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 June 2026

Research Experience

MIT Kavli Institute, Cambridge, MA — June 2024 – Present
Undergraduate Researcher — *Advisors: Dr. Sarah Blunt & Prof. Andrew Vanderburg*

- Developed a Python package titled *eurydice* to perform cross-validation tests on Gaussian Process (GP) models of stellar activity for radial velocity measurements of exoplanets.
- Utilized *eurydice* and MCMC algorithms to optimize a new GP model for the HD 63433 planetary system to further constrain the masses of three planets.

MIT Remote Observing Lab, Cambridge, MA — February 2025 – June 2025
Undergraduate Researcher — *Advisor: Dr. Michael Person & Dr. Artem Burdanov*

- Continued analysis of data collected at the IAC, focusing on variability in the VHS 1256-1257 brown dwarf system and rotational light curves of asteroid 2024 PT5.
- Applied time-series analysis techniques using *prose* (Python) and *Tycho Tracker* to produce light curves and identify key periods.

Instituto de Astrofísica de Canarias (IAC), Tenerife, Spain — January 2025
Visiting Undergraduate Researcher — *Advisor: Dr. Artem Burdanov*

- Operated professional meter-class telescopes at Teide Observatory during a three-week intensive observational astronomy research course.
- Collected and began preliminary analysis of photometric data for the triple brown dwarf system VHS 1256-1257 and asteroid 2024 PT5.

MIT Wallace Observatory, Westford, MA — May – August 2023
Undergraduate Researcher — *Advisor: Dr. Michael Person*

- Planned and captured 100+ hours of photometric observations with 5 different telescopes as part of a team of 6 undergraduates.
- Processed and analyzed light curves for 8 Koronis family asteroids and Pluto to measure photometric changes over their rotational periods using *AstroImageJ*.

Publications

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:

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:

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 — 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
Co-Vice President of Social — March 2024 – March 2025

Earth, Atmospheric, and Planetary Sciences (EAPS) Undergraduate Council
President — February 2025 – Present

Teaching

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

- Assisted 13 students with fundamental concepts for amateur astronomy, such as skills for sky navigation, astrophotography, and telescope use.

Skills

Programming Languages: Python, MATLAB, LaTeX
Workshops: Code/Astro (2024), Sagan Summer Workshop (2025), Other Worlds Laboratory (2025)
Memberships: Society of Physics Students, American Physical Society

Last updated: August 4, 2025