

# Abigail J. Lee

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## EDUCATION

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### University of Chicago

Ph.D. Candidate in Astronomy & Astrophysics

Expected 2025

Advisor: Wendy Freedman

### University of Pennsylvania

B.A., Physics *summa cum laude*

May 2019

Graduated with Departmental Honors

Minors: Classical Studies, Mathematics

## FELLOWSHIPS

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**Future Investigators in NASA Earth and Space Science and Technology** 2022 – 2025

**Illinois Space Grant Consortium Graduate Fellowship** 2022 – 2023

**LSST Corporation Data Science Fellowship** 2021 – 2023

**McCormick Graduate Fellowship**, University of Chicago 2019 – 2021

## SELECTED AWARDS & GRANTS

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**CCAPP Price Prize** 2024

**AGB Stars Prize for Young Researchers**, XIV Torino Workshop on AGB Stars 2024

**PhD Student Travel Grant**, Munich Institute for Astro-, Particle and BioPhysics 2023

**Hubble Space Telescope (HST) Cycle 31 AR Program, PI** 2023

**Hubble Space Telescope (HST) Cycle 30 AR Program, PI** 2022

**Chambliss Astronomy Achievement Award**, 237th Meeting of the AAS 2021

**Elaine K. Bernstein Women in Science Award**, University of Chicago 2019

**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 CONFERENCE TALKS

<b>*Invited Talk</b> EAS 2025: The stellar route to $H_0$ : not only Classical Cepheids, <i>Cork, Ireland</i>	Jun 2025
<b>*Invited Plenary Talk</b> CosmoVerse@Naples: Addressing observational tensions in cosmology with systematics and fundamental physics, <i>Naples, Italy</i>	May 2025
<b>Invited Plenary Talk</b> CERN EuCAPT online Workshop on $H_0$ (virtual)	Sep 2024
<b>Invited Talk</b> MIAPbP workshop on the extragalactic distance scale, <i>Munich, Germany</i>	Jul 2023

## INVITED SEMINARS AND TALKS

<b>*Seminar</b> Washington University in St. Louis Physics, <i>St. Louis, MO</i>	Jan 2025
<b>Seminar</b> LSST Dark Energy Science Collaboration (DESC) seminars (virtual)	Sep 2024
<b>Price Prize Seminar</b> The Ohio State University CCAPP, <i>Columbus, OH</i>	Aug 2024
<b>Seminar</b> SNU Physics & Astronomy, <i>Seoul, South Korea</i>	Sep 2023
<b>Seminar</b> University of Pennsylvania Physics & Astronomy, <i>Philadelphia, PA</i>	Oct 2022
<b>Talk</b> Argonne National Lab Cosmology Group Meeting (virtual)	Oct 2021

## CONTRIBUTED TALKS

<b>Dissertation Talk</b> 245th Meeting of the AAS, <i>National Harbor, MD</i>	Jan 2025
<b>Talk</b> XIV Torino Workshop on AGB stars, <i>Rome, Italy</i>	Jun 2024
<b>Poster</b> Science with the Hubble and James Webb Space Telescopes VII, <i>Porto, Portugal</i>	Apr 2024
<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)	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

\*Upcoming

## PUBLICATIONS

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### FIRST AND SINGLE AUTHOR PUBLICATIONS

1. **Lee, A. J.**, Weisz, D. R., Ren, Y., Savino, A., Dolphin, A. *Measuring Star Formation Histories from Asymptotic Giant Branch Stars: A Demonstration in M31*, 2025b, [arXiv:2410.09256](https://arxiv.org/abs/2410.09256), submitted to ApJ
2. **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*, 2025a, [arXiv:2408.03474](https://arxiv.org/abs/2408.03474), submitted to ApJ
3. **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](https://doi.org/10.1093/apj/apj96722)

4. **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](#)
5. **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](#)
6. **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](#)
7. **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](#)
8. **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](#)

## CO-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, [arXiv:2408.06153](#), 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, [ApJ, 975, 111](#)
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

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**Coral Espinoza**, Lake Forest College (LFC) undergraduate 2022 – 2023  
Oversaw UChicago REU summer project and LFC senior thesis

## TEACHING EXPERIENCE

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**College Teaching Certificate Program**, In Progress  
UChicago Center for Teaching and Learning

**Guest Lecturer**, UChicago, *Physics of Stars* 2023

**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

## TELESCOPE & COMPUTING ALLOCATIONS

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**PI/Submitter**

Magellan-Baade/FourStar, 3 nights, Cycle 2024B 2024

HST AR (PID: 17544), Cycle 31 2023

HST AR (PID: 17052), Cycle 30 2022

**Co-I**

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

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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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Selected press featuring [Lee et al. 2024c](#):

- Quanta, *The Webb Telescope Further Deepens the Biggest Controversy in Cosmology*
- Dr. Becky YouTube Channel, *JWST turned the Crisis in Cosmology into a bigger problem*
- Dr. Becky YouTube Channel, *Has JWST SOLVED the crisis in cosmology?!*

Press featuring [Lee et al. 2021a](#):

- UChicago News, *Aging stars provide a new cosmological yardstick*

## PROFESSIONAL SERVICE

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**Science Referee** for ApJ

**UChicago Graduate Admissions Committee Member**, UChicago 2024 – 2025

**Inclusion, Diversity and Equity in Astronomy Club**, UChicago 2019 – 2025  
Organizer (2022 – 2024)

**Mentor to NASA FINESST applicants**, UChicago 2023 – 2025  
Organized two workshops to help PhD students apply to the FINESST

**AAS 242 Chambliss Judge** 2022

**UChicago Empowerment/Emancipation of North Koreans (ENoK)**, English tutor 2022 – 2023

**Climate Survey Committee Member**, UChicago 2021 – 2024

**Advising & Mentoring Program Organizer and Mentor**, UChicago 2020 – 2023  
Mentored three 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 [here](#)) 2022 – Present  
Ombudsperson (2023 – 2025), Hiring Committee (2023 – 2024)

**Public Lectures & Outreach Talks**

Cosmology Talks Youtube, *Extragalactic distances from the JAGB method* 2024

Lake Forest College astronomy club, *The Expansion of the Universe* 2022

UChicago *Physics of Stars* summer HS class, *Mentorship in Academia* 2021

**Space Explorers Winter Institute Instructor**, UChicago 2020

**Observing Nights Organizer**, Penn 2018 – 2019

**Astronomy Tutor for Veterans**, Penn Veterans Upward Bound 2018 – 2019

## OTHER ACTIVITIES

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**Languages:** English (native), Spanish (intermediate), Korean (basic)

**Rec Soccer** 2019 – Present  
Play in several high-level (College Club/Division I-III experience) leagues 3x/week

**Chicago KICS FC**, WPSL Semi-professional Women's Soccer League 2023

**University of Pennsylvania Womens's Club Soccer Team** 2015 – 2019  
Treasurer (2015 – 2017)

