

# Abigail J. Lee

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## EDUCATION

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**University of Chicago** Chicago, IL  
Ph.D. Candidate, Astronomy & Astrophysics Expected 2025  
Advisor: Wendy Freedman

**University of Pennsylvania** Philadelphia, PA  
B.A., Physics, *summa cum laude* May 2019  
Graduated with Departmental Honors  
Minors: Mathematics, Classical Studies  
Advisor: Gary Bernstein  
Thesis: *Reconstructing Lognormal Density Fields using Hamiltonian Monte Carlo Techniques*

## FELLOWSHIPS

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**Future Investigators in NASA Earth and Space Science and Technology (FINESST)** 2022 – 2025  
**Illinois Space Grant Consortium Graduate Fellowship** 2022 – 2023  
**LSST Cooperation Data Science Fellowship** 2021 – 2023  
**McCormick Graduate Fellowship**, University of Chicago 2019 – 2021  
*Awarded to highly-rated applicants to the Ph.D. program*

## SELECTED AWARDS & GRANTS

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**Hubble Space Telescope (HST) Cycle 31 AR Program, Principal Investigator** 2023  
**PhD Student Travel Stipend**, Munich Institute for Astro-, Particle and BioPhysics 2023  
**Travel Grant**, University of Chicago Grad Council 2021, 2022, 2023  
**Hubble Space Telescope (HST) Cycle 30 AR Program, Principal Investigator** 2022  
**Chambliss Astronomy Achievement Award**, 237th Meeting of the AAS 2021  
*Awarded to the top graduate student posters at the AAS meeting*  
**Elaine K. Bernstein Women in Science Award**, University of Chicago 2019  
*Awarded to highly-rated women applicants to the Ph.D. program*  
**NASA Pennsylvania Space Grant Undergraduate Scholarship** 2018  
**University Scholar**, Penn 2015

## RESEARCH POSITIONS

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**UChicago**, Graduate Research Assistant 2019 – Present  
**Seoul National University**, Summer Visiting Researcher 2023  
**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

## TALKS

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### INVITED SEMINARS & TALKS

**Seminar** SNU Physics & Astronomy, *Seoul, South Korea* Sep 2023  
**Talk** MIAPbP workshop on the extragalactic distance scale, *Munich, Germany* Jul 2023  
**Seminar** University of Pennsylvania Physics & Astronomy, *Philadelphia, PA* Oct 2022  
**Talk** Argonne National Lab Cosmology Group Meeting (virtual) Oct 2021

### CONTRIBUTED TALKS

<b>Talk</b> 243rd Meeting of the AAS, <i>New Orleans, LA</i>	Jan 2024
<b>Talk</b> UC Berkeley Stellar Populations group meeting, <i>Berkeley, CA</i>	Apr 2023
<b>Talk</b> 241st Meeting of the AAS, <i>Seattle, WA</i>	Jan 2023
<b>Talk</b> 240th Meeting of the AAS, <i>Pasadena, CA</i>	Jun 2022
<b>Talk</b> University of Chicago Astronomy Lunch Talks (virtual)	Jan 2022
<b>Poster</b> 237th Meeting of the AAS (virtual), Winner of Chambliss Astronomy Achievement Award	Jan 2021
<b>Talk</b> 2017 Gulf Coast Undergraduate Research Symposium, <i>Houston, TX</i>	Nov 2017
<b>Talk</b> 2017 Emerging Researchers National Conference in STEM, <i>Washington D.C.</i>	Mar 2017

## PUBLICATIONS

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### FIRST AND SINGLE AUTHOR PUBLICATIONS

1. **Lee, A. J.**, Monson, A. J., Freedman, W. L., Madore, B. F., Owens, K. A., Beaton, R. L., Espinoza, C., Ren, T., Ren, Y. *Resolved Near-infrared Stellar Photometry from the Magellan Telescope for 13 Nearby Galaxies: JAGB Method Distances*, 2024b, submitted to ApJ
2. **Lee, A. J.**, Freedman, W. L., Jang, I. S., Madore, B. F., Owens, K. A. *First JWST Observations of JAGB Stars in the SN Ia host galaxies: NGC 7250, NGC 4536, NGC 3972*, 2024a, [ApJ, 961, 132](#)
3. **Lee, A. J.** *Carbon Stars as Standard Candles: An Empirical Test for the Metallicity, Age, and Reddening Sensitivity of the J-region Asymptotic Giant Branch (JAGB) Method*, 2023, [ApJ, 956, 15](#)
4. **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, [ApJ, 933, 201](#)
5. **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, 923, 157](#)
6. **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, 907 112](#)

### NTH AUTHOR PUBLICATIONS

1. Porth, L., Bernstein, G., Smith, R. E., **Lee, A. J.** *The Information Content of Projected Galaxy Fields*, 2022, [MNRAS, 518, 3344](#)
2. 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, [ApJ, 938, 125](#)
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](#)

### UNREFEREED MANUSCRIPTS

1. Kraemer, K., et al. including **Lee, A. J.**, *Setting the Stage for Improving the Distance Ladder with Roman Core Community Surveys*, 2023, White Paper submitted to the Roman Core Community Survey
2. **Lee, A. J.**, et al. *Predicting Winners of the Reality TV Dating Show The Bachelor Using Machine Learning Algorithms*, 2022, [April Fools arXiv paper](#)

## RESEARCH ADVISING

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<b>Coral Espinoza</b> , Lake Forest College undergraduate	2022 – 2023
• Oversaw UChicago REU summer project and senior thesis. Coral analyzed 1 of the 11 galaxies presented in the following paper: Lee, A. J., et al. (includ. <b>Espinoza, C.</b> ), et al. (2023), submitted.	

## TEACHING EXPERIENCE

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<b>Guest Lecturer</b> , UChicago, <i>Physics of Stars</i>	2023
<b>Guest Lecturer</b> , UChicago, <i>Galaxies</i>	2020
<b>Teaching Assistant</b> , UChicago, <i>Galaxies</i>	2020
<b>Teaching Assistant</b> , UChicago, <i>Stars</i>	2019
<b>Teaching Assistant</b> , Penn, <i>Classical Mechanics</i>	2019
<b>Observing Labs Teaching Assistant</b> , Penn, <i>Survey of the Universe</i>	2018, 2019
<b>Teaching Assistant</b> , Penn, <i>E&amp;M, Optics, and Modern Physics</i>	2018
<b>Lab Teaching Assistant</b> , Penn, <i>Classical Mechanics</i>	2017
<b>Tutor</b> , Penn Physics Department	2016, 2017

## TELESCOPE & COMPUTING ALLOCATIONS

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<b>PI</b> : HST AR (PID: 17544), Cycle 31	2023
<b>PI</b> : HST AR (PID: 17052), Cycle 30	2022
<b>Co-I</b> : JWST GO (PID: 1995), Cycle 1	2021
<b>Co-I</b> : UChicago Midway Research II Computing Allocation, 123k hours	2021
<b>Co-I</b> : HST AR (PID: 16126), Cycle 28	2020
<b>Co-I</b> : HST AR (PID: 16127), Cycle 28	2020

## OBSERVING EXPERIENCE

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Public data – significant experience with data from JWST, HST, Gaia, 2MASS, VMC
Magellan-Baade FourStar Near-Infrared imaging - 17 nights
Magellan-Baade IMACS Optical imaging - 1 night

## PRESS

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<b>UChicago News</b> , <i><a href="#">Aging stars provide a new cosmological yardstick</a></i>	2021
<b>Penn Today</b> , <i><a href="#">Women in Physics Group inspires the next generation of physicists and astronomers</a></i>	2019

## PROFESSIONAL SERVICE

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<b>Science Referee</b> for ApJ	2022 – Present
<b>Climate Survey Committee Member</b> , UChicago	2021 – Present
<b>Inclusion, Diversity and Equity in Astronomy Club Organizer/Member</b> , UChicago	2019 – Present
<b>UChicago Empowerment/Emancipation of North Koreans (ENoK)</b> , English tutor	2022 – 2023
<b>Advising &amp; Mentoring Program Organizer and Mentor</b> , UChicago	2020 – 2023
<b>Faculty Meeting Graduate Student Representative</b> , UChicago	2019 – 2020
<b>Society of Physics Students Board Member</b> , Penn	2018 – 2019

## OUTREACH

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<b>Writer</b> , Astrobites (find my articles <a href="#">here</a> )	2022 – 2024
Ombudsperson, Hiring Committee	2023 – 2024
<b>Public Talks &amp; Lectures</b>	
Lake Forest College astronomy club, <i>The Expansion of the Universe</i>	2022
UChicago <i>Physics of Stars</i> summer HS class, <i>Mentorship in Academia</i>	2021
<b>Space Explorers Winter Institute Instructor</b> , UChicago	2020
<b>Observing Nights Organizer</b> , Penn	2018 – 2019
<b>Astronomy Tutor for Veterans</b> , Penn Veterans Upward Bound	2018 – 2019

## WORKSHOPS & SUMMER SCHOOLS

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<b>Improving JWST Data Products Workshop</b>	2023
<i>Space Telescope Science Institute</i>	
<b>The Extragalactic Distance Scale and Cosmic Expansion in the era of JWST</b>	2023
<i>Munich Institute for Astro, Particle, and BioPhysics – awarded graduate student travel stipend (\$550)</i>	
<b>Fundamental cosmology from the ELT and space</b>	2021
<i>4th Azores School on Observational Cosmology (attended virtually due to COVID-19)</i>	
<b>Gaia Early DR3 Early Science and Best Practices</b>	2021
<i>Virtual</i>	

## EXTRACURRICULARS & PERSONAL INFORMATION

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<b>Languages:</b> English (native), Spanish (intermediate), Korean (basic)	
<b>Professional Memberships:</b> AAS, KSEA (Korean-American Scientists and Engineers Association)	
<b>Soccer</b>	2019 – Present
<i>Play in several high-level (College Club/Division I-III experience) soccer leagues 3x per week</i>	
<b>University of Pennsylvania Womens's Club Soccer Team</b> , treasurer (2015 – 2017)	2015 – 2019
<b>University of Pennsylvania Symphony Orchestra</b> , first violin	2015 – 2019