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Efrain Alvarado III

Master's Student

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Education

San Francisco State University — **San Francisco, CA**
M.S. in Astronomy and Astrophysics — *Expected 2026*
University of California, Berkeley — **Berkeley, CA**
B.A. in Astrophysics — *Awarded on Aug 2023*
Sacramento City College — **Sacramento, CA**
Full IGETC Certificate — *Awarded on July 2021*

Publications

- Brooks, H.; Burgasser, A.J.; Gerasimov, R.; **Alvarado III, E.**; *et al.*, 2026, *The BONES Project: Empirical and Predicted Photometric Tools For Identifying Low-Metallicity Ultracool Dwarfs*, (In Prep.).
- Gendreau-Distler, E.G.; Bostow, K.B.; Patra, K.C.; **Alvarado III, E.**; et al., 2025; Transit Timing of the White Dwarf-Cold Jupiter System WD 1856+534, Submitted to ApJ. (arXiv:2511.21611) [Citations]
- Zheng, W.; Dessart, L.; Filippenko, A.V.; *et al.* (39 other co-authors including **Alvarado III,E.**), 2025, *SN 2023ixf in the Pinwheel Galaxy M101: From Shock Breakout to the Nebular Phase*, ApJ, **998**, 61. (arXiv:2503.13974)[15 Citations]
- **Alvarado III, E.**; Bostow, K.B.; Patra, K.C.; *et al.*, 2024, *Searching for Tidal Orbital Decay in Hot Jupiters*, MNRAS, **534**, 1, 800-813. (arXiv:2409.04660)[7 Citations]
- Burgasser, A.J.; Gerasimov, R.; Kremer, K.; Brooks, H.; **Alvarado III, E.**; *et al.*, 2024, *Discovery of a Hypervelocity L Subdwarf at the Star/Brown Dwarf Mass Limit*, ApJL **971**, L25. (arXiv:2407.08578) [6 Citations]
- Gerasimov, R.; Bedin, L.R.; Burgasser, A.J.; Apai, D.; Nardiello, D.; **Alvarado III, E.**; & Anderson, J., 2024, *JWST Imaging of the Closest Globular Clusters – II. Discovery of Brown Dwarfs in NGC 6397 and Measurement of Age from the Brown Dwarf Cooling Sequence, using SANDee – a New Grid of Model Isochrones across the Hydrogen-Burning Limit*, ApJ, **971**, 65. (arXiv:2405.01634) [13 citations]
- **Alvarado III, E.**; Gerasimov, R.; Burgasser, A.J.; Brooks, H.; Aganze, C.; & Theissen, C.A., 2024, *The Spectral ANalog of Dwarfs (SAND) Grid: New Model Atmospheres with Varying Chemistry for Galactic Archaeology with Ultracool Dwarfs*, Res. Notes AAS, **8**, 134. [12 citations]

Research Experience

Graduate Research Assistant — **Aug 2024 — Present**
Researcher under Prof. Eileen C. Gonzales — *San Francisco, CA*

- I am investigating how metallicity impacts the structure and atmospheres of brown dwarfs. To do this, I have performed atmospheric retrievals using the code `Brewster`. I have utilized the NASA Ames supercomputer- Pleiades- as well as the San Francisco State University (SFSU) cluster, -Polaris, to compute these models.
- I have utilized data from the state-of-the-art James Webb Space Telescope, specifically from the Arcana of the Ancients program.

Undergraduate Researcher — **June 2023 — June 2024**
Researcher under Prof. Adam J. Burgasser and mentored by Dr. Roman Gerasimov — *San Diego, CA*

- I computed a grid of atmospheric models of low-temperature, metal-poor Ultracool Subdwarfs (UCDs) by using proprietary PHOENIX code of these objects at various low-metallicities, surface gravities, and effective temperatures, utilizing Bridges-2, a supercomputer located in Pittsburgh, PA.
- Used the Modules for Experiments in Stellar Astrophysics (MESA) code to investigate the impact of low metallicities on the evolution of UCDs populations in the Milky Way.
- Selected as a two-year leadership scholar to do two years of fully funded STEM research under the University of California Leadership Excellence through Advanced Degrees (UC LEADS) program.

Undergraduate Researcher — **June 2022 — Aug 2024**
Student Led Researcher mentored by Dr. Kishore C. Patra and Nickel Observer under Prof. Alexei V. Filippenko — *Berkeley, CA*

- **Student Led Research Project**: I led 14 students on a research project on detecting orbital decay of Hot Jupiter systems. Work was fully funded by UC LEADS.
  - Co-authored two successful telescope-time proposals for 1-m Nickel Telescope at Lick Observatory
  - Reduced and analyzed data that was collected from the 1-meter Nickel Telescope. I conducted the statistical analysis and modeled the data to investigate whether the orbits of the exoplanets were undergoing tidal decay.
- **Nickel 1-Meter Observer**: Monthly overnight observer on the Nickel at Lick Observatory.
  - Successfully completed training and certification as a Nickel observer, conducting observations for 15+ nights.

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Skills & Assists

Operating System	Windows OS, Mac OS, and Linux
Programming Languages	Python , MATLAB, HTML, CSS, Fortran
Libraries	NumPy, SciPy, Astropy, Astroquery, Matplotlib, emcee, Pandas, BaiscATLAS, MESA, PHEONIX
Software and Tools	AstroImageJ, SAOImageDS9 FITS Liberator, LaTeX, Jupyter, GitHub
High Performance Computing	PSC Bridges-2, NASA Pleiades Supercomputer, SFSU Cluster (POLARIS)

Conferences

- 2025 National Society of Black Physicists and Nation Society of Hispanic Physicists Joint Annual Conference. Gave a 15-minute talk about my Master's reacher project titled "A Tale of Two Dwarfs: Unveiling J1416 A and B with James Webb Space Telescope" [Slides]
- 244st American Astronomical Society Meeting. Poster presentation titled "Probing the Early History of the Milky Way with New Models of Metal-poor Brown Dwarfs". [Poster]
- 2023 Summer Research Conference (SRC) at UC San Diego. Presented a talk called 11 Probing the Early History of the Milky Way throughPHOENIX/ATLAS/MESA Models of Ultracool Dwarfs," discussing atmospheric and evolutionary models for Ultracool Subdwarfs to a general audience. [Slides]
- 241st American Astronomical Society Meeting
- 2023 Koret UC LEADS Research and Leadership Symposium. Poster presentation of my work "Searching for Evidence of Tidal Orbital Decay in Hot Jupiters". [Poster]

Awards

- **University of California Leadership Excellence Through Advanced Degrees (UC LEADS):** A two year program nurturing future STEM leaders by identifying and empowering promising undergraduates, overcoming challenges in their academic journey to graduate school.
- UC LEADS Travel Grant
- Berkeley Scholarship
- Kazuko Walson Scholarship

Courses Taught at San Francisco State University

- **ASTR 116:** Astronomy Laboratory (2 Sections in Fall 2024, 2 Sections in Spring 2025, 1 Section in Fall 2025)

News

- "Lone Star State: Tracking a Low-Mass Star as it Speeds Across the Milky Way," Michelle Franklin, June 10, 2024 [Article] (This work was also seen on CNN and the New York Times)