

Dr. Yifan Zhou

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51 Pegasi b Postdoctoral Fellow

Employment

51 Pegasi b Fellow	2021-
McDonald Observatory / Department of Astronomy, The University of Texas at Austin	
Harlan J. Smith McDonald Observatory Postdoctoral Fellow	2019-2021
McDonald Observatory / Department of Astronomy, The University of Texas at Austin	

Education

Ph.D. in Astronomy and Astrophysics	2014-2019
Department of Astronomy / Steward Observatory, The University of Arizona	
B.Sc in Astronomy	2010-2014
Department of Astronomy, Peking University	

Awards and Honors

2021–: 51 Pegasi b Fellowship
2019–2021: Harlan J. Smith McDonald Observatory Fellowship
2015–2018: NASA Earth and Space Science Fellowship
2015–2016: University of Arizona Technology & Research Initiative Funding (TRIF) Fellowship
09/2013: First Lin-Qiao Prize for Excellent Undergraduate Research Projects in Astronomy and Astrophysics, Peking University & KIAA

Grants Awarded

Total grants as principal investigator (PI) or science PI (Sci PI): \$916k (Jul. 2022).

- 2021-2024 51 Pegasi b Fellowship, Heising-Simons Foundation (Sci PI, \$375k),
Investigating the Formation, Evolution, and Atmospheres of Exoplanets with Time-Resolved Direct-Imaging Observations.
- 2021 Hubble Space Telescope GO-16651, STScI (Sci PI, \$133k),
A Search for Accreting Protoplanets within Transition Disk Gaps.
- 2021 NASA / Keck Observing Support (Sci PI, \$12k)
The Angular Momentum Architecture of the VHS1256 Planetary System.
- 2019 Hubble Space Telescope GO-16036, STScI (Sci PI, \$116k),
Mapping Clouds on a Variable Planetary-Mass Companion.
- 2019 Hubble Space Telescope GO-15830, STScI (Sci PI, \$130k),
A Planet is Born: Investigating the Accretion Process of PDS70b with WFC3/UVIS Direct Imaging Observations.

- 2017 Hubble Space Telescope AR-15060, STScI (Sci PI, \$ 150k), *Unleashing the Charges: An Improved Reduction of Key Exoplanet Datasets and a Tool for Ramp Effect Correction.*

Select Observing Programs

As principal investigators:

- HST Cycle 30 (GO-17168), *Confirming the Protoplanet Candidate AB Aur b with Accretion Light Echoes (co-PI)*
- HST Cycle 29 (GO-16651), *A Search for Accreting Protoplanets within Transition Disk Gaps.*
- HST Cycle 27 (GO-16036), *Mapping Clouds on a Variable Planetary-Mass Companion.*
- HST Cycle 27 (GO-15830), *A Planet is Born: Investigating the Accretion Process of PDS70b with WFC3/UVIS Direct Imaging Observations.*
- HST Cycle 25 (AR-15060), *Unleashing the Charges: An Improved Reduction of Key Exoplanet Datasets and a Tool for Ramp Effect Correction.*
- Spitzer DDT program (14312), *Rotational modulations of a highly variable planetary-mass companion.*
- Keck 2021A, *The Angular Momentum Architecture of the VHS1256 Planetary System.*
- McDonald Observatory 2022-1, *Monitoring variable brown dwarfs with DIAFI.*
- McDonald Observatory 2021-3, *DIAFI z-band monitoring of four highly variable brown dwarfs.*

As co-Investigators:

- JWST Cycle 1 (GO-2640, PI: W. Best), *A Census to the Bottom of the IMF in Westerlund 2: Atmospheres, Disks, Accretion, and Demographics.*
- JWST Cycle 1 (GO-2311, PI: Y. Wu/B. Bowler), *JWST MIRI Imaging Survey of Planetary-mass Companions: Testing the Compact Disk Hypothesis.*
- JWST Early Release Science Program (ERS-1386, PI: S. Hinkley), *High Contrast Imaging of Exoplanets and Exoplanetary Systems with JWST.*
- HST Cycle 30 (GO-17136, PI: E. Gaidos), *Photometry of a Young Planetary-Mass Companion to a Taurus M Dwarf Star*
- HST Cycle 30 (GO-17127, PI: Y. Aoyama), *Testing models of accretion onto the Young Planetary System PDS 70*
- HST Cycle 29 (GO-16754, PI: S. Casewell), *Decoding the clouds on an irradiated inflated brown dwarf.*
- HST Cycle 29 (GO-16721, PI: B. Bowler), *The Angular Momentum Architecture of Long-Period Giant Planets and Brown Dwarf Companions.*
- HST Cycle 28 (GO-16302, PI: Y. Wu), *Accretion Rates as a Diagnostic Tool for the Origin of Planetary-mass Companions.*
- HST Cycle 27 (GO-15947, PI: D. Apai), *Dancing with the Dwarfs: Very High Quality Spatial and Spectral Maps of Hot Jupiters Proxies.*
- HST Cycle 25 (GO-15301, PI: L. Carone), *Now You See Me – the WASP-117b Version.*
- HST Cycle 23 (GO-14241, PI: D. Apai), *Cloud Atlas: Vertical Cloud Structure and Gravity in Exoplanet and Brown Dwarf Atmospheres.*

Service and Committees

- Referee for AAS Journals (AJ, ApJ, ApJL), A&A, 3–5 manuscripts per year.

- NASA panel reviewer
- Canadian Time Allocation (CanTAC) Committee
- 2021 UT Austin Department of Astronomy graduate admission committee
- Hubble Space Telescope Proposal Reviewer (Cycles 27, 29, 30)
- 2020 NASA FINESST Fellowship Reviewer
- 2018 University of Arizona Department of Astronomy graduate admission committee

Teaching Experience

- Teaching Assistant for Dr. Laird Close, course name: *Life in the Universe*
Gave three 50 min Lectures.
- Teaching Assistant for Dr. Serena Kim, course name: *Life in the Universe*
Organized in-class activities; Gave two 75 min Lectures; Built course website.
- Guest Lecture for Dr. Laird Close

Student Mentoring

- Destiny Howell, UT Austin TAURUS scholar, 2022-
- Mateo Guerra Toro, UT Austin TAURUS scholar, 2021-
- Aniket Sanghi, UT Austin undergraduate student, 2021-. Two student-leading papers have been published.
- Zhanbo Zhang, University of Arizona summer student, 2018. One student-leading paper was published.

Recent Talks

- 8/2022: 51 Pegasi b Fellowship Summit, San Francisco, CA, USA
- 7/2022: UCSC OWL seminar, Santa Cruz, CA, USA
- 5/2022: Contribute talk, Exoplanet IV, Las Vegas, NV, USA
- 1/2022: SPF Seminar, UT Austin
- 9/2021: Twinkle conference (online)
- 8/2021: 51 Pegasi b Fellowship Summit (online)
- 6/2021: MPIA Exo-coffee (online)
- 4/2021: UC Berkeley Planetary Science Seminar, UC Berkeley (online)
- 2/2021: Carnegie EPL Seminar, Carnegie Institute (online)
- 2/2021: Origins Seminar, University of Arizona (online)
- 12/2020: KIAA Lunch Talk, Peking University (online)
- 11/2020: SPF Seminar, UT Austin (online)
- 10/2020: MIT Exoplanet Tea, MIT (online)
- 10/2020: AMNH Astrophysics Seminar, American Museum of Natural History (online)
- 02/2020: Seminar talk, University of Texas, Austin, TX, USA

Publications

 [ADS](#),  [Google scholar](#).

10 published first-author papers. 1 submitted first-author paper. 30 total publications (July 2022).

Total citations: 871, *h*-index: 15; first-author *h*-index: 8.

First-author papers:

0. Yifan Zhou, Brendan Bowler, Daniel Apai, et al.
Roaring Storms in the Planetary-Mass Companion VHS 1256-1257 b: Hubble Space Telescope Multi-epoch Monitoring Reveals Vigorous Evolution in an Ultra-cool Atmosphere,
AJ, submitted
1. Yifan Zhou, Aniket Sanghi, et al.
HST/WFC3 H α Direct-imaging Detection of a Pointlike Source in the Disk Cavity of AB Aur,
ApJL, 934:L13, 2022
2. Yifan Zhou, Dániel Apai, et al.
Mapping the pressure-dependent day-night temperature contrast of a strongly irradiated atmosphere with HST spectroscopic phase curve,
AJ, 163:17, 2022
3. Yifan Zhou, Brendan Bowler, et al.
Hubble Space Telescope UV and H α Measurements of the Accretion Excess Emission from the Young Giant Planet PDS 70 b,
AJ, 161:244, may 2021.
4. Yifan Zhou, Brendan Bowler, et al.
Spectral Variability of VHS J1256–1257b from 1 to 5 μ m,
AJ, 160:77, jul 2020.
5. Yifan Zhou, Dániel Apai, et al.
Cloud Atlas: High-precision HST/WFC3/IR Time-resolved Observations of Directly Imaged Exoplanet HD 106906b,
AJ, 159:140, mar 2020.
6. Yifan Zhou, Dániel Apai, et al.
Cloud Atlas: High-Contrast Time-Resolved Observations of Planetary-Mass Companions,
AJ, 157:128, jan 2019
7. Yifan Zhou, Dániel Apai, Stanimir Metchev, Ben W. P. Lew, et al.
Cloud Atlas: Rotational Modulations in the L/T Transition Brown Dwarf Companion HN Peg B,
AJ, 155(3):132, jan 2018.
8. Yifan Zhou, Dániel Apai, Ben W. P. Lew, and Glenn H Schneider.
A Physical Model-based Correction for Charge Traps in the Hubble Space Telescope's Wide Field Camera 3 Near-IR Detector and Applications to Transiting Exoplanets and Brown Dwarfs,
AJ, 153(6):243, mar 2017.
9. Yifan Zhou, Dániel Apai, Glenn H Schneider, Mark S Marley, and Adam P. Showman.
Discovery Of Rotational Modulations in the Planetary-Mass Companion 2M1207b: Intermediate Rotation Period and Heterogeneous Clouds in a Low Gravity Atmosphere,
ApJ, 818(2):176, feb 2016.
10. Yifan Zhou, Gregory J Herczeg, Adam L Kraus, Stanimir Metchev, and Kelle L Cruz. *Accretion onto Planetary Mass Companions of Low-Mass Young Stars*,
ApJ, 783(1):L17, feb 2014.

Student-lead papers:

11. Sanghi, Zhou, and Bowler
Efficiently Imaging Accreting Protoplanets from Space: Reference Star Differential Imaging of the PDS 70 Planetary System Using the HST/WFC3 Archival PSF Library *AJ*, 163, 119, feb, 2022
12. Zhang, Zhou, Rackham, and Apai.
The near-infrared transmission spectra of trappist-1 planets b, c, d, e, f, and g and stellar contamination in multi-epoch transit spectra.
AJ, 156, 178, oct 2018.

Co-author papers:

13. Lee et al. (incl. Zhou)
Sunbathing under white light – 3D modelling of brown dwarf - white dwarf atmospheres with strong UV irradiation
MNRAS, submitted, arXiv:2203.09854
14. Hinkley et al. (incl. Zhou)
The JWST Early Release Science Program for the Direct Imaging & Spectroscopy of Exoplanetary Systems *PASP*, in press
15. Glidic et al. (incl. Zhou)
Atmospheric Characterization of Hot Jupiter CoRoT-1 b Using the Wide Field Camera 3 on the Hubble Space Telescope *AJ*, 164:19, jul 2022
16. Lew, Apai, Zhou et al.
Mapping the pressure-dependent day-night temperature contrast of a strongly irradiated atmosphere with HST spectroscopic phase curve *AJ* 163:8, 2022
17. Uyama et al. (incl. Zhou)
Keck/OSIRIS Pa β High-contrast Imaging and Updated Constraints on PDS 70b *AJ*, 162:214, nov 2021
18. Cubillos et al. (incl. Zhou)
Longitudinally Resolved Spectral Retrieval (ReSpect) of WASP-43b *ApJ*, 915:45, jul 2021
19. Bowler et al. (incl. Zhou)
The McDonald Accelerating Stars Survey (MASS): Discovery of a Long-period Substellar Companion Orbiting the Old Solar Analog HD 47127 *ApJL*, 913L:28, jun 2021
20. Ludmila Carone, Paul Mollière, Yifan Zhou, et al.
Indications for very high metallicity and absence of methane in the eccentric exo-Saturn WASP-117b *A&A*, 646:43, feb 2021
21. Bew W. P. Lew, et al. (incl. Yifan Zhou)
Cloud Atlas: Unraveling the Vertical Cloud Structure with the Time-series Spectrophotometry of an Unusually Red Brown Dwarf
ApJ, 903:1, oct 2020
22. Brendan P. Bowler, Yifan Zhou et al.
Strong Near-infrared Spectral Variability of the Young Cloudy L Dwarf Companion VHS J1256-1257 b *ApJL*, 893L:30, apr 2020
23. Ben W.P. Lew, Dániel Apai, Yifan Zhou et al.
Cloud Atlas: Weak Color Modulations Due to Rotation in the Planetary-mass Companion GU Psc b and 11 Other Brown Dwarfs
AJ, 159:125, feb 2020
24. Paulo A. Miles-Páez, Dániel Apai, Stanimir Metchev, Yifan Zhou et al.
Cloud Atlas: Variability in and out of the Water Band in the Planetary-mass HD 203030B Points to Cloud Sedimentation in Low-gravity L Dwarfs
ApJ, 883:181, oct 2019
25. Elena Manjavacas, Dániel Apai, Ben W.P. Lew, Yifan Zhou et al.

Cloud Atlas: Rotational Spectral Modulations and Potential Sulfide Clouds in the Planetary-mass, Late T-type Companion Ross 458C
ApJL, 875:L15, apr 2019

26. Elena Manjavacas, Dániel Apai, Yifan Zhou, et al.
Cloud Atlas: Hubble Space Telescope Near-Infrared Spectral Library of Brown Dwarfs, Planetary-Mass Companions, And Hot Jupiters
AJ, 157:101, feb 2019
27. J. Spake *et al.* (incl. Y. Zhou).
Helium in the eroding atmosphere of an exoplanet.
Nature, 557:68–70, May 2018.
28. Elena Manjavacas, Dániel Apai, Yifan Zhou, Theodora Karalidi, Ben W. P. Lew, et al.
Cloud Atlas: Discovery of Rotational Spectral Modulations in a Low-mass, L-type Brown Dwarf Companion to a Star.
AJ, 155(1):11, dec 2017.
29. Ben W P Lew, Dániel Apai, Yifan Zhou, Glenn H Schneider, et al.
Cloud Atlas: Discovery of Patchy Clouds and High-Amplitude Rotational Modulations in a Young, Extremely Red L-Type Brown Dwarf.
ApJ, 829(2):L32, sep 2016.