developed a simulation framework in C++, Python, and GMAT for simulating pulsar-based navigation.
- Demonstrated feasibility of performing ambiguity resolution in context of the lost-in-space problem.

Velocity-based Initial Orbit Determination — Aug 2019 - present

- Developed a new initial orbit determination (IOD) technique using sequential range-rate measurements.
- Assessed the performance of various velocity-based IOD methods using Monte Carlo simulation.

Space Systems Optimization Laboratory — Advisor: Dr. Koki Ho

Architecture Trade Studies on IRSU Technologies for Human Space Exploration — Sep 2018 - Sep 2019

- Conducted literature review of in-situ resource utilization (ISRU) technologies to quantify input/output rates of technology options for an architecture optimization tool.

Skills

Programming Languages	Python, C/C++, MATLAB
Software/Prepackaged Tools	LaTeX, Git, GMAT
Operating Systems	Linux, MacOS, Windows
Languages	English, Mandarin Chinese

Awards

Best Student Paper, 46th AAS GN&C Conference Feb 2024
American Astronautical Society (AAS) Rocky Mountain Section

Yee Fellowship Fall 2021 - Spring 2022
Grainger College of Engineering, University of Illinois Urbana-Champaign

David and Catherine Thompson Space Technology Scholarship Jun 2020
American Institute of Aeronautics and Astronautics (AIAA)

H.S. Stillwell Problem Solving Award Mar 2020
Department of Aerospace Engineering, University of Illinois Urbana-Champaign

Robert W. McCloy Memorial Award Mar 2019
Department of Aerospace Engineering, University of Illinois Urbana-Champaign

Dean's List Fall 2017 - Spring 2021
University of Illinois Urbana-Champaign

James Scholar Spring 2018 - Spring 2021
University of Illinois Urbana-Champaign

Journal Articles

[4]**L. Hou** and Z. R. Putnam, "Autonomous Initial Orbit Determination using Sequential Range-Rate Measurements", The Journal of the Astronautical Sciences **under review**.

[3]**L. Hou** and Z. R. Putnam, "A Norm-Minimization Algorithm for Solving the Lost-in-Space Problem with XNAV", The Journal of the Astronautical Sciences **71**, 6 (2024).

[2]H. Chen et al., "Multifidelity Space Mission Planning and Infrastructure Design Framework for Space Resource Logistics", Journal of Spacecraft and Rockets **58**, 538–551 (2021).

[1]H. Chen et al., "Integrated In-Situ Resource Utilization System Design and Logistics for Mars Exploration", Acta Astronautica **170**, 80–92 (2020).

Conference Proceedings

[7]**L. Hou** et al., "Lost-in-space Position and Time Determination via Star Tracker Observations of Periodic Variable Stars (AAS-24-012)", in 46th Rocky Mountain AAS GN&C Conference (Feb. 2024).

[6]A. Auster et al., "Mars Ice Thermal Harvesting Rig & ISRU Laboratory (MITHRIL)", in *ASCEND 2022* (Aug. 2022), p. 4249.

[5]**L. Hou** and Z. R. Putnam, "A Norm-minimization Method for Solving the Cold-Start Problem with XNAV", in AAS/AIAA Astrodynamics Specialist Conference, AAS 22-560 (Aug. 2022).

[4]**L. Hou** and Z. R. Putnam, "Initial Orbit Determination from Sequential Line-of-Sight Velocity Measurements", in AAS/AIAA Astrodynamics Specialist Conference, AAS 22-561 (Aug. 2022).

[3]**L. Hou**, K. Lohan, and Z. R. Putnam, "Comparison and Error Modeling of Velocity-Based Initial Orbit Determination Algorithms", in AAS/AIAA Space Flight Mechanics Meeting, AAS 21-280 (Feb. 2021).

[2]H. Chen et al., "Multi-Fidelity Space Mission Planning and Space Infrastructure Design Framework for Space Resource Logistics", in AIAA Propulsion and Energy 2019 Forum (2019), p. 4134.

[1]H. Chen et al., "Integrated Analysis Framework for Space Propellant Logistics: Production, Storage, and Transportation", Lunar ISRU 2019-Developing a New Space Economy Through Lunar Resources and Their Utilization **2152**, 5003 (2019).