Jiadong LI

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I am an astronomer in astrophysics at the Max Planck Institute for Astronomy (MPIA). I am currently working on three projects: stellar parameterization in survey spectroscopy, forward-modeling of survey data; stellar initial mass function (IMF) and galaxy evolution; and astronomical object detection using deep learning techniques. I am interested in combining machine learning, Bayesian statistics, and theoretical modeling to address fundamental astronomy questions such as star formation and galactic evolution.

Professional experience

- **New York University** — **New York, NY, USA**
  Research scholar — *01/03/2022–22/02/2023*
- **CCA, Flatiron Institute – Simons Foundation** — **New York, NY, USA**
  Guest Researcher — *01/06/2022–22/02/2023*
- **Max-Planck-Institut for Astronomy** — **Heidelberg, Germany**
  Postdoc — *15/11/2023–now*

Education

- **Beijing Normal University** — **Beijing, China**
  B.Sc. in Astronomy — *01/09/2014–01/07/2018*
- **University of Chinese Academy of Sciences** — **Beijing, China**
  Minor in Computer Science — *01/09/2019–01/09/2020*
- **National Astronomical Observatories (NAOC)** — **Beijing, China**
  Ph.D in Astrophysics — *01/09/2018–13/05/2023*

Awards & Honours

- Excellent Doctoral Graduate of Beijing: 2023
- Excellent Graduate of Beijing Universities: 2023
- President's Scholarship of the Chinese Academy of Sciences: 2023
- Early Career Travel Funds of Sloan Digital Sky Survey-V: 2022
- Visiting and Studying Abroad Scholarship of the University of Chinese Academy of Sciences: 2021
- Excellent Student of the University of Chinese Academy of Sciences: 2019
- Membership of China Computer Federation: 2017

- Excellent Prize of Peking University Undergraduate Astronomy Symposium: 2017
- Scholarship: Jingshi Scholarship (Scholarship of Beijing Normal University): 2015, 2016, 2017, 2018

Published

Refereed publications: 16 papers, 6 as leading authors, 234 citations.

First Author

- **Li, J.**, Hans-Walter Rix, Yuan-Sen Ting, Johanna Müller-Horn, Kareem El-Badry, Chao Liu, Rhys Seeburger, Gregory M. Green, Xiangyu Zhang. "Millions of Main-Sequence Binary Stars from Gaia BP/RP Spectra." arXiv e-prints, (2025): arXiv:2507.09622.
- **Li, J.**, Mingjie Jian, Yuan-Sen Ting, Gregory M. Green. "Differentiable Stellar Atmospheres with Physics-Informed Neural Networks." arXiv e-prints, (2025): arXiv:2507.06357.
- **Li, J.**, Yuan-Sen Ting, Hans-Walter Rix, Gregory M. Green, David W. Hogg, Juan-Juan Ren, Johanna Müller-Horn, Rhys Seeburger. "Identification of 30,000 White Dwarf-Main Sequence binaries candidates from Gaia DR3 BP/RP(XP) low-resolution spectra." arXiv e-prints, (2025): arXiv:2501.14494.
- **Li, J.**, Kaze W. K. Wong, David W. Hogg, Hans-Walter Rix, Vedant Chandra. "AspGap: Augmented Stellar Parameters and Abundances for 37 Million Red Giant Branch Stars from Gaia XP Low-resolution Spectra." ApJS, 272.1 (2024): 2.
- **Li, J.**, Chao Liu, Zhi-Yu Zhang, Hao Tian, Xiaoting Fu, Jiao Li, Zhi-Qiang Yan. "Stellar Initial Mass Function Varies with Metallicity and Time." **Nature** 613.7944 (2023): 460-462.
- **Li, J.**, Chao Liu, Bo Zhang, Hao Tian, Dan Qiu, Haijun Tian. "Stellar Parameterization of LAMOST M Dwarf Stars." ApJS, 253.2 (2021): 45.

Second & Third Author

- Zhiqiang Yan, **Li, J**, Pavel Kroupa, Tereza Jerabkova, Eda Gjergo, Zhi-Yu Zhang. "The Variation in the Galaxy-wide Initial Mass Function for Low-mass Stars: Modeling and Observational Insights." ApJ, 969.2 (2024): 95.
- Pang X., Liao S., **Li, J**, Yan Z., Jian M., Kouwenhoven M. B. N., Tang S.-Y., et al., 2024, ApJ, 966, 169. doi:10.3847/1538-4357/ad33c5
- Hao Tian, Chao Liu, **Li, J**, Bo Zhang. "Mapping the Milky Way with LAMOST - IV. The Large Galactic Disc Extending to 35 kpc." MNRAS, 531.1 (2024): 1730-1745.
- Jianping Xiong, Xu Ding, **Li, J**, Hongwei Ge, Qiyuan Cheng, Kaifan Ji, Zhanwen Han, Xuefei Chen. "The Distribution of Semidetached Binaries. I. An Efficient Pipeline." ApJS, 270.2 (2024): 20.
- Xiang-Ming Yang, Sarah A. Bird, **Li, J**, Hai-Jun Tian, Dan Qiu, Jia-Peng Li, Cheng-Yuan Li, Gao-Chao Liu, Peng Zhang, Ju-Yong Zhang, Zhi-Ping Chen. "The Stellar 'Snake' - II. The Mass Function." MNRAS, 530.4 (2024): 4970-4987.
- Dan Qiu, **Li, J**, Bo Zhang, Chao Liu, Haijun Tian, Zexi Niu. "Calibration of Metallicity of LAMOST M Dwarf Stars Using FGK+M Wide Binaries." MNRAS, 527.4 (2024): 11866-11881.

Others

- Vedant Chandra, Vadim A. Semenov, Hans-Walter Rix, Charlie Conroy, Ana Bonaca, Rohan

P. Naidu, René Andrae, **Li, J**, Lars Hernquist. "The Three-phase Evolution of the Milky Way." ApJ, 972.1 (2024): 112.

- Yushan Xie, Huanyuan Shan, Nan Li, Ran Li, Eric Jullo, Chen Su, Xiaoyue Cao, Jean-Paul Kneib, Ana Acebron, Mengfan He, Ji Yao, Chunxiang Wang, **Li, J**, Yin Li. "CURLING - I. The Influence of Point-like Image Approximation on the Outcomes of Cluster Strong Lens Modelling." MNRAS, 531.1 (2024): 1179-1190.
- Jianping Xiong, Chao Liu, Jiao Li, **Li, J**, Bo Zhang, Xiaodian Chen, Changqing Luo, Zihuang Cao, Yongheng Zhao. "The Eclipsing Binaries from the LAMOST Medium-resolution Survey. III. A High-precision Empirical Stellar Mass Library." AJ, 165.2 (2023): 30.
- Chun-qian Li, Jian-rong Shi, Hong-liang Yan, Jian-Ning Fu, **Li, J**, Yong-Hui Hou. "Double- and Triple-line Spectroscopic Candidates in the LAMOST Medium-Resolution Spectroscopic Survey." ApJS, 256.2 (2021): 31.
- Wei Ji, Chao Liu, Licai Deng, Bo Zhang, **Li, J**, Hao Tian, Jiao Li. "All Spectral Type LAMOST Spectra Library (ATLAS)." ApJS, 265.2 (2023): 61.

Seminar Talks & Conference Presentations

- **The Milky Way: LAMOST and other Leading Surveys** — **Yichang, China**
  "M-dwarf Stars in LAMOST" — *2019*
- **The 13th Zhang Heng Symposium of the Chinese Astronomical Society** — **Dali, China**
  "Stellar parametrization of cool-dwarf stars by SLAM" — *2020*
- **LAMOST hacking workshop** — **Kunming, China**
  "Stellar Initial Mass Function Variation revealed by LAMOST and Gaia" — *2021*
- **Workshop on the Application of Machine Learning in Astronomy** — **Yichang, China**
  "Retina-CSST: Object detection and classification of CSST by deep learning method" — *2021*
- **CSST Image Processing Workshop** — **Chongqing, China**
  "Retina-CSST: Fast processing of multicolor photometric data in CSST" — *2021*
- **The 240th AAS Meeting** — **Pasadena, CA, USA**
  "Stellar Initial Mass Function Varies with Metallicity and Time" — *2021*
- **The Gaia selection function** — **Heidelberg, Germany**
  GaiaUnlimited — *2022*
- **SDSS-V Science Festival** — **Toronto, Canada**
  2022
- **Star formation and nuclear activity in galaxies** — **Nanjing, China**
  Invited talk — *2023*
- **The 14th Zhang Heng Symposium of the Chinese Astronomical Society** — **Wuhan, China**
  Invited talk — *2023*
- **CSST 2022/23 Annual Scientific Conference** — **Beijing, China**
  Invited talk — *2023*

- **GaiaXPloration: Discovery and measurement low-resolution spectroscopy** **Cambridge, UK**
  Invited talk *2023*
- **The structure, formation and evolution of star clusters** **Zhuhai, China**
  Invited talk *2023*
- **Seminar on big data analysis in surveys I: stellar parameterization** **Kunming, China**
  Session leader *2023*
- **Intelligent Computing in Astronomy** **Hangzhou, China**
  Invited talk *2023*
- **Cosmic Threads: Interlinking the Stellar IMF from Star-birth to Galaxies** **Sexten, Italy**
  Invited talk *2024*
- **CSST 2022/23 Annual Scientific Conference** **Hangzhou, China**
  Invited talk *2024*
- **The 3rd LAMOST-Kepler/TESS workshop** **Beijing, China**
  2024
- **New Computational Methods in Milky Way Dynamics and Structure** **Ringberg, Germany**
  LOC, speaker *2024*
- **SDSS-V collaboration meeting** **Heidelberg, Germany**
  LOC *2025*
- **CAstronomy Seminars at Stockholm University** **Stockholm, Sweden**
  Invited talk *2024*

Open Science Practice

- Source code for *AspGap*: LJ+2024, `https://github.com/jiadonglee/aspgap`AspGap;
- Original and derived data table for *AspGap*: LJ+2024, `https://zenodo.org/records/10469859`Zenodo.
- Source code for *MDwarfMachine* LJ+2021, `https://github.com/jiadonglee/MDwarfMachine`MDwarfMachine.
- Original and derived data table for LJ+2023, `https://doi.org/10.12149/101070`

Technical and Personal skills

- **Programming Languages:**
  Proficient in: Python, Shell, TeX
  Also basic ability with: MATLAB, SQL, Julia.
- **Operations Engineer** (**01/12/2019-31/12/2021**)
  Part-time operations of large general computing servers and GPU servers of the research group.

Outreach

- Volunteer: Tuanzhuang Village School (01/07/2015)
- Volunteer: Beijing Planetarium (15/07/2014)
- Volunteer guide for the open day of CAS (01/10/2020)