Leah Bigwood

https://leahbigwood.github.io/
lmb224@cam.ac.uk
Institute of Astronomy, Madingley Rd, Cambridge CB3 0HA
ORCID:0000-0002-9870-3331
UAT keywords: Gravitational lensing shear – Hydrodynamical simulations – Sunyaev-Zeldovich effect

EDUCATION

Institute of Astronomy, University of Cambridge, Cambridge, UK — **2022 - present**
PhD in Astronomy *(Prof. Alexandra Amon & Prof. Debora Sijacki)*
Durham University, Durham, UK — **2018 - 2022**
MPhys Physics and Astronomy: First Class Honours

RESEARCH

Centre for Computational Astrophysics, Flatiron Institute, NY, USA — **Sept. 2025 - Jan. 2026**
CCA pre-doctoral program
Department of Astrophysical Sciences, Princeton University, NJ, USA — **2023 - present**
Visiting graduate student
Institute for Computational Cosmology, Durham University, Durham, UK — **2022**
Summer research student (supervised by Dr. Michael Wilson)
Massachusetts Institute of Technology, Cambridge, MA, USA (remote) — **2021**
Summer research student (supervised by Prof. Anna-Christina Eilers)
University of St. Andrews, St Andrews, UK (remote) — **2020**
Summer research student (supervised by Dr. Juan Venancio Hernandez Santisteban)

AWARDS & FUNDING

Clare Hall Research Awards — **2025**
MIAPbP PhD student stipend — **2024**
John Barrow Travel Award — **2024**
D. A. Wright Prize — **2022**
Durham Physics Award for Outstanding Achievement — **2020, 2021, 2022**
Durham University Level 4 Prize for Theoretical Astrophysics — **2022**
John Simpson Greenwell Memorial Fund — **2020, 2021, 2022**

RESEARCH HIGHLIGHTS

My research bridges cosmology and galaxy formation, addressing the uncertainty in baryonic feedback modeling, which stands as the dominant systematic limiting the precision of cosmological constraints from weak lensing analyses.

- I led the first joint analysis of cosmic shear data from the Dark Energy Survey with observations of the gas content from kSZ and X-ray to jointly constrain cosmological and astrophysical parameters [Bigwood+24b, Bigwood & McCullough+25 in review].
- I provided some of the first evidence that that AGN feedback is stronger than implemented in current cosmological simulations from the kSZ effect [Bigwood+24b, Siegel+25, Bigwood+25b].
- I built a new suite of cosmological simulations, including developing a novel, physically-motivated AGN feedback model, XFABLE, that demonstrates the plausibility of a strong feedback scenario [Bigwood+25a].
- I led a comprehensive study of the kSZ effect across five simulation suites to establish the observations as a benchmark for future feedback models [Bigwood+25b].
- Publication record: Since starting my PhD in 2022, I have led four publications (with one more in advanced preparation) and contributed to three additional papers.

SELECTED TALKS

Cosmology seminar (Max Planck Institute for Astrophysics, Munich) — **2025**
High-Energy Group meeting (Max-Planck-Institute for Extraterrestrial Physics, Munich) — **2025**
Special seminar (University Observatory, LMU, Munich) — **2025**
Liam Connor Lab (Centre for Astrophysics, Harvard & Smithsonian) — **2025**

Cosmic Ecosystems (Perimeter Institute for Theoretical Physics, Waterloo) **2025**
The mm Universe (KICP at the University of Chicago) **2025**
'Big Data, Big Questions: The Future of Cosmological Surveys' workshop (MIAPbP, Munich) **2025**
Galaxies Discussion Group (Kavli Institute for Cosmology, Cambridge) **2025**
CMB/LSS Discussion Group (Kavli Institute for Cosmology, Cambridge) **2024, 2025**
Cosmology Group Meeting (Princeton University, NJ) **2024, 2025**
Cosmology Seminar (Invited, Yale University) **2024**
Bahcall Lunch (Invited, Institute of Advanced Study, Princeton, NJ) **2024**
DES WL-LSS-TP Working Group (remote) **2024**
Cambridge-LMU Cosmology Meeting (Kavli Institute for Cosmology, Cambridge) **2024**
New Physics from Old Light workshop, (University of Cambridge) **2024**
Galaxies and Lensing Seminar (Invited, University Observatory, LMU, Munich remote) **2024**
LSST Dark Energy Science Collaboration Modelling & Combined Probes General Meeting (remote) **2024**
Baryons in the Universe (with Alexandra Amon, Kavli IPMU, Tokyo) **2024**
Galaxy Formation Meeting (Flatiron Center for Computational Astrophysics, New York) **2023**
Cambridge-LMU Cosmology Meeting (Max-Planck-Institute for Extraterrestrial Physics, Munich) **2023**
Wednesday Seminar Series (Institute of Astronomy, Cambridge) **2023**
Dark Energy Survey Collaboration Meeting (remote) **2023**

TEACHING, SUPERVISION & MENTORING

Co-supervision of Kaitlyn Shavelle, graduate rotation student (Princeton University) **2024 - present**
Gonville & Caius Bridging Week Natural Sciences supervisor (University of Cambridge) **Oct. 2023**
Co-ran Undergraduate Journal Club (Institute of Astronomy, University of Cambridge) **2022 - 2023**
Stars and Galaxies 2 module demonstrator (Durham University) **2021 - 2022**
Mathematics, physics and chemistry private tutor (remote) **2017 - present**
Mentor in Oxbridge undergraduate applications and entrance exam preparation (remote) **Aug. 2024 - Nov. 2024**
'Leveling Up: Aspire Higher' physics mentor (remote) **Mar. 2021 - Jul. 2021**

OUTREACH & SERVICE

Monthly Notices of the Royal Astronomical Society reviewer **2025**
International Women's Day 2025 Committee (Institute of Astronomy, University of Cambridge) **2025**
Massive Black Holes across Cosmic Time LOC **2025**
New Physics from Old Light workshop LOC **2024**
Institute of Astronomy public open evening lectures:
'Black hole feedback: how extreme is too extreme?' **2025**
'Shedding light on the dark Universe' **2024**
Institute of Astronomy public open evening volunteer **2024 - 2025**
'How big really is the Universe?' outreach talk (University of Cambridge Primary School) **2025**
Maths Explorers volunteer (DAMTP, University of Cambridge) **2025**
Science communication articles:
'The case for large-scale AGN feedback in galaxy formation simulations' **2025**
'Extreme AGN feedback: Could X-ray observations restore trust in our cosmological model?' **2025**
'Characterising the Risk to Earth of Potentially Hazardous Asteroids' **2021**
'Investigating the Dark Matter in M82 using the Mass-to-Light Ratio' **2020**

OBSERVING EXPERIENCE

Magellan/FIRE (remote) (1 night) **2021**
Durham University/AstroLab (15 nights) **2020**