Ethan Silver

(203) 343-4562 | esilver@g.harvard.edu | ethansilver.com

EDUCATION

HARVARD UNIVERSITY — Cambridge, MA
Ph.D. in Physics (in progress) — August 2023 - present
M.A. Physics (Feb 2026)

UNIVERSITY OF CALIFORNIA BERKELEY — Berkeley, CA
B.A. Physics, B.A. Astrophysics, B.A. Data Science; GPA: 4.0/4.0 (Highest Distinction) — August 2023

RESEARCH INTERESTS

Supernova precursor emission; core collapse supernovae; final stages of massive star evolution; mass loss in massive stars; gravitational-wave astronomy; black holes, AGNs, and TDEs; ML in astrophysics; strong lensing.

RESEARCH EXPERIENCE

CENTER FOR ASTROPHYSICS|HARVARD & SMITHSONIAN, BERGER TIME-DOMAIN GROUP, March 2024-present
Graduate Student Researcher advised by Edo Berger

- Identify and characterize supernova precursor emission using time-domain surveys such as ZTF and LSST.
- Trained neural networks to detect gravitational wave signals from compact binary coalescences in each CBC category, with a focus on detecting binary black hole mergers in LIGO's O1-O3 observing runs.

LAWRENCE BERKELEY NATIONAL LAB, PHYSICS DIVISION, STRONG LENSING GROUP, January 2022 – present
Undergraduate Research Apprentice advised by Xiaosheng Huang, and in collaboration with Adam Bolton. The Strong Lensing Group, a subgroup of The Supernova Cosmology Project (Lead PI: Saul Perlmutter), searches for new strong gravitational lenses and strongly lensed supernovae using machine learning techniques.

- Trained neural networks on simulated images of galaxies strongly-lensed by galactic-scale to subgalactic-scale halos to find conventional-sized to very low halo mass strong lenses in real HST and JWST observations.
- Contributed to the analysis of a strongly lensed multiply-imaged Type Ia supernova (SN Zwicky).

SLAC NATIONAL ACCELERATOR LABORATORY, ASTROPHYSICS DIVISION, June 2021 – January 2024
DOE Science Undergraduate Laboratory Intern (SULI program) under the direction of Elena Orlando

- Completed two SULI internships fitting and optimizing models of galactic cosmic ray (CR) propagation to the most recent data from Voyager 1 and AMS-02 using the optimization library Minuit2 and GALPROP code.

LAWRENCE BERKELEY NATIONAL LAB, COSMOLOGY, CMB GROUP, January 2020 – May 2021
Undergraduate Research Apprentice under the direction of Akito Kusaka (Lead PI: Adrian Lee)

- Contributed to instrumentation and data analysis for cosmic microwave background (CMB) experiments.

SPACE SCIENCES LABORATORY AT UC BERKELEY, EXPERIMENTAL ASTROPHYSICS GROUP, Fall Semester 2019
Undergraduate Research Apprentice under the direction of Nate Darling/ Oswald Siegmund

- Performed testing and characterization of microchannel plate (MCP) photon counting imaging detectors.

UNIVERSITY OF MASSACHUSETTS AMHERST, WILSON CRYOGENIC DEVICES LAB, Summer 2019
Summer Research Intensive Intern under the direction of Grant Wilson

- Created Python visualization software for the TolTEC project (building a new camera for the LMT in Mexico).

FIRST AUTHOR PUBLICATIONS

- **E. Silver**, P. Krastev, E. Berger, 2025, "A Search for Binary Black Hole Mergers in LIGO O1-O3 Data with Convolutional Neural Networks", submitted to Phys. Rev. D. [arXiv:2512.17204v1]
- **E. Silver**, R. Wang, X. Huang, A. Bolton, C. Storfer, S. Banka, 2025, "ML-Driven Strong Lens Discoveries: Down to $\theta_E \sim 0.03''$ and $M_{halo} < 10^{11}\,M_\odot$", ApJ, 994 (1), 117. [arXiv:2507.01943].
- **E. Silver**, E. Orlando, 2024, "Testing Cosmic-Ray Propagation Scenarios with AMS-02 and Voyager Data", ApJ, 963 (2), 111. [arXiv:2401.06242].

CONTRIBUTING AUTHOR PUBLICATIONS

- F. Urcelay, X. Huang et al. *(incl*. E. Silver), 2026, "The Carousel Lens II: Cosmological Constraints with GIGA-Lens". [arXiv:2602.16077v1].
- X. Huang et al. (*incl.* E. Silver), 2026, "DESI Strong Lens Foundry I: HST Observations and Modeling with GIGA-Lens", ApJ, 998 (1), 69. [arXiv:2502.03455].
- X. Huang et al. (*incl*. E. Silver), 2025, *"*DESI Strong Lens Foundry V: A Sample of HST-Observed Strong Lenses Modeled with GIGA-Lens*"*. [arXiv:2512.07823v2].
- X. Huang et al. (*incl*. E. Silver), 2025, "DESI Strong Lens Foundry II: DESI Spectroscopy for Strong Lens Candidates", [arXiv:2509.18089].
- J.D.R. Pierel et al. (*incl.* E. Silver), 2023, "LensWatch: I. Resolved HST Observations and Constraints on the Strongly-Lensed Type Ia Supernova 2022qmx ("SN Zwicky")", ApJ, 948 (2), 115. [arXiv:2211.03772].

CONFERENCES

27th European Cosmic Ray Symposium — July, 2022
- Talk: Comparing Propagation Models with Local Cosmic Ray Spectra

240th meeting of the AAS — June, 2022
- iPoster: Comparing Propagation Models with Local Cosmic Ray Spectra

TEACHING

HARVARD UNIVERSITY
- Teaching Fellow for *Physical Science 12A: Mechanics from an Analytic, Numerical, and Experimental Perspective* – Spring 2025
- Teaching Fellow for *Physical Science 12B: Electromagnetism from an Analytic, Numerical, and Experimental Perspective* – Fall 2024

AWARDS/HONORS

- Phi Beta Kappa Member (Summer 2023)
- Graduated with Highest Distinction from UC Berkeley (Summer 2023)
- Edward Frank Kraft Award for Freshmen at UC Berkeley (Fall 2019)
- National Merit Scholarship (Spring 2019)

TECHNICAL SKILLS

- Python (Libraries: Matplotlib, NumPy, Pandas, SciPy, Iminuit), SQL, LabVIEW, MATLAB, C, C++, Java, LaTeX
- Machine Learning/Neural Networks/Deep Learning: TensorFlow, Keras, PyTorch