

Abigail J. Lee

Email: abbyl@uchicago.edu • Website: abiglee7.github.io

EDUCATION

University of Chicago

Ph.D. Candidate, Astronomy & Astrophysics

Advisor: Wendy Freedman

Chicago, IL

2019 – Present

University of Pennsylvania

B.A., Physics (with Honors); Minors in Mathematics and Classical Studies, summa cum laude

Senior Thesis: Reconstructing Lognormal Density Fields using Hamiltonian Monte Carlo Techniques

Advisor: Gary Bernstein

Philadelphia, PA

May 2019

AWARDS & FELLOWSHIPS

Illinois Space Grant Consortium Graduate Fellowship

2022

LSST Cooperation Data Science Fellowship

2021 – 2023

Most Engaging Presentation Award, UChicago Three Minute Thesis Competition

2021

Chambliss Astronomy Achievement Award, 237th Meeting of the AAS

2021

Elaine K. Bernstein Women in Science Award, University of Chicago

2019

McCormick Graduate Fellowship, University of Chicago

2019 – 2021

NASA Pennsylvania Space Grant Undergraduate Scholarship

2018

RESEARCH POSITIONS

UChicago, Graduate Research Assistant

2019 – Present

Penn, Cosmology Undergraduate Research Assistant

2017 – 2019

Stanford KIPAC, Summer Undergraduate Research Assistant

2018

Max Planck Institute for Gravitational Physics, Summer Undergraduate Research Assistant

2017

NASA Jet Propulsion Laboratory, Summer Intern

2017

Penn, Experimental Condensed Matter Undergraduate Research Assistant

2016 – 2017

PUBLICATIONS

First-author

1. **Lee, A. J.**, Rousseau-Nepton, L., Freedman, W. L., Madore, B. F., Cioni, M.-R., Hoyt, T. J., Jang, I. S., Javadi, A., Owens, K. A. *The Astrophysical Distance Scale: V. A 2% Distance to the Local Group Spiral M33 via the JAGB Method, Tip of the Red Giant Branch, and Leavitt Law*, 2022, accepted to ApJ, [arXiv:2205.11323](https://arxiv.org/abs/2205.11323)
2. **Lee, A. J.**, Freedman, W. L., Madore, B. F., Owens, K. A., Jang, I. S. *A Preliminary Calibration of the JAGB Method Using Gaia EDR3*, 2021b, [ApJ](https://doi.org/10.1093/apj/apj923.157), **923**, 157
3. **Lee, A. J.**, Freedman, W. L., Madore, B. F., Owens, K. A., Monson, A. J., Hoyt, T. J. *The Astrophysical Distance Scale III: Distance to the Local Group Galaxy WLM using Multi-Wavelength Observations of the Tip of the Red Giant Branch, Cepheids, and JAGB Stars*. 2021a, [ApJ](https://doi.org/10.1093/apj/apj907.112), **907** 112

Co-author

1. Madore, B. F., Freedman, W. L., **Lee, A. J.**, Owens, K. A. *Milky Way Zero-Point Calibration of the JAGB Method: Carbon Stars in Galactic Open Clusters*, 2022, submitted to ApJ.
2. Porth, L., Bernstein, G., Smith, R. E., **Lee, A. J.** *The Information Content of Projected Galaxy Fields*, 2021, submitted to MNRAS. [arXiv:2111.13702](https://arxiv.org/abs/2111.13702)

3. Owens, K. A., Freedman, W. L., Madore, B. F., **Lee, A. J.** *Current Challenges in Cepheid Distance Calibrations Using Gaia EDR3*, 2022, [ApJ, 927, 8](#)
4. Madore, B. F., Freedman, W. L., **Lee, A. J.** *Astrophysical Distance Scale IV. Preliminary Zero-Point Calibration of the JAGB Method in the HST/WFC3-IR Broad J-Band (F110W) Filter*. 2022, [ApJ, 926, 153](#)
5. Vishnubhotla, R., Ping. J., Gao, Z., **Lee, A.**, Saouaf, O., Vrudhula, A., Johnson, A. T. C. *Scalable Graphene Aptasensors for Drug Quantification* 2017, [AIP Advances 7, 115111](#)

SUCCESSFUL PROPOSALS & GRANTS

National Grants

- Co-I: **JWST** Cycle 1 GO (PI: Wendy Freedman & Barry Madore) 2021
Answering the Most Important Problem in Cosmology Today: Is the Tension in the Hubble Constant Real?
- Co-I: **HST** Cycle 28 AR (PI: Wendy Freedman) 2020
An Independent Appraisal of the Cepheid Distance Scale
- Co-I: **HST** Cycle 28 AR (PI: Wendy Freedman) 2020
Absolute Magnitude Calibration of SNe Ia at 1%: Doubling the Sample of TRGB Host-Galaxy SN Calibrators

University Grants

- Co-I: **Midway** Research II Allocation (PI: Josh Frieman), 123k hours 2021
Constraining dark energy's equation of state parameter w from strong lensing
- PI: **UChicago Grad Council** Travel Grants, \$1k 2021, 2022
- PI: **Penn University Scholars** Fund, \$14k 2016, 2018

TEACHING EXPERIENCE

- Guest Lecturer**, UChicago, *Galaxies* 2020
- Teaching Assistant**, UChicago, *Galaxies* 2020
- Teaching Assistant**, UChicago, *Stars* 2019
- Teaching Assistant**, Penn, *Classical Mechanics* 2019
- Observing Labs Teaching Assistant**, Penn, *Survey of the Universe* 2018, 2019
- Teaching Assistant**, Penn, *E&M, Optics, and Modern Physics* 2018
- Lab Teaching Assistant**, Penn, *Classical Mechanics* 2017
- Tutor**, Penn Physics Department 2016, 2017

OBSERVING EXPERIENCE

- Public data – significant experience with data from HST, Gaia, 2MASS
- Magellan-Baade FourStar Near-Infrared imaging - 11 nights
- Magellan-Baade IMACS Optical imaging - 1 night

PRESS

- UChicago News**, *Aging stars provide a new cosmological yardstick* 2021
- Penn Today**, *Women in Physics Group inspires the next generation of physicists and astronomers* 2019

TALKS

Invited Talks

- Carbon Stars as Standard Candles** Fall 2022
UPenn Colloquium
- Carbon Stars as Standard Candles: Establishing the Foundations for a Measurement of H_0** 2022
UChicago Astronomy Lunch Seminar
- The JAGB Method: Using Carbon Stars as Standard Candles** 2021
Argonne National Lab Cosmology Group Meeting

Conference Talks

The JAGB Method: Using Carbon Stars as Standard Candles <i>240th Meeting of the American Astronomical Society</i>	2022
Distance to WLM Using Observations of the TRGB, Cepheids, and JAGB Stars <i>237th Meeting of the American Astronomical Society</i>	2021
Characterizing the temporal variability of backscatter in prep. for the NISAR mission <i>2017 AGU Fall Meeting</i>	2017
Characterizing Backscatter Variability using UAVSAR <i>2017 Gulf Coast Undergraduate Research Symposium</i>	2017
Improved Performance in Graphene & MoS₂ FETs using a BN Isolation Layer <i>2017 Emerging Researchers National Conference in STEM</i>	2017

PROFESSIONAL SERVICE

Climate Survey Committee Member , UChicago	2021 – Present
Advising & Mentoring Program Organizer , UChicago	2020 – Present
Inclusion, Diversity and Equity in Astronomy Club Member , UChicago	2019 – Present
Alumni Interviewer , Penn	2019 – Present
Faculty Meeting Graduate Student Representative , UChicago	2019 – 2020
Society of Physics Students Board Member , Penn	2018 – 2019

OUTREACH

Writer , Astrobites (find my articles here)	2022 – Present
Guest Lecturer on “Mentorship in Academia” , UChicago Physics of Stars class	2021
Space Explorers Winter Institute Instructor , UChicago	2020
Observing Nights Organizer , Penn	2018 – 2019
Astronomy Tutor for Veterans , Penn Veterans Upward Bound	2018 – 2019

WORKSHOPS & SUMMER SCHOOLS

Fundamental cosmology from the ELT and space <i>4th Azores School on Observational Cosmology (attended virtually due to COVID-19)</i>	2021
Gaia Early DR3 Early Science and Best Practices <i>Virtual</i>	2021