

# Casey Y. Lam

Carnegie Observatories  
813 Santa Barbara Street  
Pasadena, California, 91101

Email: [clam@carnegiescience.edu](mailto:clam@carnegiescience.edu)  
Homepage: [users.obs.carnegiescience.edu/clam/](https://users.obs.carnegiescience.edu/clam/)

## Current appointment

- Carnegie Postdoctoral Fellow, Carnegie Observatories, 08/2023 - present.

## Education

- Ph.D. Astrophysics, University of California, Berkeley, 08/2023.  
*Thesis: Understanding the Galactic Black Hole Population with Gravitational Microlensing*  
*Advisor: Prof. Jessica R. Lu*
- M.A. Astrophysics, University of California, Berkeley, 05/2019.
- S.B. Mathematics and Physics, Massachusetts Institute of Technology, 06/2017.

## Grants and Awards

- UC Berkeley Astronomy Department Uhl Prize (2023)
- NASA FINESST Research Grant (09/21 - 09/23)
- UC Berkeley Astronomy Department Trumpler Award (2021)
- UC Berkeley Outstanding Graduate Student Instructor (2019)
- NSF Graduate Research Fellowship Program Honorable Mention (2017, 2019)

## Publication summary

A full list is on page 5.

- 12 refereed/in review publications (4 as first author, 1 as primary research mentor).
- 11 non-refereed/white papers (1 as first author).

## Competitively Awarded Telescope Time

- As PI: 4 orbits, Hubble Space Telescope (Cycle 29)  
*Proposal: First detection of an isolated stellar mass black hole with astrometric microlensing*
- As Co-I with major contributions to proposal and execution of observations: 40 orbits, Hubble Space Telescope (Cycle 28 – 31); 13.5 nights, Keck Observatory (Semesters 19A – 23A)
- As Co-I with minor contributions: 18 orbits, Hubble Space Telescope (Cycle 28 – 32)

## Research Mentorship

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

- Samantha Rose: The Impact of Initial-Final Mass Relations on Black Hole Microlensing (2019 – 2022, published in ApJ)
- Angela Cheng: Microlensing maps with PopSyCLE (2019 - 2020)

Also acted as a secondary advisor for other UC Berkeley undergraduates working on microlensing ( $\sim 3$ /year) and non-microlensing ( $\sim 2$ /year) projects advised by Prof. Lu.

## Scientific Presentations Summary

A full list is on page 4.

- 8 invited talks/presentations
- 19 contributed talks/presentations
- 3 posters

## Teaching

- Graduate Student Instructor, Introduction to Astrophysics I (UCB, Fall 2018)
- Graduate Student Instructor, Introduction to Astrophysics II (UCB, Spring 2018)
- Graduate Student Instructor, Introduction to Astronomy (UCB, Fall 2017)
- Undergraduate Teaching Assistant, Electricity and Magnetism (MIT, Spring 2017)

## Service

To the UC Berkeley Astronomy Department:

- arXiv Discussion Organizer (2022 – 2023)
- Grad student rep to Faculty Search (Spring 2021)
- Grad Wiki Master (2019 – 2022)
- Graduate student peer mentor (2019 – 2020)
- Prospective graduate student visit committee (Spring 2018)
- Undergraduate events (2018 – 2021)  
*Q&A panelist*  $\times 3$ , *graduate application feedback*  $\times 2$ , *poster judge*.

To the broader community:

- MNRAS Referee (2021–)
- Graduate student mentor, CalBridge peer mentoring program (2019 – 2020)
- Local co-organizer for CalBridge Scholars Python Workshop (11/17, 1/19)

## Outreach

- UC Berkeley Astronomy Outreach Coordinator (2019 – 2022)
- “Be A Scientist” Mentor  $\times 4$   
*Guide 4-5 7th graders through a science project of their own design over 6 weeks.*
- Volunteer/speaker at 18 public outreach events since 2017.  
*Stargazing, hands-on demonstrations for kids/families, public lectures.*
- List of talks:  
*R* denotes presentations given remotely over Zoom at online events
  1. H2H8 Association YouTube Research Talks<sup>R</sup>, *Searching for black holes in the Milky Way* (1/23)
  2. 2020 Bay Area Science Festival<sup>R</sup>, *How do we detect black holes?* (10/20)
  3. UC Berkeley Astrophysics Roundtable, *Hunting for Black Holes in the Milky Way* (11/19)
  4. UC Berkeley Compass Lecture Series for Undergraduates, *Finding Isolated Stellar Mass Black Holes with Microlensing* (10/19)
  5. Berkeley Public Library Claremont, *How to see a black hole (with the Event Horizon Telescope)* (7/19)
  6. MIT Parents Weekend Physics Department Reception, *Primordial Black Holes and Hybrid Inflation* (10/16)

## Skills

- Software: Python, LaTeX, Bash, Git, HTML, Mathematica, Matlab
- Languages: English (native), Cantonese (limited working/conversational)

Last updated: August 10, 2023

## Scientific Presentations

\* denotes invited presentations

<sup>R</sup> denotes presentations given remotely over Zoom at online meetings/events

1. UC Berkeley Astronomy, Dissertation Seminar (5/23, UC Berkeley)
2. 2023 Aspen Winter Conference: eXtreme Black Holes (3/23, Aspen Center for Physics)
3. \* Lawrence Livermore National Lab, Seminar (2/23, LLNL)
4. Roman Virtual Lecture Series (1/23, IPAC<sup>R</sup>)
5. AAS 241 Dissertation Talk (1/23, Seattle<sup>R</sup>)
6. \* KIPAC Tea Talks (11/22, Stanford<sup>R</sup>)
7. UCLA Astronomy Tuesday Lunch Seminar (10/22, UCLA)
8. \* Caltech TAPIR Seminar (10/22, Caltech)
9. IfA Astrocoffee Talks (10/22, UH Manoa<sup>R</sup>)
10. NSF NOIRLab-Tucson Friday Lunch Astrophysics Seminar (9/22, NOIRLab<sup>R</sup>)
11. MIT Kavli Brown Bag Lunch Talks (9/22, MIT<sup>R</sup>)
12. 25th International Microlensing Conference (8/22, Paris<sup>R</sup>)
13. \* Princeton Coffee (2/22, Princeton<sup>R</sup>)
14. \* UCLA Galactic Center Group Journal Club (2/22, UCLA<sup>R</sup>)
15. \* Carnegie Tea (2/22, Carnegie Observatories<sup>R</sup>)
16. \* CCAPP Seminar (2/22, Ohio State University<sup>R</sup>)
17. Exploring the Transient Universe with the Roman Space Telescope (2/22, Caltech<sup>R</sup>)
18. UC Berkeley Astronomy Thursday Short Talks (10/21, UC Berkeley)
19. UC Berkeley Astronomy Thursday Short Talks (3/21, UC Berkeley<sup>R</sup>)
20. UC Berkeley Astronomy Thursday Lunch Talks (11/20, UC Berkeley<sup>R</sup>)
21. Poster, Keck Science Meeting 2020 (9/20, Caltech<sup>R</sup>)
22. UC Berkeley Astronomy Thursday Lunch Talks (4/20, UC Berkeley<sup>R</sup>)
23. UC Berkeley Astronomy Thursday Lunch Talks (11/19, UC Berkeley)
24. TMT Science Forum 2019 (11/19, Xiamen University, China)
25. \* Lawrence Livermore National Lab, Physical and Life Sciences Seminar (10/19, LLNL)
26. Poster, Keck Science Meeting 2019 (9/19, UCLA)
27. Exploring the Galaxy and the Local Group with WFIRST (6/19, Caltech)
28. 23rd International Microlensing Conference (1/19, Flatiron CCA)
29. UC Berkeley Astronomy Thursday Lunch Talks (11/18, UC Berkeley)
30. Poster, Keck Science Meeting 2018 (9/18, Caltech)

## Publications

† = directly supervised student.

### *1st author, Refereed*

1. **Lam, C. Y.** and Lu, J. R. “A re-analysis of the isolated black hole candidate OGLE-2011-BLG-0462/MOA-2011-BLG-191.” Accepted to ApJ, Aug 2023.
2. **Lam, C. Y.**, Lu, J. R., Udalski, A., Bond, I., Bennett, D. P., Skowron, J., Mróz, P., Poleski, R., and 37 additional authors. “An Isolated Mass-gap Black Hole or Neutron Star Detected with Astrometric Microlensing.” *ApJL* **933** L23, July 2022.
3. **Lam, C. Y.**, Lu, J. R., Udalski, A., Bond, I., Bennett, D. P., Skowron, J., Mróz, P., Poleski, R., and 37 additional authors. “Supplement: “An Isolated Mass-gap Black Hole or Neutron Star Detected with Astrometric Microlensing” (2022, ApJL, 933, L23)” *ApJS* **260** 55, July 2022.
4. **Lam, C. Y.**, Lu, J. R., Hosek Jr., M. W., Dawson, W. A., and Golovich, N. R. “PopSyCLE: A New Population Synthesis Code for Compact Object Microlensing Events.” *ApJ* **889** 31, Jan 2020.

### *n-th author, Refereed*

5. Medford, M. S., Abrams, N. S., Lu, J. R., Nugent, P. and **Lam, C. Y.** “60 Microlensing Events from the Three Years of Zwicky Transient Facility Phase One.” *ApJ*, **947** 24, Apr 2023. Submitted to ApJ, Dec 2021. Preprint: arXiv:2201.08335 [astro-ph.GA]
6. Rose, S.†, **Lam, C. Y.**, Lu, J. R., Medford, M., Hosek, M. W. Jr., Abrams, N., Ramey, E., and Vasylyev, S. “The Impact of Initial-Final Mass Relations on Black Hole Microlensing.” *ApJ*, **941** 116, Dec 2022.
7. Golovich, N., Dawson, W., Bartolić, F., **Lam, C. Y.**, Lu, J. R., Medford, M. S., Schneider, M. D., Chapline, G., Schlafly, E. S., Drlica-Wagner, A., and Pruett, K. “A Reanalysis of Public OGLE-III and IV Gravitational Microlensing Events.” *ApJS* **260** 2, Apr 2022.
8. Zhang, K., Bloom, J. S., Gaudi, B. S., Lanusse, F., **Lam, C.**, and Lu, J. “Real-Time Simulation-Based Inference of *Roman* Binary Microlensing Events with Amortized Neural Posterior Estimation.” *AJ* **161** 262, May 2021.
9. Hosek Jr., M. W., Lu, J. R., **Lam, C. Y.**, Gautam, A. K., Lockhart, K. E., Kim, D., and Jia, S. “SPISEA: A Python-Based Simple Stellar Population Synthesis Code for Star Clusters.” *AJ* **160** 143, Aug 2020.
10. Medford, M. S., Lu, J. R., Dawson, W. A., **Lam, C. Y.**, Golovich, N. R., Schlafly, E. F., and Nugent, P. “Gravitational Microlensing Event Statistics for the Zwicky Transient Facility.” *ApJ* **897** 144, Jul 2020.

### *Submitted, Referee in progress*

11. Rowan, D. M., Jayasinghe, T., Tucker, M. A., **Lam, C. Y.**, Thompson, T. A., Kochanek, C. S., Abrams, N. S., Fulton, B. J., Ilyin, I., Issacson, H., Lu, J., Martin, D. V., and Nicholson,

- B. “A hidden population of massive white dwarfs: two spotted K+WD binaries”. Submitted to MNRAS, July 2023. Preprint: arXiv:2307.11146 [astro-ph.SR]
12. Pruettt, K., Dawson, W., Medford, M. S., **Lam, C.**, Golovich, N., Lu, J. R., and Chapline, G. “Primordial Black Hole Dark Matter Simulations Using PopSyCLE.” Submitted to ApJ, Nov 2022. Preprint: arXiv:2211.06771 [astro-ph.GA]

*Unrefereed/white papers*

13. **Lam, C. Y.**, and 36 additional authors. “Roman CCS White Paper: Characterizing the Galactic population of isolated black holes.” arXiv:2306.12514 [astro-ph.IM], Jun 2023.
14. Street, R. A., Gough-Kelly, S., **Lam, C.**, Varela, A., Makler, M., and 11 additional authors. “Maximizing science return by coordinating the survey strategies of Roman with other major facilities.” Roman CCS White Paper, arXiv:2306.13792 [astro-ph.IM], Jun 2023.
15. Terry, S. K., Hosek Jr., M. W., Lu, J. R., **Lam, C.**, and 30 additional authors. “The Galactic Center with Roman.” Roman CCS White Paper, arXiv:2306.12485 [astro-ph.IM], Jun 2023.
16. Gaudi, B. S., Bennett, D. P., and 36 additional authors, incl. **Lam, C.** “The Roman Galactic Exoplanet Survey (RGES)”. Roman Core Community Survey White Paper, Jun 2023. [https://asd.gsfc.nasa.gov/roman\\_wp\\_2023/](https://asd.gsfc.nasa.gov/roman_wp_2023/)
17. Bahramian, A., Degenaar, N., Heinke C. O., **Lam, C.**, Maccarone, T. J., and Terry, S. K. “X-ray binaries, cataclysmic variables and transients in the Galactic bulge”. Roman Core Community Survey White Paper, Jun 2023. [https://asd.gsfc.nasa.gov/roman\\_wp\\_2023/](https://asd.gsfc.nasa.gov/roman_wp_2023/)
18. Gezari, S., and 30 additional authors, incl. **Lam, C.** “R2-D2: Roman and Rubin – From Data to Discovery.” AURA-commissioned White Paper, arXiv:2202.12311 [astro-ph.IM], Feb 2022.
19. Lu, J. R., **Lam, C.**, Dawson, W., Gaudi, B. S., Golovich, N., Medford, M., Abdurrahman, F., and Beaton, R. L. “Astro2020: From Stars to Compact Objects: The Initial-Final Mass Relation.” Astro 2020 Decadal White Paper, arXiv:1904.01773 [astro-ph.SR], Apr 2019.
20. Lu, J. R., **Lam, C. Y.**, Medford, M., Dawson, W., and Golovich, N. “Primordial Black Hole Microlensing: The Einstein Crossing Time Distribution.” *Res. Notes AAS* **3** 58, Apr 2019.
21. Bechtol, K., Drlica-Wagner, A., and 178 additional authors, incl. **Lam, C.** “Dark Matter Science in the Era of LSST.” Astro 2020 Decadal White Paper, arXiv:1903.04425 [astro-ph.CO], Mar 2019.
22. Drlica-Wagner, A., Mao, Y.-Y., and 97 additional authors, incl. **Lam, C. Y.** “Probing the Fundamental Nature of Dark Matter with the Large Synoptic Survey Telescope.” LSST Dark Matter Group White Paper, arXiv:1902.01055 [astro-ph.CO], Feb 2019.
23. Bloomfield, J. K., Face, S. H. P., Guth, A. H., Kalia, S., **Lam, C.**, and Moss, Z. “Number Density of Peaks in a Chi-Squared Field.” arXiv:1612.03890 [math-ph], Dec 2016.