**Zifan Lin**
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## Education, Research, and Work Experience

**Washington University in St. Louis** St. Louis, MO
McDonnell Center Postdoctoral Fellow, McDonnell Center for the Space Sciences *July 2025 –*

**Massachusetts Institute of Technology** Cambridge, MA
PhD in Planetary Sciences *August 2020 – May 2025*
Department of Earth, Atmospheric and Planetary Sciences

- **PhD thesis topic:** Building detailed planetary interior models with applications to solar system and extrasolar planets
- **Advisor:** Prof. Sara Seager

**Cornell University** Ithaca, NY
B.A., Astronomy Major, with Concentration in Astrophysics *August 2016 – May 2020*

- Worked as undergraduate research assistant for 2.5 years
- **Research topic:** Climate, photochemistry, and spectra models for exoplanets
- **Research advisor:** Prof. Lisa Kaltenegger

## Publications

- **Lin, Z.**, & Daylan, T. 2026. The Persistent Thermal Anomalies in Rocky Worlds, submitted to ApJ, http://arxiv.org/abs/2601.00412
- Allen, N. H. et al. (including **Lin, Z.**) 2026. JWST TRAPPIST-1 e/b Program: Motivation and First Observations, *Astronomical Journal*, 171, 105.
- **Lin, Z.**, & Seager, S. 2025. Carbon-rich Sub-Neptune Interiors Are Compatible with JWST Observations, *Astrophysical Journal Letters*, 990, L35.
- **Lin, Z.**, Cambioni, S., Seager, S. 2025. Most High-density Exoplanets Are Unlikely to Be Remnant Giant Planet's Cores, *Astrophysical Journal Letters*, 978, L41.
- **Lin, Z.**, Seager, S., Weiss, B. P. 2025. Interior and Gravity Field Models for Uranus Suggest a Mixed-composition Interior: Implications for the Uranus Orbiter and Probe, *Planetary Science Journal*, 6, 27.
- Espinoza, N. et al. (including **Lin, Z.**) 2025. JWST-TST DREAMS: NIRSpec/PRISM Transmission Spectroscopy of the Habitable Zone Planet TRAPPIST-1 e, *Astrophysical Journal Letters*, 990, L52.
- Glidden, A. et al. (including **Lin, Z.**) 2025. JWST-TST DREAMS: Secondary Atmosphere Constraints for the Habitable Zone Planet TRAPPIST-1 e, *Astrophysical Journal Letters*, 990, L53.
- Louie, D. R., et al. (including **Lin, Z.**) 2025. JWST-TST DREAMS: A Precise Water Abundance for Hot Jupiter WASP-17b from the NIRISS SOSS Transmission Spectrum, *Astronomical Journal*, 169, 86.
- Cambioni, S. et al. (including **Lin, Z.**) 2025. Can Metal-Rich Worlds Form by Giant Impacts?, *Astronomy & Astrophysics*, 696, 21.
- Kunimoto, M., **Lin, Z.**, Millholland, S., et al. 2024. Two Earth-size Planets and an Earth-size Candidate Transiting the nearby Star HD 101581, *Astronomical Journal*, 169, 47.

- Gressier, A. et al. (including **Lin, Z.**) 2025. JWST-TST DREAMS: A Supersolar Metallicity in WASP-17 b's Dayside Atmosphere from NIRISS SOSS Eclipse Spectroscopy, *Astronomical Journal*, 169, 57.
- Valentine, D. et al. (including **Lin, Z.**) 2024. JWST-TST DREAMS: Nonuniform Dayside Emission for WASP-17b from MIRI/LRS, *Astronomical Journal*, 168, 123.
- Tey, E., Shporer, A., **Lin, Z.**, et al. 2024. GJ 238 b: A 0.57 Earth Radius Planet Orbiting an M2.5 Dwarf Star at 15.2 pc, *Astronomical Journal*, 167, 283.
- Vaughan, S. et al. (including **Lin, Z.**) 2024. Behind the mask: can HARMONI@ELT detect biosignatures in the reflected light of Proxima b?, *Monthly Notices of The Royal Astronomical Society*, 528, 2.
- Essack, Z. et al. (including **Lin, Z.**) 2023. TOI-1075 b: A dense, massive, ultra-short-period hot super-earth straddling the radius gap, *Astronomical Journal*, 165, 47.
- Grant, D., et al. (including **Lin, Z.**) 2023. JWST-TST DREAMS: quartz clouds in the atmosphere of WASP-17b, *Astrophysical Journal Letters*, 956, L32.
- Libralato, M., et al. (including **Lin, Z.**) 2023. JWST-TST Proper Motions. I. High-precision NIRISS Calibration and Large Magellanic Cloud Kinematics, *Astrophysical Journal*, 950, 101.
- Kaltenegger, L., Payne, R. C., **Lin, Z.**, Kasting, J., Delrez, L. 2023. Hot Earth or Young Venus? A nearby transiting rocky planet mystery, *Monthly Notices of The Royal Astronomical Society Letters*, 524, 1.
- **Lin, Z.**, Seager, S., Ranjan, S., Kozakis, T., Kaltenegger, L. 2022. $H_2$-dominated Atmosphere as an Indicator of Second-generation Rocky White Dwarf Exoplanets, *Astrophysical Journal Letters*, 925(1), p. L10.
- Ranjan, S. et al. (including **Lin, Z.**) 2022, Photochemical Runaway in Exoplanet Atmospheres: Implications for Biosignatures, *Astrophysical Journal*, 930, 2.
- **Lin, Z.** & Kaltenegger, L. 2022. High-resolution spectral models of TRAPPIST-1e seen as a Pale Blue Dot for ELT and JWST observations, *Monthly Notices of The Royal Astronomical Society*, 516, 3167.
- Kaltenegger, L., **Lin, Z.** 2021. Finding Signs of Life in Transits: High-resolution Transmission Spectra of Earth-line Planets around FGKM Host Stars. *Astrophysical Journal Letters*, 909, L2.
- **Lin, Z.**, MacDonald, R. J., Kaltenegger, L., Wilson, D. J. 2021. Differentiating modern and pre-biotic Earth scenarios for TRAPPIST-1e: high-resolution transmission spectra and predictions for JWST, *Monthly Notices of The Royal Astronomical Society*, 505(3), pp. 3562–3578.
- Kaltenegger, L., **Lin, Z.**, Madden, J. 2020. High-resolution Transmission Spectra of Earth Through Geological Time. *Astrophysical Journal*, 892, L17.
- Kaltenegger, L., **Lin, Z.**, Rugheimer, S. 2020. Finding Signs of Life on Transiting Earth-like Planets: High-resolution Transmission Spectra of Earth through Time around FGKM Host Stars. *Astrophysical Journal*, 904, 10.
- Kozakis, T., **Lin, Z.**, Kaltenegger, L. 2020. High-resolution Spectra and Biosignatures of Earth-like Planets Transiting White Dwarfs. *Astrophysical Journal*, 894, L6.
- **Lin, Z.** & Kaltenegger, L. 2019. High-resolution reflection spectra for Proxima b and Trappist-1e models for ELT observations. *Monthly Notices of The Royal Astronomical Society*, 491, 2.
- Kaltenegger, L., Madden, J., **Lin, Z.**, et al. 2019. The Habitability of GJ 357 d: Possible Climate and Observability. *Astrophysical Journal*, 883, L40.

**Conferences & Talks**

**247th meeting of the American Astronomical Society** Phoenix, AZ
Oral presentation *January 2026*

**Mid-American Regional Astrophysics Conference (MARAC)** Columbia, MO
Oral presentation *December 2025*
**Astronomik Nesnelerin Yapısı ve Evrimi (ANYE) workshop** Online
Invited talk *December 2025*
**Great Lakes Exoplanet Area Meeting (GLEAM) 2025** Madison, WI
Poster presentation *November 2025*
**The Solar System in Context** Tucson, AZ
Oral presentation *September-October 2025*
**Washington University Cosmology and AstroPhyics seminar** St. Louis, MO
Oral presentation *September 2025*
**MIT EAPS Planetary Lunch Seminar** Cambridge, MA
Oral presentation *February 2025*
**Gordon Research Conferences: Research at High Pressure** Holderness, NH
Poster presentation *July 2024*
**Gordon Research Seminar: Research at High Pressure** Holderness, NH
Oral presentation *July 2024*
**Emerging Researchers in Exoplanet Science Symposium IX** Ithaca, NY
Oral presentation *July 2024*
**Uranus Flagship Workshop 2024** Greenbelt, MD
Poster presentation *May 2024*
**Harvard CfA Exoplanet Pizza Lunch** Cambridge, MA
Oral presentation *December 2023*
**Uranus Flagship Workshop 2023** Online
Oral presentation *July 2023*
**Emerging Researchers in Exoplanet Science Symposium VIII** New Haven, CT
Poster presentation *June 2023*
**Gordon Research Conferences: Origins of Solar Systems** South Hadley, MA
Poster presentation *June 2023*
**Center for Matter at Atomic Pressures Annual Conference** Rochester, NY
Invited talk *May 2023*
**Gordon Research Conferences: Research at High Pressure** Holderness, NH
Attendee *July 2022*
**Planetary Lunch Seminar, Cornell University** Online
Invited talk *March 2022*
**Workshop: Spatially Resolved Spectroscopy with ELTs** Online
Poster presentation *September 2021*
**235th meeting of the American Astronomical Society** Honolulu, HI
Poster presentation *January 2020*
**Emerging Researchers in Exoplanet Science Symposium V** Ithaca, NY
Poster presentation *June 2019*

## Teaching Experience

**TA for 12.425** Cambridge, MA
Department of Earth, Atmospheric and Planetary Sciences, MIT *Fall 2023 & Fall 2024*

- Course title: Extrasolar Planets Physics and Detection Techniques
- Sole TA for a course with roughly 15-20 students
- Responsible for helping to organize in-class activities, holding weekly office hours, assisting with grading, and helping to organize course page on Canvas

- Give a lecture on planetary interiors each semester

**TA for 12.003** Cambridge, MA
Department of Earth, Atmospheric and Planetary Sciences, MIT *Fall 2022*

- Course title: Introduction to Atmosphere, Ocean, and Climate Dynamics
- Sole TA for a course with roughly 20 students
- Responsible for holding weekly office hours, grading problem sets, and helping to organize course page on Canvas

**Physics Undergraduate TA Program** Ithaca, NY
Department of Physics, Cornell University *Spring 2018*

- Responded to questions during lectures in the PHYS 2213 Physics II: Electromagnetism course (for ~300 students, in collaboration with 5 other TAs)
- Participated in a workshop on effectively communicating science