

# Abigail J. Lee

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## APPOINTMENTS

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<b>NHFP Hubble Fellow</b> , University of California, Berkeley	2025 – 2026
<b>Miller Research Fellow</b> , University of California, Berkeley	2026 – 2029

## EDUCATION

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<b>University of Chicago</b> Ph.D., Astronomy & Astrophysics Certificate in College Teaching Advisor: Wendy Freedman	May 2025
<b>University of Pennsylvania</b> B.A., Physics <i>summa cum laude</i> Graduated with Departmental Honors Minors: Classical Studies, Mathematics Advisor: Gary Bernstein	May 2019

## AWARDS & FELLOWSHIPS

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<b>NHFP Hubble Fellowship</b>	2025
<b>Miller Research Fellowship</b> , UC Berkeley Miller Institute	2025
<b>CCAPP Price Prize</b>	2024
<b>AGB Stars Prize for Young Researchers</b> , XIV Torino Workshop on AGB Stars	2024
<b>Future Investigators in NASA Earth and Space Science and Technology</b>	2022
<b>Illinois Space Grant Consortium Graduate Fellowship</b>	2022
<b>LSST Cooperation Data Science Fellowship</b>	2021
<b>Chambliss Astronomy Achievement Award</b> , 237th Meeting of the AAS	2021
<b>Elaine K. Bernstein Women in Science Award</b> , University of Chicago	2019
<b>McCormick Graduate Fellowship</b> , University of Chicago	2019
<b>NASA Pennsylvania Space Grant Undergraduate Scholarship</b>	2018
<b>University Scholar</b> , Penn	2015

## OBSERVING PROPOSALS & GRANTS

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Awarded \$685,623 in competitive funding as PI

### As Principal Investigator/Submitter

James Webb Space Telescope

- “J-Virgo: A JWST Treasury Survey of the Virgo Cluster” (GO/Treasury, Cycle 4, amount TBD), co-PI with Daniel Weisz, 147 hours (NIRCam) / 67 hours (NIRISS)

Hubble Space Telescope

- “Quantifying Systematics in the JAGB Method Distance Scale in M33” (AR, Cycle 31, \$19,678)

- “Quantifying Systematics in the JAGB Method Distance Scale in M31” (AR, Cycle 30, \$30,886)

#### Full Stipendiary Grants

- NASA Hubble Fellowship, “AGB Stars in the Era of NIR Astronomy: New Probes of Cosmology and Galaxy Evolution” (\$148,059)
- Miller Research Fellowship, “AGB Stars in the Era of IR Astronomy: New Probes of Cosmology and Galaxy Evolution” (\$337,000)
- NASA FINESST, “Measuring the Hubble Constant with Carbon Stars” (\$150,000)

#### Magellan-Baade Telescope (FourStar)

- “JAGB and TRGB Distances to Three New Galaxies” (2024B), 3 nights

#### As Co-Investigator

NASA Euclid General Investigator Program (PI: A. Savino)	2025
James Webb Space Telescope GO-1995 (PI: W. Freedman)	2021
UChicago Midway Research II Computing Allocation (PI: J. Frieman), 123k hours	2021
Hubble Space Telescope AR-16126 (PI: W. Freedman)	2020
Hubble Space Telescope AR-16127 (PI: W. Freedman)	2020

#### PREVIOUS RESEARCH POSITIONS

<b>UChicago</b> , Graduate Research Assistant	2019 – 2025
<b>Seoul National University</b> , Summer Visiting Researcher	2023
<b>Penn</b> , Cosmology Undergraduate Research Assistant	2017 – 2019
<b>Stanford KIPAC</b> , Summer Undergraduate Research Assistant	2018
<b>Max Planck Institute for Gravitational Physics</b> , Summer Undergraduate Research Assistant	2017
<b>NASA Jet Propulsion Laboratory</b> , Summer Intern	2017
<b>Penn</b> , Experimental Condensed Matter Undergraduate Research Assistant	2016 – 2017

#### TALKS

##### INVITED CONFERENCE TALKS

<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> Florida State University Physics (virtual)	Apr 2025
<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>Talk</b> University of Chicago near-field cosmology group meeting, <i>Chicago, IL</i>	Apr 2025
<b>Chalk Talk</b> University of Chicago Astronomy, <i>Chicago, IL</i>	Feb 2025
<b>Dissertation Talk</b> 245th Meeting of the AAS, <i>National Harbor, MD</i>	Jan 2025
<b>Talk XIV</b> 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](#), 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, [ApJ](#), **985**, 182
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. 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*, 2025, submitted to [ApJ](#)
2. Hoyt, T. J., Jang, I. S., Freedman, W. L., Madore, B. F., Owens, K. A., **Lee, A. J.** *The Chicago Carnegie Hubble Program: Improving the Calibration of SNe Ia with JWST Measurements of the Tip of the Red Giant Branch*, 2025, [arXiv:2503.11769](#), submitted to [ApJ](#)
3. 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): Measurement of the Hubble Constant Using the Hubble and James Webb Space Telescopes*, 2025, [ApJ](#), **985**, 203
4. Freedman, W. L., Madore, B. F., Hoyt, T. J., Jang, I. S., **Lee, A. J.**, Owens, K. A. *I-Band Asymptotic Giant Branch (IAGB) Stars: II. A First Estimate of their Precision and a Differential Zero Point*, 2025, [AJ](#), **169**, 247
5. Madore, B. F., Freedman, W. L., Hoyt, T. J., Jang, I. S., **Lee, A. J.**, Owens, K. A. *I-Band Asymptotic Giant Branch (IAGB) Stars: I. Exploring a New Standard Candle for the Extragalactic Distance Scale*, 2025, [AJ](#), **169**, 162
6. 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
7. Porth, L., Bernstein, G., Smith, R. E., **Lee, A. J.** *The Information Content of Projected Galaxy Fields*, 2022, [MNRAS](#), **518**, 3344
8. 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
9. 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
10. 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
11. 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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**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

## 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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Expertise Interviews:

- PopSci, [Is the universe really infinite?](#)
- PopSci, [JWST takes a jab at the mystery of the universe's expansion rate](#)

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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<b>Referee</b> for ApJ, ApJL, A&A	
<b>UChicago Graduate Admissions Committee Member</b> , UChicago	2024 – 2025
<b>Inclusion, Diversity and Equity in Astronomy Club</b> , UChicago	2019 – 2025
Organizer (2022 – 2024)	
<b>Mentor to NASA FINESST applicants</b> , UChicago	2023 – 2025
Organized two workshops to help PhD students apply to the FINESST	
<b>AAS 242 Chambliss Judge</b>	2022
<b>UChicago Empowerment/Emancipation of North Koreans</b>	2022 – 2023
( <a href="#">ENoK</a> ), English tutor	
<b>Climate Survey Committee Member</b> , UChicago	2021 – 2024
<b>Advising &amp; Mentoring Program Organizer and Mentor</b> , UChicago	2020 – 2023
Mentored three UChicago PhD students (2020 – Present)	
<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 – Present
Ombudsperson (2023 – 2025), Hiring Committee (2023 – 2024)	
<b>Public Lectures &amp; Outreach Talks</b>	
Cosmology Talks Youtube, <a href="#">Extragalactic distances from the JAGB method</a>	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
<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

## OTHER ACTIVITIES

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<b>Languages:</b> English (native), Spanish (intermediate), Korean (basic)	
<b>Semi-professional Women's Soccer</b> (WPSL, WMLIS)	2023 – Present
<b>Rec Soccer</b> , play in several high-level (college experience) leagues 3x/week	2019 – Present
<b>University of Pennsylvania Womens's Club Soccer Team</b>	2015 – 2019
Treasurer (2015 – 2017)	
<b>University of Pennsylvania Symphony Orchestra</b> , first violin	2015 – 2019