





# James Sunseri

## Astrophysics Graduate Student

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### EDUCATION

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| <b>Princeton University</b><br><i>Hertz Fellow</i><br><i>Ph.D. Astrophysical Sciences</i><br><i>M.S. Astrophysical Sciences</i>   | Princeton, NJ<br><br>Expected 2028<br>Expected 2025 |
| <b>University of California Berkeley</b><br><i>B.A. Physics; B.A. Astrophysics with High Distinction</i>   <i>Advisors: Prof. Alex Filippenko, Prof. Jia Liu, Prof. Zachary Slepian</i> | Berkeley, CA<br>2022                                |

### RESEARCH INTERESTS

- Implications of baryonic feedback on cosmology
- Magnetohydrodynamical simulations of high-energy astrophysical phenomena
- Higher-order statistics and N-Point Correlation Functions
- Machine learning and generative models
- Efficient algorithm design for large datasets

### POSITIONS

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| <b>Visiting Student Researcher, Kavli IPMU</b><br><i>The Effects of Massive Neutrinos and Dark Energy on the Cosmic Web</i>   <i>Advisor: Prof. Jia Liu</i>  | Kashiwanoha, Japan<br>2023  |
| <b>Student Researcher, UC Berkeley</b><br><i>Transient Based Observational Astronomy</i>   <i>Advisor: Prof. Alex Filippenko</i>   | Berkeley, CA<br>2018 - 2022 |
| <b>Student Researcher, University of Florida</b><br><i>SARABANDE: a python package for measuring 3/4 PCFs with FFTs</i>   <i>Advisor: Prof. Zack Slepian</i>                                       | Remote<br>2021 - 2023       |
| <b>Student Researcher, University of Tokyo</b><br><i>The Effects of Baryonic Feedback on the Cosmic Web</i>   <i>Advisor: Prof. Jia Liu</i>  | Remote<br>2020 - 2023       |
| <b>NSF Summer Research Experience for Undergraduates, University of Florida</b><br><i>Fast Four Point Statistics of Turbulence in the Interstellar Medium</i>   <i>Advisor: Prof. Zack Slepian</i> | Gainesville, FL<br>2021     |
| <b>LIGO Summer Undergraduate Research Fellowship, Caltech</b><br><i>Measuring The Hubble Constant With Dynamical Tides In Inspiralng Neutron Star Binaries</i>   <i>Advisor: Dr. Hang Yu</i>       | Pasadena, CA<br>2020        |

### PUBLICATIONS

1. Ailawadhi, B.; Dastidar, R.; Misra, K.; Roy, R.; *et al.* (33 other co-authors, incl. **Sunseri, James**), 2023, *Photometric and spectroscopic analysis of the Type II SN 2020jfo with a short plateau*, MNRAS, **519**, 248 ([arXiv:2211.02823](https://arxiv.org/abs/2211.02823)) [5 citations]
2. **Sunseri, James**; Li, Zack; & Liu, Jia, 2023, *Effects of baryonic feedback on the cosmic web*, Physical Review D, **107**, 23514 ([arXiv:2212.05927](https://arxiv.org/abs/2212.05927)) [6 citations]
3. **Sunseri, James**; Slepian, Zachary; Portillo, Stephen; Hou, Jiamin; *et al.*, 2023, *SARABANDE: 3/4 point correlation functions with fast Fourier transforms*, RAS Techniques and Instruments, **2**, 62 ([arXiv:2210.10206](https://arxiv.org/abs/2210.10206)) [3 citations]
4. Murakami, Yukei S.; Jennings, Connor; Hoffman, Andrew M.; Savel, Arjun B.; *et al.* (6 other co-authors, incl. **Sunseri, James**), 2022, *PIPS, an advanced platform for period detection in time series - I. Fourier-likelihood periodogram and application to RR Lyrae stars*, MNRAS, **514**, 4489 ([arXiv:2107.14223](https://arxiv.org/abs/2107.14223)) [2 citations]
5. Zheng, WeiKang; Stahl, Benjamin E.; de Jaeger, Thomas; Filippenko, Alexei V.; *et al.* (84 other co-authors, incl. **Sunseri, James**), 2022, *The Lick Observatory Supernova Search follow-up program: photometry data release of 70 SESNe*, MNRAS, **512**, 3195 ([arXiv:2203.05596](https://arxiv.org/abs/2203.05596)) [7 citations]
6. Kilpatrick, Charles D.; Coulter, David A.; Arcavi, Iair; Brink, Thomas G.; *et al.* (79 other co-authors, incl. **Sunseri, James**), 2021, *The Gravity Collective: A Search for the Electromagnetic Counterpart to the Neutron Star-Black Hole Merger GW190814*, ApJ, **923**, 258 ([arXiv:2106.06897](https://arxiv.org/abs/2106.06897)) [20 citations]

## POSTERS & RESEARCH TALKS

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- **The Effects of Baryons on the Cosmic Web:** Kavli IPMU, Chiba University, University of Tokyo, Nagoya University - 2023 [[Slides](#)]
- **LIGO SURF Caltech Summer Talk:** Presented my research to fellow SURF participants, LIGO research scientists, and mentors of the program.
- **237th American Astronomical Society Meeting iPoster Presentation:** Presented a research project via iPoster about gravitational wave cosmology I had done over summer in the LIGO SURF Program. (Featured on [AstroBites](#))
- **238th American Astronomical Society Meeting iPoster+ Presentation:** Our group presented a research project via iPoster+ on a new four band photometry approach of measuring the temperature of variable stars over a period cycle.

## OUTREACH

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### TEDxAustin Youth

Guest Speaker, "The Essential Skill You Can't Afford To Ignore In Today's Digital World"

Austin, TX

Spring 2023

### World of Wonders Science Museum

The local science museum of the San-Joaquin County

Lodi, CA

Summer 2017 - Present

- Co-wrote and Wrote 5 lessons for the WOW Education Programming. *Art of Alchemy, Narrowing on Newton, Solar System and Beyond II, What is Gravity, and Lunar School* and compiled 80+ Lessons for summer camps
- Helped plan and teach several summer camps for the past few years. *Astronaut Training, Science Wizards, Science Detectives, Terrific Tinkering, etc...*
- Trained to operate Lodi Unified School District's portable planetarium known as the StarLab
- Taught several Lunar School lessons for the WOW during the Apollo 11 50th Anniversary
- Helped teach with the outreach program for the WOW known as WOW on Wheels and helped run both Forensics and Astronaut Camps
- In the promotional video for the huge future expansion of the WOW
- Successfully taught two lessons at the local middle school during my senior year of high school
- Was on the news network known as Good Day Sacramento for the WOW Museum to celebrate the Apollo 11 50th Anniversary

### SPLASH at UC Berkeley

student led High School outreach program at UC Berkeley

Berkeley, CA

Spring 2021

- **Video Games & Simulations 101:** A talk where I teach high school students the basics of Python and walk through how to build a video game using only Python followed by a discussion of how it all relates to Astrophysical Simulations in research.

## TEACHING

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### Head Undergraduate Student Instructor for Astro C10

Astro C10 - Introduction to Astronomy

Berkeley, CA

Fall 2022

- I am the first undergrad to be the head student instructor that oversees the logistics of the Introduction to Astronomy course at UC Berkeley containing 900+ students. In this role I teach students, plan the logistics for the entire course, and oversee other student instructors and graders for the course.

### Undergraduate Student Instructor for Astro C10

Astro C10 - Introduction to Astronomy

Berkeley, CA

Fall 2020

- I was a UGSI for the Introduction to Astronomy course taught by Professor Alex Filippenko at UC Berkeley. I taught 4 sections, hosted office hours, prepared lessons and quizzes, and proctored exams

### Head Facilitator for the Python Decal: Astro 98

Python Decal - Introduction to Computational Methods for Astronomers

Berkeley, CA

Fall 2020 - Present

- As head facilitator for this course I have planned the entire course with the help of other facilitators, developed the curriculum, given lectures, hosted office hours, and assigned and graded homework and projects. I also secured funding to pay the course staff and interns with the funds of the Berkeley Discover grant.

## MENTORSHIP

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### ULAB Research Mentor: Numerical Spin Analysis of Relativistic Bondi Accretion in M87\*

ULAB - Undergraduate Laboratory at Berkeley

Berkeley, CA

Fall 2021 - Spring 2022

- I mentored a group of undergraduate students to complete a year long research project where they explored the effects of black hole spin on relativistic Bondi Accretion for a simple model of M87\*. In this project I taught basic fundamentals of relativity and computational hydrodynamics. Their poster can be found [here](#).

### UC Berkeley Compass Mentor

Served as a mentor for a younger undergraduate student

Berkeley, CA

Spring 2021

### Berkeley High School RISE Mentor

A tutor and mentor to struggling high school students from underprivileged families

Berkeley, CA

Fall 2018 - Spring 2020

## SKILLS & ASSETS

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- **Programming Languages:** Python, UNIX, Julia, Java, C++, HTML, Javascript, CSS
- **Clusters:** Anvil Rosen Center for Advanced Computing, **HiPerGator3.0** at University of Florida, **Savio** at UC Berkeley
- **Astrophysical Simulation Codes:** Athena++, Modules for Experiments in Astrophysics (MESA)
- **Technologies:** GitHub, SLURM, OpenMP, MPI, Adobe Illustrator, Adobe Photoshop, Adobe Premier Pro, Microsoft Office Programs, Google Drive
- **Libraries:** Numpy, Scipy, Pandas, astropy, yt, H5py, Jupyter, PyGame, Matplotlib, ffmpeg
- **Languages:** English, French

## AWARDS

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- Fannie and John Hertz Foundation Fellowship
- Department of Energy Computational Science Graduate Research Fellowship (DOE CSGF) - (*Declined*)
- Outstanding (U)GSI Teaching Award
- Chambliss Award for Best Research Poster at 238th AAS Meeting (shared)
- Recipient of the Northern California Scholarship Foundations Award
- Q728 Lui, P & Chang, J Phys Scholarship
- Berkeley Scholarship
- 7 Separate Astronomy Departmental Scholarships for Teaching
- Ehrman, Albert Scholarship
- Berkeley CARES Award
- Edward Frank Kraft Award

## EXTRACURRICULARS

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- Undergraduate Student Representative for the Astronomy Department at UC Berkeley
- Undergraduate Peer Advisor for the Astronomy Department at UC Berkeley
- Camp Kesem Berkeley Counselor, Unit Leader, and Program Coordinator
- Society of Physics Students member
- Undergraduate Astronomy Society member
- Member of the Cercle de Français at UC Berkeley