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.

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

- Operated professional meter-class telescopes (IAC80, Telescopio Carlos Sánchez, and SPECULOOS Artemis) at Teide Observatory during a three-week intensive research course.
- Processed and analyzed photometric data to characterize the variability of the triple brown dwarf system VHS 1256-1257 and rotational light curves of 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 (2024)
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)

Conference Presentations

Contributed Talks:

MIT Astronomy Field Camp Symposium at the IAC (La Laguna, Tenerife, Spain) — January 2025
Characterizing the Photometric Variability of the Triple Brown Dwarf System VHS1256-1257

MIT Stellar Contamination Workshop (Cambridge, MA) — September 2024
eurydice: A New Software Package for Evaluating Gaussian Process Models of Stellar Activity Signals

Summer MIT Kavli Institute Undergraduate Research Forum (Cambridge, MA) — August 2024
eurydice: A New Software Package for Evaluating Gaussian Process Models of Stellar Activity Signals

Posters:

Extremely Precise Radial Velocities 6 (Porto, Portugal) July 2025
Evaluating Gaussian Process Models of Stellar Activity in Radial Velocity Data

Emerging Researchers in Exoplanet Science Symposium X (Princeton, NJ) June 2025
Evaluating Gaussian Process Models of Stellar Activity in Radial Velocity Data

Awards and Fellowships

Lamat Fellowship at the University of California Santa Cruz Summer 2025
The EAPS Undergraduate Achievement Award May 2025

Departmental 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

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
Workshops: Code/Astro (2024)
Memberships: Society of Physics Students, American Physical Society

Last updated: June 26, 2025