Kaylee Barrera

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Education

Massachusetts Institute of Technology, Cambridge, MA
S.B in Earth, Atmospheric, and Planetary Sciences; S.B in Physics — Expected May 2026

Research Experience

MIT Planet Formation Lab — October 2025 – Present
Advisor: Prof. Richard Teague

Conducting senior thesis research modeling ALMA observations of the protoplanetary disk Gomez's Hamburger using `RadJAX`, a physics-motivated neural field framework to constrain density and temperature profiles.

MIT Kavli Institute & Lamat REU Program — June 2024 – Present
Advisors: Dr. Sarah Blunt & Prof. Andrew Vanderburg

Developed `eurydice`, a Python package for cross-validating Gaussian Process models of stellar activity in radial velocity data. Modeled the HD 63433 planetary system as a test case to compare multiple GP modeling approaches and assess the reliability of planet mass measurements. Submitted a first-author paper to *The Astronomical Journal* and publicly released `eurydice`.

MIT Remote Observing Lab — February 2025 – June 2025
Advisors: Dr. Michael Person & Dr. Artem Burdanov

Built upon 12.411 Astronomy Field Camp projects by applying time-series analysis using Python and Tycho Tracker to generate light curves and determine rotational periods of a near-Earth asteroid and a brown dwarf binary in a rare triple system.

MIT Wallace Observatory — May 2023 – August 2023
Advisor: Dr. Michael Person

Captured 100+ hours of photometric data with 5 telescopes as part of a 6-person team. Processed light curves for 8 Koronis asteroids and Pluto to study rotational and surface variability using AstroImageJ and Python. Produced two co-authored publications in *Minor Planet Bulletin*.

Publications

4. **Barrera, K.**, Blunt, S., Vanderburg, A., et al. "Cross Validation with `eurydice` Yields Reliable Planet Mass Constraints in the HD 63433 System", *submitted to The Astronomical Journal*.
3. Brothers, T. C., Abbasi, F. N., Ekelmann, J., et al. (including **Barrera, K.**) "Lightcurve and Rotation Period of Near-Earth Asteroid 887 Alinda During the 2025 Close Approach". *Minor Planet Bulletin*, 52, 211 (2025)
2. Slivan, S. M., **Barrera, K.**, Colclasure, A. M., et al. "Lightcurves and Derived Results for Koronis Family Member (452) Hamiltonia". *Minor Planet Bulletin*, 51, 176 (2024)
1. Slivan, S. M., **Barrera, K.**, Colclasure, A. M., et al. "Lightcurves and Derived Results for Koronis Family Member (5139) Rumoi Including a Discussion of Measurements for Epochs Analysis". *Minor Planet Bulletin*, 51, 6 (2024)

Research & Conference Presentations

Talks:

2025 Lamat Research Symposium *(Santa Cruz, CA)*	August 2025
MIT Astronomy Field Camp Symposium at the IAC *(La Laguna, Tenerife, Spain)*	January 2025
MIT Stellar Contamination Workshop *(Cambridge, MA)*	September 2024
Summer MIT Kavli Institute Undergraduate Research Forum *(Cambridge, MA)*	August 2024

Posters:

247th American Astronomical Society Meeting *(Phoenix, AZ)*	January 2026
EAPS Community Research Showcase *(Cambridge, MA)*	September 2025
2025 Sagan Summer Workshop *(Virtual)*	July 2025
Extremely Precise Radial Velocities 6 *(Porto, Portugal)*	July 2025
Emerging Researchers in Exoplanet Science Symposium X *(Princeton, NJ)*	June 2025

Awards & Fellowships

Lamat Fellowship (NSF REU program), University of California, Santa Cruz — Summer 2025
The EAPS Undergraduate Achievement Award, MIT EAPS Dept. — May 2025

Leadership

MIT Undergraduate Women in Physics (UWiP)
Co-President — March 2025 – Present
Social Chair — March 2024 – March 2025

Earth, Atmospheric, and Planetary Sciences (EAPS) Undergraduate Council
President & EAPS Student Advisory Committee Undergraduate Representative — February 2025 – Present

Outreach

Letters to a Pre-Scientist, Pen Pal — September 2025 – Present
Wallace Observatory Outreach Program, Volunteer Tour Guide — Fall 2025

Teaching

Undergraduate TA for 12.409 (Hands-On Astronomy: Observing Stars and Planets) — Spring 2025
Department of Earth, Atmospheric, and Planetary Sciences, MIT

Skills

Programming Languages: Python, MATLAB, LaTeX
Projects: `eurydice` (Lead Developer)
Professional Memberships: American Astronomical Society, Society of Physics Students, American Physical Society

Last updated: Dec 30, 2025