

Abigail J. Lee

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EDUCATION

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

FINESST Graduate Fellowship

2022 – 2025

Future Investigators in NASA Earth and Space Science and Technology

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

2024

Awarded to a young scientist providing a remarkable and most interesting contribution to AGB star research at the XIV Torino Workshop on AGB Stars

CCAPP Price Prize in Cosmology and AstroParticle Physics

2024

Awarded to an outstanding graduate student who has shown exceptional accomplishments and promise

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

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

AWARDED TRAVEL GRANTS

AAS International Travel Grant

2024

PhD Student Travel Stipend

2023

Awarded to excellent advanced graduate students by the Munich Institute for Astro-, Particle and BioPhysics

Travel Grant, University of Chicago Grad Council

2021, 2022, 2023

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 CONFERENCE TALKS

Invited Plenary Talk CERN EuCAPT online Workshop on H_0 (virtual)	Sep 2024
Invited Talk MIAPbP workshop on the extragalactic distance scale, <i>Munich, Germany</i>	Jul 2023

INVITED SEMINARS AND TALKS

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

CONTRIBUTED TALKS

Talk XIV Torino Workshop on AGB stars, <i>Rome, Italy</i>	Jun 2024
Poster Science with the Hubble and James Webb Space Telescopes VII, <i>Porto, Portugal</i>	Apr 2024
Talk 243rd Meeting of the AAS, <i>New Orleans, LA</i>	Jan 2024
Talk UC Berkeley Stellar Populations group meeting, <i>Berkeley, CA</i>	Apr 2023
Talk 241st Meeting of the AAS, <i>Seattle, WA</i>	Jan 2023
Talk 240th Meeting of the AAS, <i>Pasadena, CA</i>	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, <i>Houston, TX</i>	Nov 2017
Talk 2017 Emerging Researchers National Conference in STEM, <i>Washington D.C.</i>	Mar 2017

*Upcoming

PUBLICATIONS

FIRST AND SINGLE AUTHOR PUBLICATIONS

1. **Lee, A. J.**, Weisz, D. R., Ren, Y., Savino, A., Dolphin, D. *Measuring Star Formation Histories from Asymptotic Giant Branch Stars: A Demonstration in M31*, 2024d, [arXiv: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*, 2024c, [arXiv: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
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, in press at 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

Coral Espinoza , Lake Forest College (LFC) undergraduate Oversaw UChicago REU summer project and LFC senior thesis Winner of AAS 242 FAMOUS grant	2022 – 2023
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TEACHING EXPERIENCE

College Teaching Certificate Program , UChicago Center for Teaching and Learning	In Progress
Guest Lecturer , UChicago, <i>Physics of Stars</i>	2023
Guest Lecturer , UChicago, <i>Galaxies</i>	2020
Teaching Assistant , UChicago, <i>Galaxies</i>	2020
Teaching Assistant , UChicago, <i>Stars</i>	2019
Teaching Assistant , Penn, <i>Classical Mechanics</i>	2019
Observing Labs Teaching Assistant , Penn, <i>Survey of the Universe</i>	2018, 2019
Teaching Assistant , Penn, <i>E&M, Optics, and Modern Physics</i>	2018

Lab Teaching Assistant , Penn, <i>Classical Mechanics</i>	2017
Tutor , Penn Physics Department	2016, 2017

TELESCOPE & COMPUTING ALLOCATIONS

PI

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

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

UChicago News	2024
<i>New Webb Telescope data suggests our model of the universe may hold up after all</i>	
Dr. Becky YouTube (770k subscribers)	2024
<i>JWST turned the Crisis in Cosmology into a bigger problem</i>	
Quanta	2024
<i>The Webb Telescope Further Deepens the Biggest Controversy in Cosmology</i>	
Dr. Becky YouTube (770k subscribers)	2024
<i>Has JWST SOLVED the crisis in cosmology?!</i>	
UChicago News	2021
<i>Aging stars provide a new cosmological yardstick</i>	
Penn Today	2019
<i>Women in Physics Group inspires the next generation of physicists and astronomers</i>	

PROFESSIONAL SERVICE

Science Referee for ApJ	
Inclusion, Diversity and Equity in Astronomy Club , UChicago	2019 – Present
Organizer (2022 – 2024)	
AAS 242 Chambliss Judge	2022
UChicago Empowerment/Emancipation of North Koreans	2022 – 2023
(ENoK), English tutor	

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

Writer , Astrobites (find my articles here)	2022 – Present
Ombudsperson (2023 – Present), Hiring Committee (2023 – 2024)	
Public Talks & Lectures	
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

OTHER ACTIVITIES

Soccer	2019 – Present
Play in several high-level (College Club/Division I-III experience) leagues 3x/week	
University of Pennsylvania Womens's Club Soccer Team	2015 – 2019
Treasurer (2015 – 2017)	
University of Pennsylvania Symphony Orchestra , first violin	2015 – 2019