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: satellite galaxies in the Local Volume, 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
Thesis: *Probing low surface brightness features in the NGC 1052 field with Dragonfly Telephoto Array*
Advisors: Pieter van Dokkum & Luis C. Ho

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. Yingjie Peng	Kavli Institute for Astronomy and Astrophysics, Peking University
Prof. Alexie Leauthaud	University of California, Santa Cruz

Publications

Total citations: 288; first-author citations: 80 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 was 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., et al. (including **Li J.**), The Merian Survey: A Statistical Census of Milky Way Analogs and LMC-SMC-Like Satellites, to be 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* submitted.
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
American Astronomical Society's Chambliss Astronomy Achievement Student Award	Jan 2024
Outstanding Undergraduate Thesis Award in Beijing (北京市本科优秀毕业论文)	Sept 2020
Weiming Bachelor ("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

Observing Experience

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

HST Cycle 33: WFC3 imaging (30 orbits)	PI: 2025
Testing the Mass Threshold of Reionization-Quenching with Isolated Dwarf Galaxy Hedgehog (PI: J. Li)	
Baade/IMACS on Magellan telescope: 9 dark nights imaging	PI: 2024A, 2024B, 2025A
Hyper-Suprime Camera on Subaru telescope: 25 hours dark time imaging	PI, 2025A
Clay/IFU-M on Magellan telescope: 1 dark night	PI, 2025A
Green Bank Telescope: 10.5 hours	PI: 2025A
GMOS on Gemini-North telescope: 18 hours dark time imaging	PI: 2024B, 2025B
WIYN telescope: 10 dark nights imaging	PI: 2024A, 2024B
Clay/LDSS3 on Magellan telescope: 1 dark night spectroscopy	PI, 2022B
Baade/MagE on Magellan telescope: 4 dark nights spectroscopy	Co-I: 2024B, 2025A
HST Cycle 32: SNAP program for Local Volume Satellite Galaxies	Co-I, 2024
Clay/IFU-M on Magellan telescope: 2 dark nights spectroscopy	Co-I, 2023A
Clay/IFU-M on Magellan telescope: 1 dark night spectroscopy	Co-I, 2023A

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

Computer Skills

Software Contributions:

- `smplotlib`: A Matplotlib template for SuperMongo style.
  It has $>$ 120 stars on GitHub and is used in $>$ 15 published papers.
- `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, 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 $\times$ 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