CURRICULUM VITAE

# Lily Larkins

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***Objective:*** *To use my strong science, mathematics, organizational, communication, teamwork, and business analyst skills to contribute to the overall success of an organization or program focused on Astrophysics. I am an intelligent, hard-working, and punctual person looking for a beginning opportunity.*

***Research Interests:*** *My goal is to continue my passion and pursuit of astrobiology research, ultimately obtaining my Ph.D. in the field. I am particularly interested in using observational astronomy for the detection and characterization of exoplanets, as well as the habitability of exoplanets.*

## EDUCATION

B.S., Astrophysics — June 2025
University of California, Santa Cruz
Cumulative GPA: 3.37

## RESEARCH EXPERIENCE

*Postbaccalaureate Research Assistant* — August 2025 – August 2026
(Position on hold due to 2025 NASA funding constraints)
NASA SURA CRESST II
Advisor: Dr. Avi Mandell

Successful candidate for the postbaccalaureate research position to support the Astrophysics Science and Solar System Exploration Divisions at NASA / Goddard Space Flight Center in Greenbelt, MD. Position was expected to be funded by Southeastern Universities Research Association (SURA) for the Center for Research and Exploration in Space Science and Technology II (CRESST II). Specifically, working under Dr. Avi Mandell on exoplanet spectroscopy modeling with the Planetary Spectrum Generator and development of the open-access exoplanet software database called the Exoplanet Modeling & Analysis Center. As of July 2025, position is currently on hold or cancelled due to 2025 NASA funding constraints.

*Undergraduate Research Assistant* — May 2024 - Current
University of California, Santa Cruz

Advisor: Dr. Artem Aguichine

I began research with Dr. Aguichine, a Postdoctorate working under Professor Natalie Batalha. Dr. Aguichine's project focuses on developing a theoretical temperature model for exoplanets with molten interiors, exploring how different equations of state (EOS) affect the thermal dynamics within these planets. My role in this research involved actively assisting Dr. Aguichine with his upcoming paper and project. Specifically, I was responsible for manipulating and improving the data integrated into his Python-based models. The goal was to investigate how adjustments in the data or equations of state could change the theoretical temperature model of smaller planets, and to understand the implications for larger, high-mass exoplanets. These models are crucial for predicting how internal heat and molten dynamics influence the surface conditions, atmosphere, and potential habitability of these distant worlds. A significant part of the research involved continuous improvements to the smaller-scale temperature model. My tasks included refining the input parameters and algorithms, ensuring that the model could be scaled and extrapolated to apply to larger exoplanets. This required an understanding of planetary science, thermodynamics, and Python programming, as well as a careful analysis of how the equations of state impacted temperature distribution within exoplanets' interiors. Our long-term objective was to make more accurate predictions for high-mass exoplanets, particularly those that may be observed by next-generation space telescopes, like the James Webb Space Telescope (JWST) and the Hubble Space Telescope. Dr. Aguichine and I aimed to improve the model's accuracy so that it could be compared against data already collected from these telescopes, helping to validate or refine current theoretical models of exoplanetary interiors and atmospheres.

*Undergraduate Research Assistant* January 2024 - June 2024
University of California, Santa Cruz
Advisor: Dr. Francis Nimmo

While working under the guidance of Professor Nimmo, I was tasked with digitizing and analyzing lunar magnetic field data. The primary focus was on the paper titled "Magnetic Field in Le Monnier Bay According to Data of Lunokhod 2" by Sh. Sh. Dolginov, Ye. G. Yeroshenko, L. N. Zhuzgov, and V. A. Sharova. This paper provided magnetic field measurements recorded by the Lunokhod 2 rover during its exploration of the lunar surface, particularly in Le Monnier Bay. I manually outlined the magnetic field lines from the paper's figures, documenting the changes in magnetic field strength and direction as recorded by the rover. After this meticulous manual process, I digitized the field lines using software tools, translating the hand-drawn diagrams into data points that could be further manipulated and analyzed computationally. Once digitized, I assigned a physical scale to these magnetic field lines, allowing for the conversion of the raw data into meaningful real-world measurements. Using Python, I then extrapolated these values to match the lunar geography, aligning the magnetic field data with the actual coordinates and travel path of the Lunokhod 2 rover. This required precise calibration of the data to fit the scale of the lunar terrain, taking into account the rover's movement and the magnetic field's

behavior in relation to lunar features. Throughout the project, I collaborated closely with Professor Nimmo, meeting weekly to discuss progress and challenges. I also exchanged emails whenever I encountered something particularly noteworthy or required further guidance on how to proceed.

## PUBLICATIONS

- Larkins, L., Aguichine A., "Thermal effects on the bulk density of rocky planets: the Earth-like composition band" (pending)

## COMPUTER AND EDUCATIONAL SKILLS

- Extensive Python and SciPy knowledge.
- Knowledge of Mac OS, Windows, Word Processing, Spreadsheet, and Databases. These include: Microsoft Office including Outlook, Word, Excel, and PowerPoint. Also includes Google suite of office and collaboration tools.
- ASTR136 Advanced Astronomy Lab Fall 2024
  Instructor: Rebecca Jensen-Clem
  Acquired skills in remote observing on the Nickel telescope located at the Lick Observatory on Mt. Hamilton. Also acquired skills in in-person observing on the Shane telescope, also located at Lick Observatory. Used the CCD Camera on the Nickel to data reduce to measure and document variable stars, as well as use the spectrograph on the Shane to measure and document galaxy rotation.

## SCHOLARSHIPS, AWARDS AND GRANTS

- National Science Foundation (NSF) Graduate Research Fellowship (2025 - not accepted)
  - Paper Title: Chemical Tracers for Potential Biosignatures in Ocean Worlds
    Discusses the importance and usefulness of investigating the potential habitability of icy moons and its impact on the search for habitable exoplanets.

## MEMBERSHIPS

- Society of Physics Students at UC Santa Cruz
- Woman in Physics and Astrophysics at UC Santa Cruz
- American Astronomical Society
- Project Management Institute (PMI)

## OTHER COMMUNITY INVOLVEMENT

- Speaker and Attende at the Other Worlds Laboratory Exoplanet Summer Conference Summer 2025
- Attendee of weekly Planetary Science research meetings at UC Santa Cruz, presented by faculty, professors, and graduate students Fall 2024