Jiaxuan Li

Personal Information

Name:	Jiaxuan Li (李嘉轩)	Address:	012 Peyton Hall, 4 Ivy Lane, Princeton, NJ 08544
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Research Interests

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

Education

Graduate Student, Department of Astrophysical Sciences, Princeton University, U.S.A. Aug 2021 – Aug 2026
Advisor: Jenny E. Greene
Thesis: *ELVES-Dwarf Survey: Probing Satellite Population 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 (PKU)

Research Positions

Research Assistant, KIAA, Peking University, China Sept 2020 – Aug 2021
Research Intern, Yale University, U.S. June 2019 – Sept 2019
Exchange Undergraduate Student, University of California, Santa Cruz, U.S. Oct 2018 – Jan 2019

References

Prof. Jenny Greene Princeton University

Prof. Marla Geha Yale University

Prof. Shany Danieli Tel Aviv University

Prof. Yao-Yuan Mao University of Utah

Prof. Yingjie Peng Kavli Institute for Astronomy and Astrophysics, Peking University

Publications

Total citations: 419; first-author citations: 106 ADS Library

1. **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.
2. **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.*
3. **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).
4. **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).

5. **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).
6. **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).
7. Cheng S., **Li J.**, Yang E., Discovery of a Dwarf Planet Candidate in an Extremely Wide Orbit: 2017 OF_{201}.
   ⋆ **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.*
8. Wei L., Huang S., **Li J.**, et al., Zangetsu: A Candidate of Isolated, Quiescent, and Backsplash Ultra-Diffuse Galaxy in the COSMOS Field, *ApJ* submitted.
9. 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* submitted.
10. 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* accepted.
11. 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* submitted.
12. 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, *PRD* accepted.
13. 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).
14. Danieli S., et al. (including **Li J.**), Merian: A Wide-Field Imaging Survey of Dwarf Galaxies at $z \sim 0.06 - 0.10$, *ApJ* submitted.
15. 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).
16. 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).
17. 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).
18. 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).
19. Greene J. et al. (including **Li J.**), The Nature of Low Surface Brightness Galaxies in the Hyper Suprime-Cam Survey, *ApJ* 933, 150 (2022).
20. 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).
21. 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).
22. 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).
23. 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 Matte, arXiv:2109.09778, ApJ submitted.
24. 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).

25. 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).
26. 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 code

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.

Honors and Awards

Charlotte Elizabeth Procter Fellowship, Princeton University — Apr 2025
The fellowship recognizes students in their later years of study for outstanding academic performance and professional promise.

American Astronomical Society's Chambliss Astronomy Achievement Student Award — Jan 2024
The Chambliss Astronomy Achievement Student Awards are given to recognize exemplary research by undergraduate and graduate students who present at one of the poster sessions at the meetings of the AAS.

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 General Colleges and 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

Press

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: Princeton Astronomers Discover Extraordinary Distant Object at Solar System's Edge
AAS Nova: Discovery of a Lonely Galactic Hedgehog

Observational Programs

30 orbits on HST, ∼10 nights on the 6.5 m Magellan telescopes, 3 nights on the 8 m Subaru telescope, ∼10 nights on the 3.5 m WIYN telescope, plus various other observational programs.

Hubble Space Telescope Cycle 33: WFC3/UVIS imaging (30 orbits) — PI; 2025
Testing the Mass Threshold of Reionization-Quenching with Isolated Dwarf Galaxy Hedgehog (PI: J. Li)

Magellan Telescope: 11 dark nights imaging with Baade/IMACS	PI; 2024A, 2024B, 2025A, 2025B
Magellan Telescope: 1 dark night with Clay/IFU-M	PI; 2025A
Subaru Telescope: 25 hours dark time imaging with Hyper-Suprime Camera	PI, 2025A
Magellan Telescope: 1 dark night spectroscopy with Clay/LDSS3	PI; 2022B
Magellan Telescope: 4 dark nights spectroscopy with Baade/MagE	Co-I; 2024B, 2025A
Green Bank Telescope: 10.5 hours	PI; 2025A
Gemini-North telescope: 18 hours dark time imaging with GMOS	PI; 2024B, 2025B
WIYN telescope: 10 dark nights imaging with ODI	PI; 2024A, 2024B
HST Cycle 32: SNAP program for Local Volume Satellite Galaxies	Co-I; 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	Jan 2019

Teaching, Advising, Service, and Outreach

- Reviewer for the Astronomical Journal (AJ) — 2023 – now
- Course Designer of AST 207 (Observational Astronomy) — 2025 Spring
- Teaching Assistant of AST 303 (Research Methods in Astrophysics) — 2022 Fall
- Co-advising Princeton undergraduate students: Sufia Birmingham, Vivek Vijayakumar — 2022 – now
- Organizer of the Survey Science Discussion at Princeton — 2022 – now
- Organizer of the tea time for Princeton colloquium speakers — 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 TV show "Voice" (开讲啦) and talked about astronomy outreach

Software Contributions

- `smplotlib`: A Matplotlib template for SuperMongo style.
  It has $>$ 120 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`

Talks and Presentations

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

Talk, KIPAC Tea Talk, Stanford, California — Aug 2025
Dwarfs: Near and Far

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

Talk, DREAMS collaboration meeting, New York City — May 2025
ELVES-Dwarf Survey: Probing Satellite Population of Isolated Dwarf Galaxies in the Local Volume

Talk, Yale Galaxy Lunch — May 2025
ELVES-Dwarf Survey: Probing Satellite Population of Isolated Dwarf Galaxies in the Local Volume

Talk, Magellan Science Meeting, Washington D.C. — May 2025
ELVES-Dwarf, Hedgehog, and future SBF surveys

Talk at Yale's Astro × Data Science seminar (*invited*) Nov 2024

PopSED: Population-level inference for galaxy properties from broadband photometry

Talk, "Small Galaxies, Cosmic Questions. II", Durham, UK Aug 2024

ELVES-Dwarf, Hedgehog, and future SBF surveys

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

Talk at Tsinghua DoA ML Session (*invited*) Nov 2023

PopSED: Population-level inference for galaxy properties from broadband photometry

Poster, Machine Learning for Astrophysics, International Conference on Machine Learning, Hawaii July 2023

Population-Level Inference for Galaxy Properties from Broadband Photometry

Talk, "Galactic Frontiers: Dwarf Galaxies in the Local Volume and Beyond", New York City July 2023

Ultra-puffy galaxies among satellites of Milky Way analogs

Seminar, 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

Seminar, Department of Astronomy, Tsinghua University, Beijing June 2023

Ultra-puffy galaxies among satellites of Milky Way analogs: from definition to environmental quenching

Poster, Roman Science Inspired by JWST Results, STScI, Baltimore June 2023

Surface Brightness Fluctuations of Nearby Dwarf Galaxies in the Roman Era

Morning Coffee talk about ultra-puffy galaxies, Institute for Advanced Study Dec 2022

Low surface brightness galaxies and `scarlet`, Princeton HSC+PFS+Rubin discussion May 2022