

Samantha C. Wu

Carnegie Theoretical Astrophysics Center (CTAC), Carnegie Observatories
813 Santa Barbara Street • Pasadena, CA 91101, USA
[+1 \(408\) 504-0346](tel:+14085040346) | swu@carnegiescience.edu | samanthacwu.github.io

Research Interests: Stellar evolution–massive stars, waves in stars, binary interaction. High-energy astrophysical transients–interacting supernovae, tidal disruption events, radio synchrotron emission. Theoretical techniques–semi-analytic models, (radiation) hydrodynamical simulations, stellar evolution simulations, high-performance computing.

Education & Experience

- 2026– **Northwestern University**, Evanston, IL
Center for Interdisciplinary Exploration and Research in Astrophysics (CIERA) Fellow
- 2024–2026 **Carnegie Observatories**, Pasadena, CA
Carnegie Theoretical Astrophysics Center (CTAC) Fellow
- 2024–2026 **Northwestern University**, Evanston, IL
CIERA Visiting Scholar
- 2019–2024 **California Institute of Technology** (Caltech), Pasadena, CA
Ph.D. in Astrophysics
NSF Graduate Research Fellowship
 - Thesis: *The interplay of waves and stellar evolution*
 - Advisor: Jim Fuller
- 2018–2019 **University of California, Santa Cruz & Niels Bohr Institute at University of Copenhagen**, Santa Cruz, CA & Copenhagen, Denmark
Junior Specialist
 - Post-bachelor’s researcher with Prof. Enrico Ramirez-Ruiz
- 2014–2018 **University of California, Berkeley**, Berkeley, CA
BA in Applied Mathematics and Astrophysics | GPA 3.98/4.0

Honors & Awards

- 2021–2024 NSF Graduate Research Fellowship
- 2019–2020 Virginia Gilloon Graduate Fellowship, Caltech
- 2018 Highest Distinction in General Scholarship, UC Berkeley
- 2018 Department Citation, UC Berkeley Astronomy

Presentations (selected)

Invited Talks

- | | | |
|------|---|-----------------|
| 2026 | International Symposium on Relativistic Astrophysics | Shanghai, China |
| | Astrophysics and Cosmology Seminar at University of California, Davis | Davis, CA |
| | Harvard Institute for Theory and Computation Luncheon | Cambridge, MA |

	Rise_Time: Explosive Astrophysics in the Era of High-Cadence Astronomy	Purdue, IN
	Multi-RAPTOR Seminar	Berkeley, CA
2023	CIERA Theory Group Meeting	Evanston, IL
	Princeton THUNCH Seminar	Princeton, NJ
	University of Amsterdam GRAPPA Seminar	Amsterdam, Netherlands
	MIAPbP Workshop on Interacting Supernovae, Review Talk	Garching, Germany
2021	UCSC GAFD Seminar (remote)	Santa Cruz, CA

Contributed Talks

2026	Tidal Disruption Events and Nuclear Transients in Crete vol. 2	Heraklion, Crete, Greece
2022	240th Meeting of the American Astronomical Society	Pasadena, CA

Poster Presentations

2026	YITP Multi-Messenger Astrophysics in the Dynamic Universe	Kyoto, Japan
2018	233rd Meeting of the American Astronomical Society	Seattle, WA

Teaching & Mentoring

2025-2026	Carnegie Astrophysics Summer Student Internship (CASSI), Carnegie Observatories	
	- Organized and led presentations for the workshop series on Scientific Practice, Ethics and Community. - Organized 8-week Research Talks series given by Carnegie staff and postdocs for summer undergrad interns. - Assisted in running sessions on Introduction to Scientific Computing with Python. - Gave feedback to interns on research talks, scientific reports, and conference abstracts.	
2025	Advancing Inclusive Mentoring mentor training program	
	Completed a six-week workshop on effective strategies to promote inclusive mentoring as academic research mentors to undergraduates. Certificate available upon request.	
2024-2025	Guest Instructor at University of Southern California	
	Taught lectures to non-major undergraduates for ASTR 100 “The Universe” on topics including Kepler’s laws, the history of astronomy, and extrasolar planets.	
2020-2024	Certificate of Practice in University Teaching , Caltech	
	Completed program offered by Caltech’s Center for Teaching, Learning, and Outreach (CTLO) to develop teaching skills, including courses in pedagogy, feedback from classroom observations by CTLO staff, and culminating in a teaching portfolio. Certificate and teaching portfolio available upon request.	
2022-2023	Caltech Connection Mentor	
	Mentored a Pasadena City College student in a near-peer mentorship program to build research experience for students in LA county.	
2021-2022	LAMAT REU Mentor , UC Santa Cruz	
	Mentored Rewa Bush (Cabrillo College → Wesleyan University → Yale) on a research project studying long-term evolution of tidal disruption remnants, leading to a first-author student paper.	
2020-2021	Teaching Assistant , Caltech	

- TA for Physics of Stars (Ay 101), Galaxies and Cosmology (Ay 21), and Intro to Astronomy (Ay 1). Summary statistics of "Overall teaching effectiveness" follow, with the average scores across the Division of Physics, Math, and Astronomy and across all of Caltech given in parentheses. Full course evaluations available upon request.
- Ay 101: 5.0/5.0 (Division 4.38/5.0, Caltech 4.54/5.0); Ay 21: 5.0/5.0 (Division 4.52/5.0, Caltech 4.73/5.0); Ay 1: 5.0/5.0 (Division 4.56/5.0, Caltech 4.67/5.0).

2014–2018 **Mathematics/Statistics Tutor**, Student Learning Center, UC Berkeley

- Tutored undergraduate students on a drop-in basis for all math courses at UC Berkeley.

2014–2018 **Mathematics/Statistics Study Group Leader**, Student Learning Center, UC Berkeley

- Worked as a supplemental course lecturer for Calculus (Math 1b) and Discrete Mathematics (Math 55). Led biweekly interactive, small-group sessions focused on cooperative problem-solving and learning strategies. Trained with formal coursework in pedagogy and implemented teaching best practices in the classroom.

Research Supervision

Daggers mark publications by advisees.

- | | |
|-----------|---|
| 2026– | • Melusi Ngeleka (Howard University) |
| 2025 | • Sean Lozano (Mt. San Antonio College) |
| 2021–2025 | • † Rewa Bush (Cabrillo College → Wesleyan University → Ph.D. student at Yale University) |
| 2022–2023 | • Tuojin Yin (Pasadena City College → USC → Ph.D. student at Johns Hopkins University) |

Professional Service

Referee for *The Astrophysical Journal* | *Astronomy and Astrophysics*

2025–2026 Carnegie Observatories Community and Culture Committee Member

Carnegie Observatories Lunch Seminar Committee Member

2020–2024 Caltech GWIPMA Committee Member

2022–2023 Caltech Gender Minorities and Women in Physics, Mathematics, and Astronomy (GWIPMA) Co-President

2021–2022 Caltech Astronomy Admissions Committee Member

Caltech Future Ignited and Future of Physics Research Presenter

Caltech Physics, Math, & Astronomy New Student Orientation Teaching Panelist

Caltech Teaching Conference Session Facilitator

Outreach and Public Lectures (selected)

2025–2026 Presenter at STEM Savvy: Girls' Science Day at Pasadena City College, representing Carnegie Observatories

2024 Volunteer for Carnegie Observatories Open House (Ask an Astronomer)

2024 Public talk for Carnegie Observatories Lecture Series at Pasadena City College

2021–2024 Panelist for Caltech Astronomy Outreach Stargazing Lecture Q&A

2022 Public talk for Sequoia National Park Dark Sky Festival

Public talk for Caltech Astronomy Outreach Stargazing Lecture

Publications

† = student paper

1. **Wu, S. C.** & Piro, A. L. Shock Cooling Emission from Late-time Mass Loss in Low-mass He Star Binaries. *ApJ* 1009, 32. doi:[10.3847/1538-4357/ae9d5e](https://doi.org/10.3847/1538-4357/ae9d5e) (Sept. 2026).
2. **Wu, S. C.**, Tsuna, D., Mockler, B. & Piro, A. L. Delayed Radio Emission in Tidal Disruption Events from Collisions of Outflows Driven by Disk Instabilities. *ApJ* 998, 199. doi:[10.3847/1538-4357/ae36a3](https://doi.org/10.3847/1538-4357/ae36a3) (Feb. 2026).
3. Tsuna, D., Villar, V. A., Piro, A. L. & **Wu, S. C.** UV and Optical Signatures of Late-time Disk Instabilities in Tidal Disruption Events. *arXiv e-prints*, arXiv:2602.15103. doi:[10.48550/arXiv.2602.15103](https://doi.org/10.48550/arXiv.2602.15103) (Feb. 2026).
4. **Wu, S. C.** & Tsuna, D. Luminous Late-time Radio Emission from Supernovae Interacting with Circumbinary Material. *ApJ* 994, 141. doi:[10.3847/1538-4357/ae113c](https://doi.org/10.3847/1538-4357/ae113c) (Dec. 2025).
5. Baer-Way, R. *et al. incl. Wu, S. C.* The First Radio View of a Type Ibn Supernova in SN 2023fyq: Understanding the Mass-loss History in the Last Decade before the Explosion. *ApJL* 995, L49. doi:[10.3847/2041-8213/ae1cb8](https://doi.org/10.3847/2041-8213/ae1cb8) (Dec. 2025).
6. Dorn-Wallenstein, T. Z., Chen, K. M., **Wu, S. C.**, Goldberg, J. A., O’Grady, A. J. G., Mann, A. T. & Don-Wallanchez, P. I. A Spectroscopic Hunt for Post-Red Supergiants in the Large Magellanic Cloud. II. Turbulent Line Broadening in the Spectra of LMC Yellow Supergiants. *ApJ* 991, 173. doi:[10.3847/1538-4357/adfa8f](https://doi.org/10.3847/1538-4357/adfa8f) (Oct. 2025).
7. †Bush, R. C., **Wu, S. C.**, Everson, R. W., Yarza, R., Murguia-Berthier, A. & Ramirez-Ruiz, E. Black Hole Survival Guide: Searching for Stars in the Galactic Center that Endure Partial Tidal Disruption. *ApJL* 990, L7. doi:[10.3847/2041-8213/adeffe](https://doi.org/10.3847/2041-8213/adeffe) (Sept. 2025).
8. Haynie, A., **Wu, S. C.**, Piro, A. L. & Fuller, J. Multiphase Shock Cooling Emission in Ultrastripped Supernovae. *ApJ* 987, 149. doi:[10.3847/1538-4357/addc72](https://doi.org/10.3847/1538-4357/addc72) (July 2025).
9. Tsuna, D., **Wu, S. C.**, Fuller, J., Dong, Y. & Piro, A. L. Merger Precursor: Year-long Transients Preceding Mergers of Low-mass Stripped Stars with Compact Objects. *The Open Journal of Astrophysics* 7, 82. doi:[10.33232/001c.123897](https://doi.org/10.33232/001c.123897) (Sept. 2024).
10. Das, K. K. *et al. incl. Wu, S. C.* Probing Presupernova Mass Loss in Double-peaked Type Ibc Supernovae from the Zwicky Transient Facility. *ApJ* 972, 91. doi:[10.3847/1538-4357/ad595f](https://doi.org/10.3847/1538-4357/ad595f) (Sept. 2024).
11. Das, K. K. *et al. incl. Wu, S. C.* SN 2023zaw: An Ultrastripped, Nickel-poor Supernova from a Low-mass Progenitor. *ApJL* 969, L11. doi:[10.3847/2041-8213/ad527a](https://doi.org/10.3847/2041-8213/ad527a) (July 2024).
12. Tsuna, D., Matsumoto, T., **Wu, S. C.** & Fuller, J. Bright Supernova Precursors by Outbursts from Massive Stars with Compact Object Companions. *ApJ* 966, 30. doi:[10.3847/1538-4357/ad3637](https://doi.org/10.3847/1538-4357/ad3637) (May 2024).
13. **Wu, S. C.**, Dewberry, J. W. & Fuller, J. Tidal Migration of Exoplanets around M Dwarfs: Frequency-dependent Tidal Dissipation. *ApJ* 963, 34. doi:[10.3847/1538-4357/ad1e54](https://doi.org/10.3847/1538-4357/ad1e54) (Mar. 2024).
14. Dewberry, J. W. & **Wu, S. C.** On the damping of tidally driven oscillations. *MNRAS*. doi:[10.1093/mnras/stad3164](https://doi.org/10.1093/mnras/stad3164) (Oct. 2023).

15. **Wu, S. C.** & Fuller, J. Extreme Mass Loss in Low-mass Type Ib/c Supernova Progenitors. *ApJL* 940, L27. doi:[10 . 3847/2041-8213/ac9b3d](https://doi.org/10.3847/2041-8213/ac9b3d) (Nov. 2022).
16. Thomsen, L. L., Kwan, T. M., Dai, L., **Wu, S. C.**, Roth, N. & Ramirez-Ruiz, E. Dynamical Unification of Tidal Disruption Events. *ApJL* 937, L28. doi:[10 . 3847/2041-8213/ac911f](https://doi.org/10.3847/2041-8213/ac911f) (Oct. 2022).
17. **Wu, S. C.** & Fuller, J. Wave-driven Outbursts and Variability of Low-mass Supernova Progenitors. *The Astrophysical Journal* 930, 119. doi:[10 . 3847/1538-4357/ac660c](https://doi.org/10.3847/1538-4357/ac660c). <https://doi.org/10.3847/1538-4357/ac660c> (May 2022).
18. Leung, S.-C., **Wu, S. C.** & Fuller, J. Wave-driven Mass Loss of Stripped Envelope Massive Stars: Progenitor-dependence, Mass Ejection, and Supernovae. *ApJ* 923, 41. doi:[10 . 3847/1538-4357/ac2c63](https://doi.org/10.3847/1538-4357/ac2c63) (Dec. 2021).
19. **Wu, S. C.** & Fuller, J. A Diversity of Wave-driven Presupernova Outbursts. *ApJ* 906, 3. doi:[10 . 3847/1538-4357/abc87c](https://doi.org/10.3847/1538-4357/abc87c) (Jan. 2021).
20. Law-Smith, J. A. P. *et al. incl. Wu, S. C.* Successful Common Envelope Ejection and Binary Neutron Star Formation in 3D Hydrodynamics. *arXiv e-prints*, arXiv:2011.06630. doi:[10 . 48550/arXiv.2011.06630](https://doi.org/10.48550/arXiv.2011.06630) (Nov. 2020).
21. **Wu, S. C.**, Everson, R. W., Schneider, F. R. N., Podsiadlowski, P. & Ramirez-Ruiz, E. The Art of Modeling Stellar Mergers and the Case of the B[e] Supergiant R₄ in the Small Magellanic Cloud. *ApJ* 901, 44. doi:[10 . 3847/1538-4357/abaf48](https://doi.org/10.3847/1538-4357/abaf48) (Sept. 2020).
22. **Wu, S. C.**, Coughlin, E. R. & Nixon, C. Super-Eddington accretion in tidal disruption events: the impact of realistic fallback rates on accretion rates. *MNRAS* 478, 3016–3024. doi:[10 . 1093/mnras/sty971](https://doi.org/10.1093/mnras/sty971) (Aug. 2018).
23. Siegel, D. M., Mösta, P., Desai, D. & **Wu, S. C.** Recovery Schemes for Primitive Variables in General-relativistic Magnetohydrodynamics. *ApJ* 859, 71. doi:[10 . 3847/1538-4357/aabcc5](https://doi.org/10.3847/1538-4357/aabcc5) (May 2018).