

ERIN E. HAYES

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Institute of Astronomy, Madingley Road, Cambridge CB3 0HA

SCIENTIFIC INTERESTS

Observational cosmology, transient astronomy, supernovae, strong lensing, microlensing, time-delay cosmography, supernova cosmology, dark matter, dark energy, large scale survey analysis, and astrostatistics

EDUCATION

Institute of Astronomy & Lucy Cavendish College, University of Cambridge Cambridge, UK
Ph.D. in Astronomy October 2022 - present
Expected Submission Date: June 2026
Advisor: Dr. Suhail Dhawan

Department of Physics & Astronomy, University of Pennsylvania Philadelphia, PA, USA
M.S. in Physics August 2021 - May 2022
Thesis Title: “*Classifying Transients and Variable Objects in Data from the Photometric LSST Astronomical Time-Series Classification Challenge (PLAsTiCC)*”
Advisor: Prof. Masao Sako
B.A. in Physics with Honors, Summa Cum Laude August 2018 - May 2022

GRANTS AND AWARDS

Gates-Cambridge Scholarship (£240,000) Oct 2022 - present
LSST:UK Travel Awards (totalling £1,280) Mar 2024 & Jul 2025
Lucy Cavendish College Travel Awards (totalling £700) Feb 2024 & Jun 2025
Finalist, American Statistical Association Astrostatistics Student Paper Competition (\$100) Aug 2024
William E. Stephens Memorial Prize (\$300) May 2022
Phi Beta Kappa National Honor Society May 2022
Roy and Diana Vagelos Challenge Award (\$70,000) Aug 2021 - May 2022
Roy and Diana Vagelos Science Scholar (\$20,000) Aug 2018 - May 2022

SCIENTIFIC COMMUNITY LEADERSHIP & COLLABORATION INVOLVEMENT

The Vera C. Rubin Observatory’s Legacy Survey of Space and Time Oct 2022 - present
Strong Lensing Science Collaboration (SLSC) & Dark Energy Science Collaboration (DESC)

- [JOint Lensed Transient Event Observation Network \(JOLTEON\)](#) Co-lead: Jointly with DESC and SLSC, we are developing a light-curve level data set of lensed transients and contaminants (e.g., unlensed SNe, AGN) to aid the training of models for lensed transient discovery.
- DESC Scientific Referee

The Young Supernova Experiment (YSE) Oct 2022 - present

- Led first YSE SNe Ia cosmology analysis within the SNe Ia cosmology working group of over 40 members.

Cosmic Lighthouses at the Kavli Institute for Cosmology Jul 2025
Scientific Organizing Committee (SOC)

The Multimodal Universe Collaboration Apr 2024 - Dec 2024

- Provided supernova light curve data sets to the Multimodal Universe data base using Github and used field-specific knowledge to expand and improve utility of the project for supernova science.

The Cosmostatistics Initiative (COIN) Collaboration Sep 2023 - Sep 2024

- Collaboratively contributed to development of the ELEPHANT hostless transient identification pipeline born out of the [COIN Residence Program #7](#) using Github.

TEACHING & SUPERVISION

Co-supervision of Abdullah Al Zaif, Part III Student at Institute of Astronomy, University of Cambridge Oct 2024 - Sep 2025

Invited Lecturer, JWST Summer School on High Redshift Transients, Space Telescope Science Institute Aug 2025

- Delivered two hour-long lectures on gravitationally lensed supernovae (glSNe) and their applications to cosmology to an audience of 50 advanced undergraduate students and early PhD students.
- Developed and led two interactive Jupyter Notebook activities on 1) lens modelling and 2) time-delay estimation with glSNe, and facilitated discussion of new applications of gravitational lensing.

Teaching Assistant, Part II Astrophysics: Structure and Evolution of Stars, Institute of Astronomy, University of Cambridge Oct 2023 - Jun 2024

- Led biweekly problem sheet review sessions for five third year undergraduate students.
- Deepened students' interest in astronomy by connecting discussions of problem sheets to current research.
- Attended workshops to learn best teaching practices and improve efficacy for giving feedback.

OUTREACH

School Outreach Activity Lead, International Women's Day at the Institute of Astronomy, University of Cambridge Mar 2023 - 2025

- Taught 300 secondary school students over three years about exoplanet detection and the contribution of women to exoplanet science through a presentation and hands-on coding workshop.
- Developed interactive "Discovering Exoplanets" Jupyter Notebook for the session or individual use.
- [Github Repository with the coding and teaching materials for this program.](#)

Volunteer, Institute of Astronomy Open Day for the Cambridge Festival Mar 2023 - 2024

- Designed "Cosmic Distance Ladder" obstacle course to teach about how distance is measured in space.

Invited Speaker, REACT for the Cambridge Festival, University of Cambridge Feb 2023

- Delivered interactive "Fate of the Universe" presentation to 4 groups of 20 primary school students each.
- Encouraged engagement in astronomy by answering questions and assisting with associated art project.

SELECTED TALKS

Seminar, Johns Hopkins University Aug 2025

Time Delay Cosmography in the era of LSST: Estimating Precise Time Delays from Lensed Supernovae

Contributed Talk, UK National Astronomy Meeting Jul 2025

Time Delay Cosmography in the era of LSST: Estimating Precise Time Delays from Lensed Supernovae

Contributed Talk, Cosmic Lighthouses at the Kavli Institute for Cosmology Jul 2025

Standardisation of Type Ia Supernovae in the z band

Seminar, University of Birmingham Apr 2025

Time Delay Cosmography in the era of LSST: Estimating Precise Time Delays from Lensed Supernovae

Contributed Talk, Joint Statistical Meeting Aug 2024

GAUSSN: Applications of Gaussian Processes to Lensed Supernovae

Contributed Talk, MRC Biostatistics Unit Workshop on Gaussian Processes Mar 2024

GAUSSN: Applications of Gaussian Processes to Lensed Supernovae

Seminar (online), Vera C. Rubin Observatory Transients and Variable Stars Colloquium Mar 2024

GAUSSN: Bayesian Time Delay Estimation from Strongly Lensed Supernovae

Contributed Talk, Royal Society Meeting on Multi-messenger Gravitational Lensing Mar 2024

GAUSSN: Bayesian Time Delay Estimation from Strongly Lensed Supernovae

Contributed Talk, Machine Learning for Transient Astronomy Dec 2024

GAUSSN: Bayesian Time Delay Estimation from Strongly Lensed Supernovae

PUBLICATIONS

Lead Author/Significant Contribution:

E.E. Hayes, S. Dhawan, K.S. Mandel, D.O. Jones, et al. (2025); *Characterising the Standardisation Properties of Type Ia Supernovae in the z band with Hierarchical Bayesian Modelling*. [[MNRAS 541, 1948](#)]

N. Arendse, E. Mörtzell, L. Weisenbach, **E.E. Hayes**, et al. (2025); *Microlensing of lensed supernovae Zwicky & iPTF16geu: constraints on the lens galaxy mass slope and dark compact object fraction*. Submitted to the Open Journal of Astrophysics. [[pre-print](#)]

P.J. Pessi, R. Durgesh, L. Nakazono, **E.E. Hayes**, et al. for the COIN Collaboration (2024); *ELEPHANT: ExtragaLactic alErt Pipeline for Hostless AstroNomical Transients*. [[A&A 691, A181](#)]

E.E. Hayes, S. Thorp, K.S. Mandel, N. Arendse, M. Grayling, and S. Dhawan (2024); *GAUSSN: Bayesian Time-Delay Estimation for Strongly Lensed Supernovae*. [[MNRAS 530, 3942](#)]

Co-Author:

B. Popovic, W.D. Kenworthy, M. Ginolin, A. Goobar, ..., **E.E. Hayes**, et al. (2025); *A Reassessment of the Pantheon+ and DES 5YR Calibration Uncertainties: Dovekie*. Submitted to A&A. [[pre-print](#)]

G. Smith, T. Baker, S. Birrer, C.E. Collins, ..., **E.E. Hayes**, et al. (2025); *Multi-messenger Gravitational Lensing*. [[RSPTA 383: 20240134](#)]

C. Larison, J.D.R. Pierel, M.J.B. Newman, S.W. Jha, D. Gilman, and **E.E. Hayes** for the LensWatch collaboration (2025); *LensWatch. II. Improved Photometry and Time-delay Constraints on the Strongly Lensed Type Ia Supernova 2022qmx (“SN Zwicky”) with HST Template Observations*. [[ApJ 980, 172](#)]

E. Angeloudi, J. Audenaert, M. Bowles, B.M. Boyd, ..., **E.E. Hayes**, et al. for the Multimodal Universe Collaboration (2024); *The Multimodal Universe: Enabling Large-Scale Machine Learning with 100TB of Astronomical Scientific Data*. [[RNAAS 8, 301](#)]

M. Grayling, S. Thorp, K.S. Mandel, S. Dhawan, A.S.M. Uzsoy, B.M. Boyd, **E.E. Hayes**, and S.M. Ward (2024); *Scalable hierarchical BAYESN inference: Investigating dependence of SN Ia host galaxy dust properties on stellar mass and redshift*. [[MNRAS 531, 953](#)]

P.D. Aleo, K. Malanchev, S. Sharief, D.O. Jones, ..., **E.E. Hayes**, et al. (2023); *The Young Supernova Experiment Data Release 1 (YSE DR1): Light Curves and Photometric Classification of 1975 Supernovae*. [[ApJS 266, 9](#)]