

# MADELYN I. BROOME

mabroome@ucsc.edu ◊ 0000-0002-7520-5663 ◊ mibroome.github.io

University of California Santa Cruz

Department of Astronomy and Astrophysics ◊ 1156 High Street, Santa Cruz, CA 95064

## EDUCATION

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**University of California Santa Cruz, Ph.D.** October 2020 - May 2026

Thesis: *Atmospheric escape with metals and X-rays* - Advised by Ruth Murray-Clay

**Princeton University** September 2015 - 2019

**A.B. Astrophysics** - Graduated with Honors

Certificate (minor): Planets and Life

Thesis: *The Destruction of Wide Binaries by the Milky Way* - Advised by David N. Spergel

**Cambridge University** October 2019 - June 2020

**Master's of Advanced Studies in Astrophysics** - Graduated with highest mark of Distinction on Thesis (coursework ungraded)

Thesis: *Radiative Transfer in Protoplanetary Disks with Gaps* - Advised by Oliver Shorttle

## FELLOWSHIPS AND PRIZES

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*Total:* \$373,000

UCSC President's Dissertation-Year Fellowship	2026
Chahta Doctorate & Kanneube Fellowships	2025-26
Eugene Cota-Robles Graduate Fellowship	October 2020-2025
NASA ExoExplorer	2025
ARCS Foundation Fellow	2024
AAS National Osterbrock Leadership Program Fellow	2021-present
UCSC Teaching & Learning Center Graduate Pedagogy Fellow	2023
UCSC WiSE Denise Denton Women Prize for Excellence in DEI Excellence in Mentoring, UCSC Astro Dept.	June 2024 2023
Graduate Student Liaison (formerly "Head Grad")	September 2022-2023
Gregory T. Pope Prize for Science Writing	May 2019

## PRESENTATIONS (A SELECTION)

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Evaporating Worlds: Linking Theory and Observ. of Atmo. Loss - Talk	June 2026
STSci Atmospheric Escape and Replenishment - Talk	October 2025
European Planetary Science Conference - Talk	September 2025
Escape from Exoplanets Conference - Talk	June 2024
AAS Exoplanets V Conference - Talk	June 2024
Early Researchers in Exoplanets - Talk	June 2023
AAS Exoplanets IV Conference - Session talk, poster	June 2022

*Posters:* Rocky Planets IV (January 2026), Extreme Solar Systems III (March 2024), Gordon Conference (June 2023)

*Invited:* U Michigan Star and Planet Formation seminar (2025), ARCS Annual Meeting (speaker, 2024), International Conference on College Counseling (panelist, 2023), CA STEAM (panelist, 2023)

## SELECTION OF PUBLICATIONS

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1. **Broome, M.I.**, Shorttle, O., Kama, M., Booth, R.A., “*Iceline Variations Driven by Protoplanetary Disc Gaps*”, 2022, MNRAS
2. **Broome, M.I.**, Murray-Clay, R., McCann, J., Owen, J.E., “*A Fast, Open-source 1D Photoevaporation Code with Metal and Multifrequency X-ray Capabilities*”, ApJ, Accepted
3. Lloyd, R.O.P., Schreyer, E., Rogers, J., Owen, J.E., **Broome, M.I.**, et al., “*Hydrogen Escaping from a Pair of Exoplanets Smaller than Neptune*”, 2025, Nature
4. Tang, Y., Fortney, J., Murray-Clay, R., **Broome, M.I.**, “*Understanding the Origins of Super-Puff Planets: A New Mass-Loss Regime Coupled to Planetary Evolution*”, 2025, ApJ
5. Pai Asnodkar A., Wang J., **Broome M.I.**, Huang C., et al., “*PEPSI’s non-detection of escaping hydrogen and metal lines adds to the enigma of WASP-12 b*” 2024, MNRAS, 535, 1829.
6. Patra, K.I., Winn, J.N.,..., and **Broome, M.I.**, “*The Continuing Search for Evidence of Tidal Orbital Decay for Hot Jupiters*”, ApJ, 2020
7. **Broome, M.I.** & Jue, M., “*Astrobiological Media*”, UC Humanities Research Institute Foundry Journal, 2023

## PAST RESEARCH

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Hunting for Circumnuclear Water Masers with VLA (ALMA, Advisor: V. Impellizzerri)	2018
AGN Feedback in a Quasar-driven Superbubble (Advisors: J.E. Greene & A.D. Gould)	2018
Detectability of WASP-12b Orbital Decay w/ TESS (Advisors: J.N. Winn)	2017
Algorithm for Differential Chromatic Refraction (Princeton REU, Advisors: N.B. Lust)	2017

## TEACHING

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<i>Head TA</i>	October 2023-present
<b>Primary Instructor &amp; Curriculum Designer:</b> ASTR 1 - Introduction to the Universe (undergraduate course, 2023), ASTR 205 - Introduction to Teaching and Research (graduate course, 2023, 2024), ASTR 206/Equitable Mentoring for Astro Research Professional Development Fellowship (2024, 2025)	
<b>Certifications:</b> Graduate Pedagogy Fellow, Certificate in Inclusive Pedagogy, USA Rugby Level 1 Coach & USA Rugby Strength and Conditioning Coach	

## OUTREACH (A SELECTION)

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Native Star Stories Night - Lick Observatory - <i>Program founder</i>	2023-present
Lamat Undergraduate Summer Research Program - <i>Research Mentor</i>	May 2022 - August 2022
Pyar (public astronomy Python course) - <i>Instructor</i>	2020-present
UCSC Ask an Astronomer - <i>Writer</i>	2020-present
Society of Physics Students - <i>Graduate Mentor</i>	2020-present
Undergraduate Women in Physics, Princeton - <i>Co-founder, Co-president, Peer Mentor</i>	2018-2019

## RESEARCH INTERESTS

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Exoplanet Theory (formation and evolution) – Astrostatistics – Geophysics – Astrobiology

## ADDITIONAL COMPETENCIES

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<b>Languages</b>	Python, C, Fortran, R, MATLAB, IDL, Bash
<b>Software &amp; Tools</b>	MPI/OpenMP, CASA, GALA, DS9, Github, Rebound, MESA
<b>Software Development</b>	Wind-AE (fully documented, pip installable, CI tested, JOSS article)