Finian Ashmead

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Education

The University of Pittsburgh, Pittsburgh, PA — August 2023 - Present

Ph.D. Physics

The University of Chicago, Chicago, IL — September 2017 - June 2021

B.S. Astrophysics
GPA: 3.442/4.000

Awards & Honors

University Dean's List — 2018 - 2019

Research & Technical Experience

Newman-Andrews Research Group — August 2023 - Present

The University of Pittsburgh, Pittsburgh, PA
Graduate Student Researcher

Working under the supervision of Dr. Jeffrey A. Newman and Dr. Brett H. Andrews on improved photometric redshift techniques and training data sets for the Nancy Grace Roman Space Telescope and Rubin-LSST. Current research involves using the Uniform Manifold Approximation and Projection (UMAP) dimensionality reduction algorithm to map the observed galaxy color–redshift relation in compressed spaces.

Science Undergraduate Laboratory Internships — August 2022 - May 2023

Fermi National Accelerator Laboratory, Batavia, IL
Intern

Participated in the SULI (Science Undergraduate Laboratory Internships) program under co-supervision of Dr. Alex Drlica-Wagner and Dr. Tom Diehl. This work focused on observational cosmology, and has involved analysis of observational data, R&D for a spectroscopic instrument, and working on a telescope proposal.

Handbook of Quantum Gravity, *Springer* — February - October 2022

Researcher / Author

Worked with Professor David D. Reid to co-author a chapter on dimension estimation techniques for causal sets, as part of the Causal Set Theory section of the upcoming *Handbook of Quantum Gravity*, to be published by Springer. Submitted October 15 2022.

COOL-LAMPS Collaboration — January 2021 - September 2021

The University of Chicago, Chicago, IL

Student-Researcher / Researcher

Participated in the COOL-LAMPS (ChicagO Optically-selected strong Lenses – Located At the Margins of Public Surveys) research collaboration. Work included reading and presentation of relevant papers to the group, visual identification of strong gravitational lensing, operation of the FOURSTAR near infrared camera on the Magellan Baade Telescope, analysis of data in SAOImage DS9, and galaxy modeling and data analysis using GALFIT. Through June of 2021, this was facilitated through the Astronomy Field Course taught by Professor Mike Gladders. During August and September of 2021, I was paid as a research assistant to analyze the strongly-lensed galaxy COOL-J2129-0126 using GALFIT.

Carnegie-Chicago Hubble Program June 2019 - 2021

The University of Chicago, Chicago, IL

Student-Researcher

Performed analysis of data from various instruments on Milky Way globular clusters in order to ultimately construct accurate color–magnitude diagrams with which to calibrate the magnitude of the tip of the red giant branch (TRGB) for use in the cosmic distance ladder.

Publications

Finian Ashmead, Jeffrey A. Newman, Brett H. Andrews, et al. "Optimizing Photometric Redshift Training Sets I: Efficient Compression of the Galaxy Color–Redshift Relation with UMAP"
December 2025. Submitted to *Ap. J.*

https://arxiv.org/abs/2512.09032

Rebekah Sebok, **Finian Ashmead**, et al. "Small pitch tilting spine optical fiber positioners for massively parallel spectroscopy"
August 2024. Proceedings of the SPIE, Volume 13100, id. 131006A 11 pp.

Yunchong Zhang, Viraj Manwadkar, et al. (incl. **Finian Ashmead**) "COOL-LAMPS IV: A Sample of Bright Strongly-Lensed Galaxies at $3 < z < 4$"
June 2023. The Astrophysical Journal, Volume 950, Issue 1, id.58, 15 pp.

Erik Zaborowski, Alex Drlica-Wagner, **Finian Ashmead**, et al. (DELVE & DES Collaborations). "Identification of Galaxy–Galaxy Strong Lens Candidates in the DECam Local Volume Exploration Survey Using Machine Learning"
September 2023. The Astrophysical Journal, Volume 954, Issue 1, id.68, 24 pp.

Finian Ashmead and David D. Reid. "Estimating the Manifold Dimension of Causal Sets"
October 2022. Appears in *Handbook of Quantum Gravity*, Springer Nature 2023.

William Cerny, Wendy L. Freedman, Barry F. Madore, **Finian Ashmead**, et al. "Multi-Wavelength, Optical (VI) and Near-Infrared (JHK) Calibration of the Tip of the Red Giant Branch Method based on Milky Way Globular Clusters"
December 2020. Submitted to *Ap. J.*

https://arxiv.org/abs/2012.09701

Presentations

Cosmic Cartography with Roman: Advances in Galaxy Structures, Distributions, Dark Matter, and Dark Energy July 2025

Selected to contribute a poster to the symposium at the Space Telescope Science Institute (STScI) on my work on a UMAP-based approach to mapping the color–redshift relation in dimensionality-reduced spaces, and leveraging this to optimize photometric redshift training data.

LSST-DESC Virtual Collaboration Meeting February 2025

Gave a JuDO Research Bytes talk on my work in the Newman-Andrews group at The University of Pittsburgh, covering my research on using the UMAP dimensionality reduction algorithm to recover a low-dimensional structure of broadband galaxy colors governed primarily by two parameters, redshift and specific star formation rate, and the utility of this low-dimensional embedding to improving photometric redshift estimation for Rubin and Roman observatory data.

Survey Science Group, Kavli Institute for Cosmological Physics at The University of Chicago October 2024

Gave a presentation to the KICP Survey Science Group on my work in the Newman-Andrews group at The University of Pittsburgh, covering my research on using the UMAP dimensionality reduction algorithm to recover the low-dimensional structure of broadband galaxy colors governed primarily by two parameters, redshift and specific star formation rate, and the utility of this low-dimensional embedding to improving photometric redshift estimation.

Surveys Group, Fermi National Accelerator Laboratory December 2022

Gave a presentation to the FNAL Surveys Group on my work in the SULI Fall 2022 program, covering my work analyzing strong gravitational lensing candidates, my work designing a plotting tool to use in planning our follow-up observing proposals, and my work on R&D for a "tilting spine" spectrograph fiber positioner.

Activities & Employment

Department of Physics August 2023 - May 2024

University of Pittsburgh

Teaching Assistant

Served as a teaching assistant for Astronomy 0089 for two semesters, supporting courses taught by Jeffrey A. Newman and Sandhya Rao.

Department of Astronomy and Astrophysics June - August 2022

The University of Chicago, Chicago, IL

SEO Telescope Technician

Worked with the UChicago SEO (Stone Edge Observatory) group under Al Harper and Marc Berthoud on code for image processing and calibration to create master flat images for the data reduction pipeline.

Department of Astronomy and Astrophysics June - August 2021

The University of Chicago, Chicago, IL

Teaching Assistant

Served as a teaching assistant under Prof. Fausto Cattaneo for two summer courses, ASTR 12700 (Stars) and ASTR 12610 (Black Holes).

Long Beach Lifeguard Patrol May 2015 - September 2018

Long Beach, NY

Ocean Lifeguard

Worked four summers as an ocean lifeguard at Ocean Beach Park in Long Beach, NY. Five days a week from 8:40 AM to 6:10 PM, was responsible for the safety of swimmers in the ocean. Included extensive training on rescue swimming, CPR, spinal injury care, and AED use.

Languages & Citizenship

Languages:

English - Native

French - Conversational

United States citizen

Technical skills

Programming: Python, Unix, Tex, SCPI, Fortran

Software: UMAP, minisom, GALFIT, SAOImage DS9, Microsoft Office, Github

Hardware: Keysight EDU332112A Waveform Generator, Tektronix TDS5054B-NV-T Oscilloscope, Multimeter, Basic Electrical Training