

Lizhou Sha

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EDUCATION

University of Wisconsin–Madison

Fall 2020 – present

PhD student in Astronomy

Advisors: Professor Andrew Vanderburg (MIT), Professor Ellen Zweibel

Massachusetts Institute of Technology

Fall 2014 – Spring 2018

SB in Physics (2018)

Academic advisor: Professor Sara Seager

RESEARCH INTERESTS

Uncovering unusual planetary systems with advanced computational techniques

Evolution and statistics of hot gas giant planetary systems

SUMMARY OF PUBLICATIONS

17 refereed publications (1 first author)

2 non-refereed publications

EMPLOYMENT

Summer Science Program University of Colorado Boulder (held online due to COVID-19)

Teaching Assistant and Residential Mentor, Astrophysics Program

Summer 2020

Massachusetts Institute of Technology Cambridge, MA

TESS Quick Look Pipeline Engineer

2018 – 2020

Google Seattle, WA

Software Engineering Intern

Summer 2017

TEACHING

Exoplanet Excavation for MIT *Splash!* and *Spark!*

annually, 2014 – 2019

1-hour lecture for high and middle schoolers, covering exoplanet detection methods.

Exoplanet Explorer for MIT HSSP

Summer 2018

7 weekly lectures for 7th–12th graders, topics: detection methods, atmospheres, habitability.

Quirky Quaternions for MIT *Splash!*

annually, 2015 – 2019

2-hour lecture for high schoolers, introducing a non-commutative algebra with vectors.

Science as Social Practice for MIT *Splash!*

2019

2-hour seminar for high schoolers, discussing science as a community of practice

LEADERSHIP AND SERVICE

Graduate Outreach Committee, UW–Madison Astronomy

Fall 2021 – present

Chair '16, Secretary '15, MIT Student Information Processing Board

2014 – 2018

Projection Subdirector, MIT Lecture Series Committee

2014 – 2018

Ham Radio Operator, Boston Marathon

2017, 2018

PUBLICATIONS, REFEREED OR UNDER REVIEW

[1] **L. Sha** et al. “TOI-954 b and K2-329 b: Short-period Saturn-mass Planets that Test whether Irradiation Leads to Inflation”. In: *Astron. J.* 161.2, 82 (Feb. 2021). DOI: 10.3847/1538-3881/abd187.

[2] M. Kunitomo et al. “The TESS Faint-star Search: 1617 TOIs from the TESS Primary Mission”. In: *Astrophys. J. Suppl. Ser.* 259.2, 33 (Apr. 2022), p. 33. DOI: 10.3847/1538-4365/ac5688. arXiv: 2112.02176 [astro-ph.EP].

- [3] M. Fausnaugh et al. “The TESS Mission Target Selection Procedure”. In: *Publ. Astron. Soc. Pac.* 133.1027, 095002 (Sept. 2021). DOI: 10.1088/1538-3873/ac1d3f.
- [4] J. Dong et al. “Warm Jupiters in TESS Full-frame Images: A Catalog and Observed Eccentricity Distribution for Year 1”. In: *Astrophys. J. Suppl. Ser.* 255.1, 6 (July 2021). DOI: 10.3847/1538-4365/abf73c.
- [5] N. M. Guerrero et al. “The TESS Objects of Interest Catalog from the TESS Prime Mission”. In: *Astrophys. J. Suppl. Ser.* 254.2, 39 (June 2021). DOI: 10.3847/1538-4365/abefe1.
- [6] T. Daylan et al. “TESS Observations of the WASP-121 b Phase Curve”. In: *Astron. J.* 161.3, 131 (Mar. 2021). DOI: 10.3847/1538-3881/abd8d2.
- [7] M. M. Fausnaugh et al. “Early-time Light Curves of Type Ia Supernovae Observed with TESS”. In: *Astrophys. J.* 908.1, 51 (Feb. 2021). DOI: 10.3847/1538-4357/abcd42.
- [8] T. G. Beatty et al. “The TESS Phase Curve of KELT-1b Suggests a High Dayside Albedo”. In: *Astron. J.* 160.5, 211 (Nov. 2020). DOI: 10.3847/1538-3881/abb5aa.
- [9] I. Wong et al. “Systematic Phase Curve Study of Known Transiting Systems from Year One of the TESS Mission”. In: *Astron. J.* 160.4, 155 (Oct. 2020). DOI: 10.3847/1538-3881/ababad.
- [10] D. J. Armstrong et al. “A remnant planetary core in the hot-Neptune desert”. In: *Nature* 583.7814 (July 2020), pp. 39–42. DOI: 10.1038/s41586-020-2421-7.
- [11] R. Cloutier et al. “TOI-1235 b: A Keystone Super-Earth for Testing Radius Valley Emergence Models around Early M Dwarfs”. In: *Astron. J.* 160.1, 22 (July 2020). DOI: 10.3847/1538-3881/ab9534.
- [12] C. X. Huang et al. “TESS Spots a Hot Jupiter with an Inner Transiting Neptune”. In: *Astrophys. J. Lett.* 892.1, L7 (Mar. 2020). DOI: 10.3847/2041-8213/ab7302.
- [13] R. I. Dawson, C. X. Huang, J. J. Lissauer, K. A. Collins, **L. Sha**, et al. “TOI-216b and TOI-216 c: Two Warm, Large Exoplanets in or Slightly Wide of the 2:1 Orbital Resonance”. In: *Astron. J.* 158.2, 65 (Aug. 2019). DOI: 10.3847/1538-3881/ab24ba.
- [14] J. E. Rodriguez et al. “An Eccentric Massive Jupiter Orbiting a Subgiant on a 9.5-day Period Discovered in the Transiting Exoplanet Survey Satellite Full Frame Images”. In: *Astron. J.* 157.5, 191 (May 2019). DOI: 10.3847/1538-3881/ab11d9.
- [15] D. Dragomir et al. “TESS Delivers Its First Earth-sized Planet and a Warm Sub-Neptune”. In: *Astrophys. J. Lett.* 875.2, L7 (Apr. 2019). DOI: 10.3847/2041-8213/ab12ed.
- [16] C. X. Huang et al. “TESS Discovery of a Transiting Super-Earth in the pi Mensae System”. In: *Astrophys. J. Lett.* 868, L39 (Dec. 2018). DOI: 10.3847/2041-8213/aaef91.
- [17] I. J. M. Crossfield et al. “A TESS Dress Rehearsal: Planetary Candidates and Variables from K2 Campaign 17”. In: *Astrophys. J. Suppl. Ser.* 239, 5 (Nov. 2018). DOI: 10.3847/1538-4365/aae155.

**PUBLICATIONS,
NON-REFEREED**

- [1] C. X. Huang, A. Vanderburg, A. Pál, **L. Sha**, L. Yu, et al. “Photometry of 10 Million Stars from the First Two Years of TESS Full Frame Images: Part II”. In: *Res. Notes Am. Astron. Soc.* 4.11, 206 (Nov. 2020). DOI: 10.3847/2515-5172/abca2d.
- [2] C. X. Huang, A. Vanderburg, A. Pál, **L. Sha**, L. Yu, et al. “Photometry of 10 Million Stars from the First Two Years of TESS Full Frame Images: Part I”. In: *Res. Notes Am. Astron. Soc.* 4.11, 204 (Nov. 2020). DOI: 10.3847/2515-5172/abca2e.

**CONFERENCE
TALKS**

- [1] L. Sha et al. “A new TESS discovery refines the occurrence rate of inner companions to hot Jupiters”. In: *American Astronomical Society Meeting Abstracts #235*. Honolulu, HI, Jan. 2020, 349.08, p. 349.08.

- [2] L. Sha, C. X. Huang, and A. Vanderburg. “Does WASP-47 e Have Friends? Occurrence Rate of Inner Companions to Hot Jupiters with TESS FFI Data”. In: *TESS Science Conference I*. Cambridge, MA, July 2019.
- [3] L. Sha et al. “The MIT Quick Look Pipeline for TESS Full Frame Images: Performance and Early Results”. In: *Breakout Session: Community Data Products and Early Science from the TESS Mission*. Ed. by T. Barclay and K. Colón. Kepler and K2 Science Conference V. Glendale, CA, Mar. 2019.
- [4] L. Sha et al. “The MIT Quick Look Pipeline for TESS Full Frame Images”. In: *TESS Data Workshop*. Baltimore, MD, Feb. 2019.
- [5] L. Sha, R. I. Dawson, C. X. Huang, J. J. Lissauer, and K. Collins. “TOI 216: A system of two warm, large exoplanets in or near 2:1 resonance”. In: *Boston Area Exoplanet Science Meeting #5*. Boston, MA, Jan. 2019.

SEMINARS AND COLLOQUIA

1. L. Sha. “Searching TESS Data for Inner Companion to Hot Jupiters” (**invited**). Exoplanet Pizza Lunch, Center for Astrophysics | Harvard & Smithsonian (online). 2020 Oct 19.
2. L. Sha. “TESS Full Frame Images and Hot Massive Planets”. Exoplanet Lunch Talk, Princeton University. 2020 Jan 27.

POSTERS

- [1] L. Sha et al. “TESS Discovers A Short-Period Saturn-Mass Planet with an Inner Companion”. In: *Posters from the TESS Science Conference II*. Online, July 2021, 198, p. 198. DOI: 10.5281/zenodo.5148845.
- [2] L. Sha, C. X. Huang, and A. Vanderburg. “Refining the occurrence rate of inner companions to hot Jupiters using TESS full-frame image data”. In: *AAS/Division for Extreme Solar Systems Abstracts*. Vol. 51. Reykjavík, Iceland, Aug. 2019, 309.11, p. 309.11.
- [3] L. Sha, C. X. Huang, and A. Vanderburg. “Photometric performance of the MIT Quick Look Pipeline for the TESS full frame data”. In: *American Astronomical Society Meeting Abstracts #233*. Seattle, WA, Jan. 2019, 467.08, p. 467.08.

SKILLS

PROGRAMMING Python, Go, C, JavaScript, Java, bash, Mathematica, Julia
 PYTHON LIBRARIES Astropy, Emcee, Matplotlib, Numpy, Scipy, Pandas, Pymc3
 LANGUAGES Chinese (native speaker), English (native-level speaker)

Last updated: 2022-03-24