

# Elliot Yarnell Davies

## Employment

2025–2028 **Massachusetts Institute of Technology, MIT Kavli Postdoctoral Associate**  
**PI:** Prof. Lina Necib

## Education

- 2021–2025 **University of Cambridge (Gonville & Caius College), Ph.D. Astronomy & Astrophysics**  
**Thesis:** *Chemodynamics of the Galactic Halo*  
**Supervisors:** Prof. Vasily Belokurov & Prof. N. Wyn Evans
- 2020–2021 **University of Edinburgh, MSc (with Merit) Theoretical Physics**  
**Thesis:** *Probing the Neutrino Mass Hierarchy with Cosmological Density and Velocity Fields*  
**Supervisor:** Prof. John Peacock
- 2016–2020 **Princeton University, A.B. (cum laude) Astrophysics with Applied Mathematics**  
**Thesis:** *Smoothing the Universe by Cosmological Contraction in Various Scalar Field Potentials*  
**Supervisor:** Prof. Paul Steinhardt

## Publication Summary

- ORCID iD **0000-0001-5996-4072**  
H-index **8 (NASA ADS)**  
Citations **277 (NASA ADS)**  
Paper count **7 (first author); 6 (other author)**

## First Author Publications

- 7 Apr '25 **Blind source separation of the stellar halo**  
**Elliot Y. Davies**, Vasily Belokurov, Andrey Kravtsov, Stephanie Monty, GyuChul Myeong, N. Wyn Evans, Sarah G. Kane  
<https://arxiv.org/abs/2410.21365>
- 22 Feb '24 **Hints of a disrupted binary dwarf galaxy in the Sagittarius stream**  
**Elliot Y. Davies**, Stephanie Monty, Vasily Belokurov, Adam M. Dillamore  
<https://doi.org/10.1093/mnras/stae559>
- 5 Jan '24 **Disrupted dwarf binary merger as the possible origin of NGC 2419 and Sagittarius stream substructure**  
**Elliot Y. Davies**, Vasily Belokurov, Stephanie Monty, N. Wyn Evans  
<https://doi.org/10.1093/mnrasl/slae001>
- 17 Jul '23 **Stellar halo striations from assumptions of axisymmetry, MNRAS**  
**Elliot Y. Davies**, Adam M. Dillamore, Vasily Belokurov, N. Wyn Evans  
<https://doi.org/10.1093/mnras/stad2138>
- 14 Feb '23 **Accelerated phase mixing in the stellar halo due to a rotating bar, MNRAS**  
**Elliot Y. Davies**, Adam M. Dillamore, Eugene Vasiliev, Vasily Belokurov  
<https://doi.org/10.1093/mnrasl/slad017>
- 9 Dec '22 **Ironing the folds: The phase space chevrons of a GSE-like merger as a dark matter subhalo detector, MNRAS**  
**Elliot Y. Davies**, Eugene Vasiliev, Vasily Belokurov, N. Wyn Evans, Adam M. Dillamore  
<https://doi.org/10.1093/mnras/stac3581>
- 23 Jan '20 **Fuzzy dark matter soliton cores around supermassive black holes, MNRAS**  
**Elliot Y. Davies**, Philip Mocz  
<https://doi.org/10.1093/mnras/staa202>

## Other Publications

- 27 Sep '25 **STRINGS: STReams in Residual Images of Nearby Galaxies**  
Elisabeth Sola, David Chemaly, Vasily Belokurov, Oliver Müller, Anke Ardern-Arentsen, **Elliot Y. Davies**, ...  
<https://doi.org/10.1093/mnras/staf1647>
- Submitted **The realm of Aurora. Density distribution of metal-poor giants in the heart of the Galaxy**  
Evgeny P. Kurbatov, Vasily Belokurov, Sergey Koposov, Andrey Kravtsov, **Elliot Y. Davies**, ...  
<https://arxiv.org/abs/2410.22250>

- 8 Aug '24 **The ratio of [Eu/Si] differentiates accreted/in-situ Milky Way stars across metallicities, as indicated by both field stars and globular clusters**  
Stephanie Monty, Vasily Belokurov, Jason L. Sanders, Therese T. Hansen, Erika M. Holmbeck, Charli M. Sakari, Madline McKenzie, GyuChul Myeong, **Elliot Y. Davies**, ...  
<https://doi.org/10.1093/mnras/stae1895>
- 17 Jul '23 **Stellar halo substructure generated by bar resonances**, *MNRAS*  
Adam M. Dillamore, Vasily Belokurov, N. Wyn Evans, **Elliot Y. Davies**  
<https://doi.org/10.1093/mnras/stad2136>
- 25 Nov '22 **Energy wrinkles and phase-space folds of the last major merger**, *MNRAS*  
Vasily Belokurov, Eugene Vasiliev, Alis J. Deason, Sergey E. Koposov, Adam M. Dillamore, **Elliot Y. Davies**, ...  
<https://doi.org/10.1093/mnras/stac3436>
- 13 Aug '20 **Robustness of Slow Contraction to Cosmic Initial Conditions**, *JCAP*  
Anna Ijjas, William G. Cook, Frans Pretorius, Paul J. Steinhardt, **Elliot Y. Davies**  
<https://doi.org/10.1088/1475-7516/2020/08/030>

## Teaching & Supervision

- 2022-2024 **Part II Stellar Dynamics and the Structure of Galaxies**, *Supervisor*, Institute of Astronomy, Cambridge  
2022 **Part II Introduction to Cosmology**, *Supervisor*, Institute of Astronomy, Cambridge

## Mentoring

- 2023 - 2024 **Yuxuan Zeng**, *Part III (Masters)*, University of Cambridge, Institute of Astronomy

## Outreach

- Nov.'21 – Outreach Supervisor for Cambridge Higher Aspirations Scheme, whereby I led six-to-seven sessions per year,  
Jul.'23 covering topics in introductory Astrophysics and Cosmology for high achieving state-school students. Self-made preparatory work was provided to the students prior to each session, and discussions were held about assigned work during the sessions. (Gonville & Caius College, Cambridge, UK).
- Dec '19 Presentation to roughly 50 high school physics students about studying physics at university (Alun School, Mold, UK)
- Dec '17 Presentation to talented high school students on going to university in the United States (Alun School, Mold, UK)

## Research Positions

- Jun.'19 – **Princeton University, Dept. of Astrophysical Science**  
Aug.'19 Princeton University, USA  
Undergraduate Summer Researcher – Supervised by Dr. Philip Mocz
- Jul.'18 – **Princeton University, Dept. of Physics**  
Sep.'18 Princeton University, USA  
Undergraduate Summer Researcher – Supervised by Prof. Bill Jones & Dr. Aurelien Fraisse

## Conferences, Talks & Schools

- Jan' 25 **Dissertation talk entitled Blind source separation of the stellar halo**  
245th AAS Meeting (National Harbor, MD)
- Dec' 24 **Winter school attendee**  
Galaxy modelling and Galactic Centre workshop (University of Surrey, Guildford)
- Aug' 24 **Contributed talk entitled Hints of a disrupted binary dwarf galaxy in the Sagittarius stream**  
Small Galaxies, Large Questions (Durham, UK)
- May' 24 **Contributed talk entitled Hints of a disrupted binary dwarf galaxy in the Sagittarius stream**  
The Milky Way Assembly Tale (Bologna, Italy)
- Sep' 23 **Contributed talk entitled Capturing subhaloes with Galactic halo substructure**  
Revealed by Gaia: the central halo of the Milky Way (Institute of Astronomy, Cambridge)
- Jul' 23 **Poster entitled Accelerated phase mixing in the stellar halo due to a rotating bar**  
European Astronomical Society (Krakow, Poland)
- Jul' 23 **Poster entitled Accelerated phase mixing in the stellar halo due to a rotating bar**  
Galactic Bars: Driving and Decoding Galaxy Evolution (Granada, Spain)
- Mar' 23 **Talk entitled The wrinkles and folds of the Milky Way's most recent major merger**  
MCR Research Day 2023 (Gonville & Caius College, Cambridge)

Nov' 22 **Talk entitled The Phase Mixed Debris of a Massive Merger as a Dark Matter Subhalo Detector**

Wednesday Seminar (Institute of Astronomy, Cambridge)

Jan' 20 **Poster entitled How Supermassive Black Holes impact the Fuzzy Dark Matter Mass Mystery**

235th AAS Meeting (Hawai'i Convention Center, Honolulu, HI)

## Activities

Nov.'21 – **Interviewer & Ambassador, Princeton University Undergraduate Admissions**

present Conduct interviews with prospective Princeton University students and produce reports on each interviewee to aid in the undergraduate admissions process. **Total interviews conducted: 16**

Nov.'21 – **Journal Club Coordinator, Institute of Astronomy, Cambridge**

Mar.'22 Organiser for the bi-weekly undergraduate journal club for final year undergraduates and masters students.

Jan.'17– **Director & Volunteer, Princeton Envision (Entrepreneurship Club)**

Jan.'18 Assisted in organising, promoting and managing Envision Conference: an annual conference held over 3 days in December that brings 200 competitively selected students from universities across the world together with top researchers, entrepreneurs, and professionals to attend lectures and workshops discussing the disruptive technologies such as artificial intelligence and space travel.

Sep.'17– **Library Assistant, Princeton University Architecture Library**

Mar.'20 Duties included but were not limited to: circulation services, reserves, shelving, shelf reading, with other duties as directed by the librarian.

Dec.'16– **Peer Reviewer, Princeton Undergraduate Research Journal**

Sep.'17 Assisted in the peer reviewing process for the Princeton Undergraduate Research Journal (PURJ), Princeton's first peer-reviewed academic journal, highlighting top-quality research performed by Princeton undergraduates across all academic pursuits, including the natural sciences, humanities, engineering, social sciences, and arts.

## Awards & Academic Programmes

Oct.'21 – **STFC PhD Studentship**

Apr.'25 Cambridge, UK

Full funding for 3.5 years to complete PhD at the Institute of Astronomy, University of Cambridge.

Sep.'16 – **Full-ride Academic Scholarship**

Jun'20 Princeton University, USA

Various financial aid packages covering all tuition fees and living costs to attend Princeton University in the United States for four years.

Mar.'15 – **Sutton Trust USA Programme**

May.'16 London, UK

One of 150 selected from 1600 high achieving low-income, first-generation students to receive admissions guidance for applying to the top universities in the US.

Jul.'15 **UNIQ Summer School**

University of Oxford, UK

One of 36 Sixth Form students selected to attend the Oxford University Physics UNIQ Summer School for students from underrepresented backgrounds.