Jiaxuan Li

Personal Information

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Research Interests

- Dwarf galaxies across different environments: satellite galaxies, field dwarfs, ultra-diffuse (puffy) galaxies.
- Dark matter physics: observational tests for alternative dark matter models.
- Low surface brightness astronomy: galaxy outskirts, tidal debris, data reduction, and LSB-specific instrumentation.
- Stellar population: star formation history, surface brightness fluctuation, initial mass function, photo-z.
- Galaxy evolution: quenching, scaling relations, galaxy–halo connection.
- Statistical methods and machine learning in astrophysics.

Education

PhD Candidate, Department of Astrophysical Sciences, Princeton University, U.S.A.   Aug 2021 – July 2026
    Advisor: Jenny E. Greene

    Thesis: *ELVES-Dwarf Survey: Probing Satellite Populations of Isolated Dwarf Galaxies in the Local Volume*

Master of Arts, Department of Astrophysical Sciences, Princeton University, U.S.A.   Aug 2021 – May 2023

Bachelor of Science (highest honor), Department of Astronomy, Peking University, China   Sept 2016 – July 2020
    Major: Astrophysics   GPA: 3.80/4.00   Rank: 2 / 28

    Advisors: Pieter van Dokkum (Yale) & Luis C. Ho (Peking)

Press Coverage

- AAS Nova: Discovery of a Lonely Galactic Hedgehog
- The New York Times: Scientists Say They've Found a Dwarf Planet Very Far From the Sun
- Reuters: Possible new dwarf planet spotted near the edge of the solar system
- Sky & Telescope: Another Dwarf Planet in Our Solar System?
- Institute for Advanced Study: An Extreme Cousin for Pluto? Possible Dwarf Planet Discovered at Solar System's Edge
- Princeton University: Princeton Astronomers Discover Extraordinary Distant Object at Solar System's Edge

Honors and Awards

Charlotte Elizabeth Procter Fellowship, Princeton University   Apr 2025
    The fellowship recognizes final-year graduate students for outstanding academic performance and professional promise.

American Astronomical Society's Chambliss Astronomy Achievement Student Award   Jan 2024
    Awarded to the top graduate student posters at the AAS meeting.

Outstanding Undergraduate Thesis Award in Beijing (北京市本科优秀毕业论文)	Sept 2020
Inaugural PKU Junior Scholar ("未名学士" 称号), Peking University	June 2020
Outstanding Graduate of Universities in Beijing (北京市普通高校优秀毕业生)	June 2020
Outstanding Graduate of Peking University (北京大学优秀毕业生)	June 2020
PKU Scholar in Physics (未名物理学子)	2017 – 2020
Tang Li-Xin Scholarship (10,000 RMB per year, most competitive scholarship in PKU)	May 2019
AEON Scholarship, Peking University (10,000 RMB, 2/202)	Sept 2018

Leo KoGuan Scholarship, Peking University (10,000 RMB, 4/202)   Oct 2017

Lin-bridge Prize for Excellent Undergraduate Research (2,800 RMB, endowed by Prof. Douglas Lin)   Sept 2018

Merit Student, Peking University   2017, 2018

First Prize, 8th China Undergraduate Physicists Tournament   Aug 2017

Meritorious Winner in Mathematical Contest In Modeling (MCM/ICM)   Apr 2018

Silver Medal, 9th International Olympiad on Astronomy and Astrophysics (IOAA)   Aug 2015

Gold Medal & Best Result, China National Astronomy Olympiad   2014, 2015

Gold Medal (3rd place), 1st Princeton University Physics Competition   Jan 2015

PUBLICATIONS
Total citations: 455; first-author citations: 107; h-index: 14   ADS Library

1. **Li J.**, Greene J., Danieli S., Carlsten S. G., Geha M., A Possible "Too-Many-Satellites" Problem in the Isolated Dwarf Galaxy DDO 161, *ApJL* submitted; arxiv:2511.01733.

2. **Li J.**, Greene J., Danieli S., Carlsten S. G., Geha M., Jiang F., Tanaka M., ELVES-Dwarf I: Satellites Systems of Eight Isolated Dwarf Galaxies in the Local Volume, *ApJ* submitted; arxiv:2504.08030.

3. **Li J.**, Greene J., Carlsten S., Danieli S., Hedgehog: An Isolated Quiescent Dwarf Galaxy at 2.4 Mpc, *ApJL* 975, L23 (2024).
    ⋆ *This work is highlighted in AAS Nova.*

4. **Li J.**, Melchior P., Hahn C., Huang S., PopSED: Population-Level Inference for Galaxy Properties from Broadband Photometry with Neural Density Estimation, *AJ* 167, 16 (2024).

5. **Li J.**, Greene J., Greco J., Beaton R., Danieli S., Goulding A., Huang S., Kado-Fong E., Beyond Ultra-Diffuse Galaxies II: Environmental Quenching of Mass-Size Outliers Among the Satellites of Milky Way Analogs, *ApJ* 955, 2 (2023).

6. **Li J.**, Greene J., Greco J., Huang S., Melchior P., Beaton R., Casey K., Danieli S., Goulding A., Joseph R., Kado-Fong E., Kim J., MacArthur L., Beyond Ultra-Diffuse Galaxies I: Mass-Size Outliers Among the Satellites of Milky Way Analogs, *ApJ* 955, 1 (2023).

7. **Li J.**, Huang S., Leauthaud A., Moustakas J., Danieli S., Greene J., Abraham R., Ardila F., Kado-Fong E., Lokhorst D., Lupton R., Price P., Reaching for the Edge I: Probing the Outskirts of Massive Galaxies with HSC, DECaLS, SDSS, and Dragonfly, *MNRAS* 515, 4 (2022).

8. Cheng S., **Li J.**, Yang E., Discovery of a Dwarf Planet Candidate in an Extremely Wide Orbit: 2017 OF$_{201}$, *ApJL* submitted.
    ⋆ **See the press releases from the IAS and Princeton University.** *This work is also highlighted by New York Times, NBC News, Reuters, Sky & Telescope, Discover Magazine, Phys.org, New Scientist, and many more.*

9. Luo Y., Wick J., Leauthaud A., et al. (including **Li J.**), Testing the Stellar Feedback-driven Breathing Mode in Low-mass Galaxies with Gas Kinematics, *ApJ* submitted.

10. Wei L., Huang S., **Li J.**, et al., Zangetsu: A Candidate of Isolated, Quiescent, and Backsplash Ultra-Diffuse Galaxy in the COSMOS Field, *ApJ* accepted.

11. Pan Y., Greene J. E., Danieli S., **Li J.**, et al., The Merian Survey: A Statistical Census of Milky Way Analogs and LMC-SMC-Like Satellites, *ApJ* accepted.

12. Ma Y., Greene J. E., Setton D. J., Goulding A. D. et al. (including **Li J.**), Counting Little Red Dots at $z < 4$ with Ground-based Surveys and Spectroscopic Follow-up, *ApJL* accepted.

13. Srinivasaragavan G. P., et al. (including **Li J.**), EP250108a/SN 2025kg: A Broad-Line Type Ic Supernova Associated with a Fast X-ray Transient Showing Evidence of Extended CSM Interaction, *ApJL* 988, L60 (2025).

14. Zeng Z., Peter A., Du X., Benson A., **Li J.**, Mace C., Yang S., Diversity and universality: evolution of dwarf galaxies with self-interacting dark matter, *PhRvD*, 112, 063008 (2025).

15. Dou J., Peng Y., et al. (including **Li J.**), The HI Reservoir in Central Spiral Galaxies and the Implied Star Formation Process, *ApJL*, 973, 1 (2024).

16. Danieli S., et al. (including **Li J.**), Merian: A Wide-Field Imaging Survey of Dwarf Galaxies at $z \sim 0.06 - 0.10$, *ApJ* accepted.

17. Mintz A., Greene J., Kado-Fong E., Danieli S., **Li J.**, et al., A non-parametric morphological analysis of Hα emission in bright dwarfs using Merian Survey, *ApJ* 974, 2 (2024).

18. Nemer A., Hahn C., **Li J.**, Melchior P., Goodman J., Constraining Protoplanetary Disk Winds from Forbidden Line Profiles with Simulation-based Inference, *ApJ* 965, 157 (2024).

19. Luo Y. et al. (including **Li J.**), The Merian Survey: Design, Construction, and Characterization of a Filter Set Optimized to find Dwarf Galaxies and Measure their Dark Matter Halo Properties with Weak Lensing, *MNRAS* 530, 4 (2024).

20. Greene J., Danieli S., Carlsten S., Beaton R., Jiang F., **Li J.**, ELVES III: Environmental Quenching by Milky Way-Mass Hosts, *ApJ* 949, 94 (2023).

21. Greene J. et al. (including **Li J.**), The Nature of Low Surface Brightness Galaxies in the Hyper Suprime-Cam Survey, *ApJ* 933, 150 (2022).

22. Shi J., Peng Y., et al. (including **Li J.**), Cold Gas in Massive Galaxies as A Critical Test of Black Hole Feedback Models, *ApJ*, 927, 2 (2022).

23. Danieli S., et al. (including **Li J.**), NGC5846-UDG1: A galaxy formed mostly by star formation in massive, extremely dense clumps of gas, *ApJL* 927, 2 (2022).

24. Liu Q., Abraham R., Gilhuly C., van Dokkum P., Martin P. G., **Li J.**, Greco J. P., et al., A Method To Characterize the Wide-Angle Point Spread Function of Astronomical Images, *ApJ* 925, 2 (2022).

25. Keim M. A., van Dokkum P., Danieli S., Lokhorst D., **Li J.**, Shen Z., Abraham R., et al., Tidal Distortions in NGC1052-DF2 and NGC1052-DF4: Independent Evidence for a Lack of Dark Matter, arXiv:2109.09778, ApJ submitted.

26. Miller T. B., van Dokkum P., Danieli S., **Li J.**, Abraham R., Conroy C., Gilhuly C., Greco J. P., Liu Q., Lokhorst D., Merritt A., The Dragonfly Wide Field Survey. II. Accurate Total Luminosities and Colors of Nearby Massive Galaxies and Implications for the Galaxy Stellar Mass Function, *ApJ*, 909, 74 (2021).

27. van Dokkum P., Lokhorst D., Danieli S., **Li J.**, Merritt A., Abraham R., Gilhuly C., Greco J. P., Multi-resolution filtering: an empirical method for isolating faint, extended emission in Dragonfly data and other low resolution images, *PASP*, 132, 1013 (2020).

28. Danieli S. et al. (including **Li J.**), The Dragonfly Wide Field Survey. I. Telescope, Survey Design, and Data Characterization, *ApJ*, 894, 2 (2020).

Conference papers, white papers, and software

1. **Li J.**, `smplotlib`: A Matplotlib template for SuperMongo style.

2. **Li J.**, Melchior P., Hahn C., Huang S., Population-Level Inference for Galaxy Properties from Broadband Photometry, accepted to 2023 ICML ML4Astro workshop.

3. Han J. et al. (including **Li J.**), NANCY: Next-generation All-sky Near-infrared Community surveY, white paper for the Roman Core Community Survey, June 2023.

Observational Programs

30 orbits on the Hubble Space Telescope, 15 nights on the 6.5 m Magellan telescopes, 3 nights on the 8 m Subaru telescope, 2 nights on the 8 m Gemini telescope, 10 nights on the 3.5 m WIYN telescope, plus various other observational programs.

PI:

Hubble Space Telescope Cycle 33: WFC3/UVIS imaging (30 orbits)	2025
Magellan Telescope: 11 dark nights, imaging with Baade/IMACS	2024–2025
Subaru Telescope: 25 hours dark time, imaging with Hyper-Suprime Camera	2025A
Green Bank Telescope: 10.5 hours	2025A
Gemini-North telescope: 18 hours dark time imaging with GMOS	2024B, 2025B
WIYN telescope: 10 dark nights, imaging with ODI	2024A, 2024B
Magellan Telescope: 1 dark night with Clay/IFUM	2025A
Magellan Telescope: 1 dark night, spectroscopy with Clay/LDSS3	2022B

Co-I:

Magellan Telescope: 4 dark nights, spectroscopy with Baade/MagE	2024–2025
HST Cycle 32: SNAP program for Local Volume Satellite Galaxies	2024
HST Cycle 32: Fulfilling the UV Legacy of the Hubble and Webb Deep Public Frontier Field	2024
Magellan Telescope: 3 dark nights, spectroscopy with Clay/IFUM	2023–2024
Merian Survey using the Dark Energy Camera on the Blanco telescope: 12 nights	2021–2024
Shane 3-m Telescope, UCO Lick Observatory: 2 nights observing	2019

References

Prof. Jenny Greene	Princeton University
Prof. Marla Geha	Yale University
Prof. Shany Danieli	Tel Aviv University
Prof. Pieter van Dokkum	Yale University
Prof. Song Huang	Tsinghua University
Prof. Yingjie Peng	Kavli Institute for Astronomy and Astrophysics, Peking University

Software

- `smplotlib`: A Matplotlib template for SuperMongo style.
  It has 130+ stars on GitHub and is used in 15+ published papers.
- `RoSESim`: Roman SEmi-resolved galaxy Simulator (Li+ in prep)
- `mrf`: Multi-Resolution Filtering – a method for isolating faint extended emission in
  Dragonfly data and other low-resolution images (van Dokkum et al. 2020)
- More work can be found on my GitHub: `@AstroJacobLi`

Collaboration, Teaching, Advising, Service, and Outreach

• Core member of the Merian Survey collaboration	2021 – now
• Contributor to LSST System Integration, Test, and Commissioning	2024 – now
• Reviewer for the Astronomical Journal (AJ), Astronomy & Astrophysics (A&A)	2023 – now
• Course Designer of AST 207 (Observational Astronomy) at Princeton	2025 Spring

- Teaching Assistant of AST 303 (Research Methods in Astrophysics) at Princeton   2022 Fall
- Co-advising Princeton graduate student: Lucas Mandacaru Guerra
- Co-advising Princeton undergraduate students: Sufia Birmingham, Vivek Vijayakumar
- Organizer of the Survey Science Discussion at Princeton   2022 – 2025
- Organizer of tea time for colloquium speakers at Princeton   2021 – 2022
- President of Peking University Youth Astronomy Society (largest academic student association at PKU).
- Problem designer for the 2018 International Olympiad on Astronomy and Astrophysics (IOAA)
- Invited to a popular Chinese science TV show "Voice" (开讲啦) and talked about astronomy outreach

Talks and Presentations

Invited Talk, KICP Seminar, University of Chicago	Nov 2025
Invited Talk, Galaxy Seminar, University of Michigan	Oct 2025
Talk, Observer Group Meeting, Northwestern University	Oct 2025
Talk, ITC Luncheon, Harvard University	Oct 2025
Invited Talk, Rutgers Journal Club, New Jersey	Sept 2025
Talk, Near field science with the Roman High Latitude Wide Area Survey, Caltech, California	Aug 2025
How to characterize semi-resolved dwarf galaxies in Roman HLWAS	
Invited Talk, KIPAC Tea Talk, Stanford University, California	Aug 2025
Dwarfs: Near and Far	
Tea Talk, Carnegie Observatories, California	Aug 2025
Talk, Santa Cruz Galaxy Workshop, Santa Cruz, California	Aug 2025
ELVES-Dwarf Survey: Probing Satellite Population of Isolated Dwarf Galaxies in the Local Volume	
Talk, Galactic Frontiers II: Dwarf Galaxies in the Local Volume and Beyond, Dartmouth, New Hampshire	June 2025
ELVES-Dwarf Survey: Probing Satellite Population of Isolated Dwarf Galaxies in the Local Volume	
Invited Talk, DREAMS collaboration meeting, New York City	May 2025
Invited Talk, Yale Galaxy Lunch	May 2025
Talk, Magellan Science Meeting, Washington D.C.	May 2025
Talk, Yale's Astro $\times$ Data Science seminar	Nov 2024
PopSED: Population-level inference for galaxy properties from broadband photometry	
Talk, "Small Galaxies, Cosmic Questions. II", Durham, UK	Aug 2024
Poster, "Dwarf Galaxies, Star Clusters, and Streams in the LSST Era", Chicago, Illinois	July 2024
Hedgehog: An Isolated Quiescent Dwarf Galaxy at 2.4 Mpc	
Talk, the 243rd meeting of the American Astronomical Society, New Orleans, Louisiana	Jan 2024
The Merian Survey: Mapping Classical Dwarf Galaxies at $z = 0.05 - 0.1$ with HSC-SSP + Blanco/DECam	
Poster, the 243rd meeting of the American Astronomical Society, New Orleans, Louisiana	Jan 2024
PopSED: Population-level inference for galaxy properties from broadband photometry	
Invited Talk, Tsinghua DoA Machine Learning Seminar	Nov 2023
Poster, Machine Learning for Astrophysics, International Conference on Machine Learning, Hawaii	July 2023
Talk, "Galactic Frontiers: Dwarf Galaxies in the Local Volume and Beyond", New York City	July 2023
Talk, Kavli Institute for Astronomy and Astrophysics, Peking University, Beijing	June 2023
Ultra-puffy galaxies among satellites of Milky Way analogs: from definition to environmental quenching	
Talk, Department of Astronomy, Tsinghua University, Beijing	June 2023