Natasha S. Abrams

www.nsabrams.com
nsabrams@berkeley.edu
ORCID: 0000-0002-0287-3783

EDUCATION

University of California, Berkeley, PhD — Berkeley, CA
Astrophysics — Aug 2021 – Present

University of California, Berkeley, MA — Berkeley, CA
Astrophysics — Aug 2021 – May 2023

Harvard University, AB — Cambridge, MA
Astrophysics and Physics
Magna Cum Laude with Highest Honors in Astrophysics and Physics — Aug 2017 – May 2021

RESEARCH EXPERIENCE

Berkeley Fellow — Aug 2021 – Present
University of California, Berkeley — *Advisor: Jessica Lu*

Graduate Student Researcher — Oct 2020 – Present
TVS Microlensing Subgroup; Vera C. Rubin Observatory

Herchel Smith Fellow — Sept 2019 – June 2021
Harvard University — *Advisor: Christopher Stubbs*

Reischauer Summer Science Undergraduate Research Fellow — June 2019 – Nov 2020
Kavli Institute for the Physics and Mathematics of the Universe – University of Tokyo — *Advisor: Masahiro Takada*

Undergraduate Researcher — June 2017 – Aug 2017
Harvard University — *Advisor: Allyson Bieryla*

Undergraduate Researcher — Sept 2018 – May 2019
Center for Astrophysics | Harvard & Smithsonian — *Advisors: Belinda Wilkes and Mojegan Azadi*

PRISE Fellow — June 2018 – Aug 2018
Center for Astrophysics | Harvard & Smithsonian — *Advisor: Akos Bogdan*

Researcher — June 2015 – Jan 2016
American Museum of Natural History — *Advisor: Ariyeh Maller*

PUBLICATIONS

16. **Abrams, N. S.** et al. "Assessing the Impact of Binary Systems on Microlensing Using SPISEA and PopSyCLE Population Simulations". ApJ. 980. P. 103. 2025

15. **Abrams, N. S.** et al. "Microlensing Discovery and Characterization Efficiency in the Vera C. Rubin Legacy Survey of Space and Time". ApJS. 276. P. 10. 2025

14. Kaczmarek, Zofia et al. (*incl.* **Abrams, N. S.**). "On Finding Black Holes in Photometric Microlensing Surveys". arXiv e-prints. arXiv:2410.14098 (Submitted to AAS Journals). 2024

13. Fardeen, James et al. (*incl.* **Abrams, N. S.**). "Astrometric Microlensing by Primordial Black Holes with the Roman Space Telescope". ApJ. 965. P. 138. 2024

12. Rowan, Dominick M. et al. (*incl.* **Abrams, N. S.**). "A hidden population of massive white dwarfs: two spotted K + WD binaries". MNRAS. 529. Pp. 587–603. 2024

11. Perkins, Scott E. et al. (*incl.* **Abrams, N. S.**). "Disentangling the Black Hole Mass Spectrum with Photometric Microlensing Surveys". ApJ. 961. P. 179. 2024

10. Street, R. A. et al. (*incl.* **Abrams, N. S.**). "LSST Survey Strategy in the Galactic Plane and Magellanic Clouds". ApJS. 267. P. 15. 2023

9. Medford, M. S., **Abrams, N. S.**, et al., "60 Microlensing Events from the Three Years of Zwicky Transient Facility Phase One." ApJ 947 1, 2023.

8. Azadi, Mojegan et al. (*incl.* **Abrams, N. S.**). "Disentangling the AGN and Star formation Contributions to the Radio-X-Ray Emission of Radio-loud Quasars at $1 < Z < 2$". ApJ. 945. P. 145. 2023

7. Rose, Sam et al. (*incl.* **Abrams, N. S.**). "The Impact of Initial-Final Mass Relations on Black Hole Microlensing". ApJ. 941. P. 116. 2022

6. Lam, Casey Y. et al. (*incl.* **Abrams, N. S.**). "An Isolated Mass-gap Black Hole or Neutron Star Detected with Astrometric Microlensing". 933. P. L23. 2022

5. Lam, Casey Y. et al. (*incl.* **Abrams, N. S.**). "Supplement: "An Isolated Mass-gap Black Hole or Neutron Star Detected with Astrometric Microlensing" (2022, ApJL, 933, L23)". ApJS. 260. P. 55. 2022

4. **Abrams, N. S.**, and Takada, M. "Hunting Gravitational Wave Black Holes with Microlensing." *The Astrophysical Journal*, vol. 905, no. 2, Dec. 2020, p. 121.

3. **Abrams, N. S.**, Gomez, S., and Bieryla, A. "Measured Lightcurves and Rotational Periods of (16579) 1992 GO (25660) 2000 AO88, And (37652) 1994 JS1." *Minor Planet Bulletin.* July 2020. 168-169.

2. **Abrams, N. S.**, et al., "Measured Lightcurves and Rotational Periods of 3122 Florence, 3830 Trelleborg, and (131077) 2000 YH105." *Minor Planet Bulletin.* January 2020. 3-4.

1. **Abrams, N. S.**, "Galaxy Morphology Dependence on Mass and Luminosity." Proceedings of 24th International Competition "First Step to Nobel Prize in Physics"(FSNPP) 2016. Fall, 2016. 294-306.

WHITE PAPERS/TECHNICAL NOTES

9. Kruszyńska, Katarzyna et al. (*incl.* **Abrams, N. S.**). "Synergies between Roman Galactic Plane Survey and other major surveys". arXiv e-prints. arXiv:2406.14767. 2024

8. Terry, S. K., et al. (*incl.* **Abrams, N. S.**) "The Galactic Center with Roman" *Roman Core Community Survey White Paper.* June 2023.

7. Lam, Casey Y. et al. (*incl.* **Abrams, N. S.**). "Roman CCS White Paper: Characterizing the Galactic population of isolated black holes". *Roman Core Community Survey White Paper.* arXiv:2306.12514. 2023

6. Street, R. A. et al. (*incl.* **Abrams, N. S.**). "Maximizing science return by coordinating the survey strategies of Roman with Rubin, and other major facilities". *Roman Core Community Survey White Paper.* arXiv:2306.13792 *Roman Core Community Survey White Paper.* 2023

5. **Abrams, N. S.**, et al., "Microlensing Discovery and Characterization Efficiency at Different Timescales" *Rubin Observatory Cadence Note.* April 2021.

4. Hundertmark, M., et al. (*incl.* **Abrams, N. S.**) "Alerting transient phenomena in the Galactic Plane in time to coordinate follow-up" *Rubin Observatory Cadence Note.* April 2021.

3. Street, R., et al. (*incl.* **Abrams, N. S.**) "LSST Survey Footprint in the Galactic Plane and Magellanic Clouds" *Rubin Observatory Cadence Note.* April 2021.

2. Bachelet, E., et al. (*incl.* **Abrams, N. S.**) "On the observational synergies between all-sky surveys for the characterization of microlensing events" *Rubin Observatory Cadence Note.* April 2021.

1. Dawson, W., Smyth N., et al. (*incl.* **Abrams, N. S.**) "Rubin/LSST Black Hole Dark Matter Microlensing" *Snowmass2021 - Letter of Interest.* August 2020.

PRESENTATIONS

20. UC Berkeley Astronomy Lunch Talks — Feb 2025
    - Oral Presentation: "Assessing the Impact of Binary Systems on Microlensing Using SPISEA and PopSyCLE Population Simulations""

19. International Microlensing 27 Conference — Jan 2025
    - Oral Presentation: "Bias in Fitting Simulated Microlensing Lightcurves from PopSyCLE"

18. Ciela Institute's Astromerique Student Talk Series — Nov 2024
    - Invited talk: "Gravitational Microlensing in the Era of All-Sky Surveys"

17. Rubin Community Workshop July 2024
- Oral presentation: "Microlensing in the Era of All Sky Surveys"

16. Challenging Theory with Roman: From Planet Formation to Cosmology July 2024
- Oral presentation: "Assessing the Impact of Binaries on Microlensing in PopSyCLE"

15. International Microlensing 26 Conference Jan 2024
- Oral presentation: "Microlensing in the Era of All Sky Surveys"

14. 243rd American Astronomical Society Jan 2024
- Oral presentation: "Microlensing in the Era of All-Sky Surveys"

13. Rubin Project and Community Workshop Aug 2023
- Contributed Talk: "Microlensing Discovery and Characterization Efficiency in the Vera C. Rubin Legacy Survey of Space and Time"

12. UC Berkeley Astronomy Short Talks March 2023
- "60 Microlensing Events in ZTF One"

11. International Microlensing 25 Conference Aug 2022
- Contributed Talk: "Assessing the Impact of Binary Systems on Microlensing"

10. UC Berkeley Astronomy Short Talks March 2022
-"Assessing the Impact of Binary Systems on Microlensing"

9. Rubin Observatory Project and Community Workshop Aug 2021
-Oral presentation: "Microlensing Discovery, Alerts, and Characterization Efficiency at Different Timescales in the Vera C. Rubin Legacy Survey of Space and Time"

8. 238th American Astronomical Society June 2021
-Oral presentation: "What's Hiding Amongst the Pulses?: Using Phase Modulation in the Light Curves of RR Lyrae Variables to Search for Black Holes"

7. 237th American Astronomical Society Jan 2021
-Oral presentation: "Assessing the Effect of Binary Systems on Microlensing Adding Binary Systems to SPISEA and PopSyCLE"

6. UC Berkeley Astronomy Short Talks Oct 2020
-"Hunting black holes with photometric microlensing"

5. Rubin Observatory Project and Community Workshop Aug 2020
-Oral presentation: "Hunting gravitational wave black holes with microlensing"

4. San Francisco State University Dark Matter Series Guest Lecture Aug 2020
-"MACHOs"

3. 235th American Astronomical Society Jan 2020
-Oral presentation: "Assessing LSST's ability to hunt LIGO black holes with microlensing"

2. Harvard Summer Undergraduate Research Village Aug 2018
-Probing the evolution of supermassive black holes in various galaxy environments

1. 232nd American Astronomical Society June 2018
-Poster presentation: "Developing methods of determining unknown rotational periods of asteroids via observations of (3122) Florence by the Harvard Observing Project"

HONORS/AWARDS

Berkeley Fellowship 2021 – 2026

UC Berkeley Outstanding Graduate Student Instructor 2023

NSF Graduate Research Fellowship Program Honorable Mention 2022

LSSTC Enabling Science Award 2021 – 2022

John Harvard Scholar 2019 – 2020

Herchel Smith Fellowship Summer 2020
Harvard Undergraduate Science Research Program

2020 AstroTech Summer School Summer 2020

Japan Summer Science Undergraduate Research Program Summer 2019

Program for Research in Science and Engineering (PRISE) Summer 2018

Columbia Science Honors Program 2015 – 2017

National Merit Scholar Honorable Mention 2015

TEACHING EXPERIENCE

Instructor: Akamai PREP Course (Camera Obscura) Summer 2024
Professional Development Program 2024

Graduate Student Instructor: Astronomy Data Science Laboratory (Astronomy 128/256) Fall 2022
University of California, Berkeley (Prof. Jessica Lu & Prof. Aaron Parsons)

Graduate Student Instructor: Introduction to Astrophysics (Astronomy 7B) Spring 2022
University of California, Berkeley (Dr. Ryan Chornock)

Course Assistant: Nonlinear Dynamical Systems (Applied Math 108) Fall 2020
Harvard University (Dr. Sarah Iams)

RESEARCH MENTORSHIP

Graduate student advisor for UC Berkeley undergraduates advised by Prof. Jessica Lu:

- Tanay "Dex" Bhadra - Adding orbital motion to BAGLE Microlensing code — Fall 2023 - Present
- Sage Hironaka Remulla - Adding Rubin and Roman filters to PopSyCLE — Fall 2024 - Present
- Kai Marshall - Improving PopSyCLE event calculation algorithm — Summer 2024
- Abby Schleigh - Improvements to BAGLE documentation and code — Fall 2023 - Spring 2024

OBSERVING EXPERIENCE

Keck Observatory

- NIRSPEC w/ LGS AO — Co-I (Major Contribution): 1 night (Cycle 25A)
- OSIRIS Imager w/ LGS AO — Co-I (Major Contribution): 9 nights (Cycles 22A-24B)

Lick Observatory

- Shane — **PI**: 8 nights (Cycles 24B-25A)
- Automatic Planet Finder — Co-I (Minor Contribution): 180 hr (Cycles 23A-23B)
- Graduate Popper Workshop — 2023

JWST

- NIRCam Imaging — 12.1 hours (Director's Discretionary 2024-2025)

Fred Lawrence Whipple Observatory

- 60" telescope (KeplerCam) — 5 nights, 2019
- 48" telescope (FAST) — 2 nights, 2019

SERVICE

Outreach

- Wonderfest Science Envoy — 2024 – Present
- UC Berkeley Society for Women in Physical Sciences (SWPS) Mentor — 2023 – Present

- UC Berkeley Astro Night Organizer 2022 – Present
- UC Berkeley Outreach Coordinator 2022 – Present
- UC Berkeley Compass Mentor 2021 – 2022
- Harvard Society for Physics Students (SPS) Mentor 2019 – 2021
- Harvard Observing Project (HOP) Instructor 2018 – 2021
- Orchestar: Color Sonification Arduino Developer 2017
  Device to make observational astronomy accessible to people with visual impairments.
- **Public Talks**
  - Wonderfest Feb 2025
    Ask a Scientist - "Black Holes: Discovering the Invisible"
  - Nueva School Jan 2025
    "Black Holes: Discovering the Invisible"
  - KPOO "Let Me Touch Your Mind" Interview Jan 2025
  - Splash at Berkeley Nov 2024
    "Black Holes: Discovering the Invisible"
  - Splash at Berkeley Nov 2023
    "Black Holes: Discovering the Invisible"
  - Popping the Science Bubble April 2022
    "Black Holes: The Most Fascinating Zoo in the Universe"
  - Splash at Berkeley April 2022
    "Black Holes: The Most Fascinating Zoo in the Universe"

Institutional Service

UC Berkeley Astronomy Department

- Graduate Meeting w/ Colloquium Speaker Organizer and Facilitator 2022 – Present
- Graduate Peer Mentor 2023 – Present

Harvard Astronomy Department

- Harvard Undergraduate Astronomy Society (AstroSoc) 2019 – 2021
  Co-President and Founder

Conference and Workshop Organizing Committees

- LOC, Microlensing 26 2024

SKILLS

Programming Languages: Python; Bash
Software and Frameworks: LaTeX; Git; Unix; Slurm; SAOImage DS9; IRAF Command Language
Languages: English (Native), Spanish (Conversational), Japanese (Conversational)