Zhuofu (Chester) Li

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Education

- **University of Washington, Seattle (UW, Seattle)** *Sep 2022 - Present*
  Dual Ph.D. in Astrophysics and Astrobiology; Dual M.S. in Astrophysics and Statistics Seattle, WA, USA
  - GPA: 3.92/4.00
- **University of California, Los Angeles (UCLA)** *Sep 2018 - Jun 2022*
  Dual B.S. in Astrophysics and Geophysics with Highest Honors Los Angeles, CA, USA
  - GPA: 3.88/4.00

Projects

- **LSST Asteroid Streak Detection Using Convolutional Neural Network** *Jan 2024 - Present*
  Tools: Python, U-Net CNN, Computer Cluster
  - Developed a machine learning algorithm to detect faint, fast-moving asteroids in Rubin Observatory images, enhancing the current point source detection algorithm.
  - Managed and processed large datasets from HSC and DECam, including injecting synthetic streaks to create a training and testing dataset with known ground truth for model validation.
  - Designed and implemented a U-Net-based convolutional neural network (CNN) with attention blocks and custom loss functions to improve detection sensitivity, focusing on converting integrated magnitudes to PSF magnitudes and addressing surface brightness challenges.
  - Led simulations and hyperparameter tuning on computing environments like Hyak and SLAC, overcoming challenges related to low surface brightness and resource management.
- **Estimates of Rotation Periods for Jupiter Trojans with ZTF Photometric Light Curves** *Sep 2022 - Sep 2024*
  Tools: Python, Zwicky Transient Facility, Lomb-Scargle periodogram
  - Estimated rotation periods for 216 Jupiter Trojans using photometric measurements in the g and r bands from the Zwicky Transient Facility, including 80 Trojans with no previously known periods.
  - Identified a spin barrier for Trojans larger than 10 km, providing insights into their bulk density and formation history.
  - Developed robust methods for analyzing light curves and phase-folded data, resulting in high-confidence period estimates, supported by comparisons with the Asteroid Lightcurve Database.
- **A Systematic Search for Short Orbital Period Cataclysmic Variables Using ZTF** *Jan 2021 - Oct 2022*
  Tools: Python, Gaussian Process Regression, Zwicky Transient Facility, Lomb-Scargle periodogram
  - Systematically searched for cataclysmic variables (CVs) with short orbital periods using ZTF light curves, identifying 235 objects, including 176 newly discovered CVs.
  - Employed advanced data analysis techniques such as Gaussian Process Regression and Lomb-Scargle periodogram to detect periodic variability in CVs despite challenges from irregular sampling and brightness variations.
  - Classified objects based on light curve shapes, Gaia parallax, and color data from Pan-STARRS and WISE, identifying 50 high-confidence CV candidates, including several period bouncers.

Patents and Publications

C=Conference, J=Journal, P=Patent, S=In Submission, T=Thesis

[J.1] Z. Li, Y. Chowdhury, Ž. Ivezić, et al. **Estimates of Rotation Periods for Jupiter Trojans with ZTF Photometric Light Curves** . Manuscript in preparation.

[J.2] P. M. Ogle, et al. (including Z. Li). **Radio Jet Feedback on the Inner Disk of Virgo Spiral Galaxy Messier 58**. *Astrophysical Journal*, 962 (2), 196.

[J.3] J. Roman, et al. (including Z. Li). **A giant thin stellar stream in the Coma Galaxy Cluster**. *Astronomy & Astrophysics*, 679, A157.

[J.4] J. L. Margot, et al. (including Z. Li). **A Search for Technosignatures Around 11680 Stars with the Green Bank Telescope at 1.15-1.73 GHz**. *Astrophysical Journal*, 166 (5), 206.

Skills

- **Programming Languages:** Python, C++, R, Java, HTML
- **Operating Systems:** iOS, Windows, Linux
- **Data Science & Machine Learning:** Deep Learning, Natural Language Processing, Supervised/Unsupervised Learning, Reinforcement Learning, TensorFlow
- **Specialized Area:** Astrophysics, Statistics, Machine Learning, Data Science
- **Research Skills:** Time-Series Analysis, Statistical Analysis, Pattern Recognition, Database Management

Honors and Awards

- **UCLA Department of Earth, Planetary, and Space Sciences Salutatorian** *2022*
  UCLA
  ◦ Graduated as Salutatorian for outstanding academic performance in the department.
- **UCLA Chancellor's Service Award** *2022*
  UCLA
  ◦ Recognized graduating students with a sustained record of outstanding service to UCLA and the Los Angeles community
- **Caltech Astronomy Summer Undergraduate Research Fellowship** *2021*
  Caltech
  ◦ Selected for a highly competitive research fellowship in astronomy.

Leadership Experience

- **President, Chief Telescope Operator, and Astrophotographer** *Sep 2018 - Sep 2022*
  The Astronomical Society at UCLA
  ◦ Led astronomy education initiatives for non-majors, organizing and conducting weekly public telescope viewing sessions.
  ◦ Delivered engaging public lectures on astronomical phenomena and curated a selection of celestial objects for observation.
  ◦ Captured high-quality images of deep-sky objects using a 0.36m Schmidt–Cassegrain Telescope, contributing to the society's astrophotography archive.
- **President** *Sep 2020 - Sep 2022*
  The Society of Sigma Gamma Epsilon UCLA (The National Honor Society for the Earth Sciences)
  ◦ Provided strategic leadership and direction, advancing the organization's mission and goals.
  ◦ Successfully planned and executed field trips, outreach events, and educational displays, enhancing engagement and learning opportunities for members.

Volunteer Experience

- **Speaker** *Sep 2022 - Present*
  Planetarium, University of Washington
  ◦ Delivered engaging weekly planetarium shows to public audiences, exploring a wide range of astronomy topics and fostering a deeper appreciation for the cosmos.
- **Organizer and Speaker** *Sep 2018 - Sep 2022*
  Astronomical Society at UCLA
  ◦ Organized and led weekly public telescope shows at UCLA, effectively engaging with the local community and promoting interest in astronomy.

Certifications

- **Stanford University:** Machine Learning Specialization *2024*
- **DeepLearning.AI:** TensorFlow Developer Professional Certificate *2024*

Additional Information

Languages: English (Native), Mandarin (Native), Japanese (Intermediate)
Interests: Quantitative Finance, Machine Learning, Data-Driven Research, Financial Markets, Traveling, Astrophotography