

# Abigail J. Lee

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## EDUCATION

**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: Classical Studies, Mathematics  
Advisor: Gary Bernstein  
Thesis: *Reconstructing Lognormal Density Fields using Hamiltonian Monte Carlo Techniques*

## FELLOWSHIPS

**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

**AGB Stars Prize for Young Researchers**, XIV Torino Workshop on AGB Stars 2024  
*Awarded to a young scientist providing a remarkable and most interesting contribution to AGB research*  
**CCAPP Price Prize in Cosmology and AstroParticle Physics** 2024  
**Hubble Space Telescope (HST) Cycle 31 AR Program, Principal Investigator** 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

**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

### INVITED SEMINARS & TALKS

**Plenary Talk** CERN EuCAPT online Workshop on  $H_0$  Sep 2024  
**Seminar** LSST Dark Energy Science Collaboration (DESC) seminars (virtual) Sep 2024  
**Price Prize Seminar** The Ohio State University CCAPP, *Columbus, OH* Aug 2024  
**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

**Talk** XIV Torino Workshop on AGB stars, *Rome, Italy*

Jun 2024

**Poster** Science with the Hubble and James Webb Space Telescopes VII, *Porto, Portugal*

Apr 2024

**Talk** 243rd Meeting of the AAS, *New Orleans, LA*

Jan 2024

**Talk** UC Berkeley Stellar Populations group meeting, *Berkeley, CA*

Apr 2023

**Talk** 241st Meeting of the AAS, *Seattle, WA*

Jan 2023

**Talk** 240th Meeting of the AAS, *Pasadena, CA*

Jun 2022

**Talk** University of Chicago Astronomy Lunch Talks (virtual)

Jan 2022

**Poster** 237th Meeting of the AAS (virtual), Winner of Chambliss Astronomy Achievement Award

Jan 2021

**Talk** 2017 Gulf Coast Undergraduate Research Symposium, *Houston, TX*

Nov 2017

**Talk** 2017 Emerging Researchers National Conference in STEM, *Washington D.C.*

Mar 2017

\*Upcoming

## PUBLICATIONS

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### FIRST AND SINGLE AUTHOR PUBLICATIONS

1. **Lee, A. J.**, Freedman, W. L., Madore, B. F., Jang, I. S., Owens, K. A., Hoyt, T. J. *The Chicago-Carnegie Hubble Program: The JWST J-region Asymptotic Giant Branch (JAGB) Extragalactic Distance Scale*, 2024c, submitted to ApJ
2. **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, [ApJ, 967, 22](#)
3. **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](#)
4. **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](#)
5. **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](#)
6. **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](#)
7. **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. Freedman, W. L., Madore, B. F., Jang, I. S., Hoyt, T. J., **Lee, A. J.**, Owens, K. A. *Status Report on the Chicago-Carnegie Hubble Program (CCHP): Three Independent Astrophysical Determinations of the Hubble Constant Using the James Webb Space Telescope*, 2024, submitted to ApJ
2. Owens, K. A., Jang, I. S., Freedman, W. L., Hoyt, T. J., **Lee, A. J.**, Madore, B. F., Monson, A. J. *Investigating the Extragalactic Distance Scale with JWST: Cepheids in NGC 7250*, 2024, submitted to ApJ
3. Hoyt, T. J., Jang, I. S., Freedman, W. L., Madore, B. F., **Lee, A. J.**, Owens, K. A. *Coordinated JWST Imaging of Three Distance Indicators in a SN Host Galaxy and an Estimate of the TRGB Color Dependence*, 2024, submitted to ApJ, [arXiv:2407.07309](#)

4. Porth, L., Bernstein, G., Smith, R. E., **Lee, A. J.** *The Information Content of Projected Galaxy Fields*, 2022, [MNRAS](#), **518**, 3344
5. 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
6. 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
7. 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
8. 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

<b>Coral Espinoza</b> , Lake Forest College (LFC) undergraduate	2022 – 2023
Oversaw UChicago REU summer project and LFC senior thesis, winner of AAS 242 FAMOUS grant	

## TEACHING EXPERIENCE

<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

<b>PI</b>	
Magellan-Baade/FourStar, 3 nights, Cycle 2024B	2024
HST AR (PID: 17544), Cycle 31	2023
HST AR (PID: 17052), Cycle 30	2022
<b>Co-I</b>	
JWST GO (PID: 1995, PIs: W. Freedman, B. Madore), Cycle 1	2021
UChicago Midway Research II Computing Allocation (PI: J. Frieman), 123k hours	2021
HST AR (PID: 16126, PI: W. Freedman), Cycle 28	2020
HST AR (PID: 16127, PI: W. Freedman), Cycle 28	2020

## OBSERVING EXPERIENCE

Public data – significant experience with data from JWST, HST, Gaia, 2MASS, VMC  
 Magellan-Baade FourStar near-infrared imaging - 20 nights  
 Magellan-Baade IMACS optical imaging - 1 night  
 Magellan-Baade IMACS optical spectroscopy - 1 night

## PRESS

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UChicago News, <i>New Webb Telescope data suggests our model of the universe may hold up after all</i>	2024
Dr. Becky YouTube (760k subscribers), <i>JWST turned the Crisis in Cosmology into a bigger problem</i>	2024
Quanta, <i>The Webb Telescope Further Deepens the Biggest Controversy in Cosmology</i>	2024
Dr. Becky YouTube (760k subscribers), <i>Has JWST SOLVED the crisis in cosmology?!</i>	2024
UChicago News, <i>Aging stars provide a new cosmological yardstick</i>	2021
Penn Today, <i>Women in Physics Group inspires the next generation of physicists and astronomers</i>	2019

## PROFESSIONAL SERVICE

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Science Referee for ApJ	
Climate Survey Committee Member, UChicago	2021 – Present
Inclusion, Diversity and Equity in Astronomy Club Organizer/Member, UChicago	2019 – Present
AAS 242 Chambliss Judge	Jun 2022
UChicago Empowerment/Emancipation of North Koreans (ENoK), English tutor	2022 – 2023
Advising & Mentoring Program Organizer and Mentor, UChicago	2020 – 2023
Mentored two UChicago PhD students	2020 – Present
Faculty Meeting Graduate Student Representative, UChicago	2019 – 2020
Society of Physics Students Board Member, Penn	2018 – 2019

## OUTREACH

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Writer, Astrobites (find my articles <a href="#">here</a> )	2022 – 2024
Ombudsperson	2023 – Present
Hiring Committee	2023 – 2024
Public Talks & Lectures	
UChicago astronomy grad student lunch talks, <i>Tips on Winning a FINESST grant</i>	2024
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
Space Explorers Winter Institute Instructor, UChicago	2020
Observing Nights Organizer, Penn	2018 – 2019
Astronomy Tutor for Veterans, Penn Veterans Upward Bound	2018 – 2019

## AWARDED TRAVEL GRANTS

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AAS International Travel Grant	2024
PhD Student Travel Stipend, Munich Institute for Astro-, Particle and BioPhysics	2023
<i>Awarded to excellent advanced graduate students</i>	
Travel Grant, University of Chicago Grad Council	2021, 2022, 2023

## EXTRACURRICULARS & PERSONAL INFORMATION

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Languages: English (native), Spanish (intermediate), Korean (basic)	
Soccer, <i>play in several high-level (College Club/Division I-III experience) leagues 3x per week</i>	2019 – Present
University of Pennsylvania Womens's Club Soccer Team, treasurer (2015 – 2017)	2015 – 2019
University of Pennsylvania Symphony Orchestra, first violin	2015 – 2019