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 J1256-1257 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

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 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 (SMURF) — August 2024
eurydice: A New Software Package for Evaluating Gaussian Process Models of Stellar Activity Signals

Departmental Leadership

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

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: March 1, 2025