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Dr. Yifan Zhou

Employment

2023- **Assistant Professor**
Department of Astronomy, The University of Virginia

2021-2023 **51 Pegasi b Fellow**
Department of Astronomy, The University of Texas at Austin

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

Education

2014-2019 **Ph.D. in Astronomy and Astrophysics**
Department of Astronomy, The University of Arizona
Time-resolved observations of directly-imaged planetary-mass companions and exoplanets.
Advisor: Dániel Apai.

2010-2014 **B.Sc. in Astronomy**
Department of Astronomy, Peking University

Awards and Honors

2021–2023 51 Pegasi b Fellowship

2019–2021 Harlan J. Smith McDonald Observatory Fellowship

04/2019 University of Arizona College of Science Excellence in Teaching Award

2015–2018 NASA Earth and Space Science (NESSF) 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): $ 1.0M (Jul. 2023).

- 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.
- 2023 James Webb Space Telescope GO-03181, STScI (PI, pending),
  Monitor a variable planetary mass companion with NIRSpec IFU
- 2023 James Webb Space Telescope GO-03375, STScI (co-PI, pending),
  Dancing 1 - 14 micron spectra to solve the cloudy and chemical puzzle of brown dwarf variability

- 2022 Hubble Space Telescope GO-17280, STScI (Sci PI, 87k),
  Validating and Characterizing the Protoplanet Candidate AB Aur b with WFC3/UVIS UV and Optical Photometry
- 2021 Hubble Space Telescope GO-16651, STScI (Sci PI, $ 133k),
  A Search for Accreting Protoplanets within Transition Disk Gaps.
- 2023B NASA/Keck Observing Support (PI, $ 13k)
  Monitor a variable planetary mass companion with NIRSpec IFU
- 2023A NASA/Keck Observing Support (Sci PI, $ 13k)
  Characterizing the Atmosphere of a Benchmark T Dwarf Companion.
- 2021 NASA/Keck Observing Support (Sci PI, $ 12k)
  The Angular Momentum Archetecture 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.

Selected Observing Programs

As principal investigator:

- JWST Cycle 2 (GO-03181), *Monitor a variable planetary mass companion with NIRSpec IFU*
- JWST Cycle 2 (GO-03375, co-PI), *Dancing 1 - 14 micron spectra to solve the cloudy and chemical puzzle of brown dwarf variability*
- HST Cycle 30 (GO-17280), *Validating and Characterizing the Protoplanet Candidate AB Aur b with WFC3/UVIS UV and Optical Photometry*
- 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 2023B, *Monitor a variable planetary mass companion with NIRSpec IFU*
- Keck 2023A, *Characterizing the Atmosphere of a Benchmark T Dwarf Companion*
- Keck 2021A, *The Angular Momentum Archetecture 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-Investigator:

- JWST Cycle 2 (GO-03947, PI: B. Bowler), *Testing the Giant Planet Hypothesis for Spiral-driven Arms in Protoplanetary Disks*
- JWST Cycle 2 (GO-02965, PI: B. Biller), *Clouds or Chemistry?: Pinpointing the drivers of variability across the L/T transition via the benchmark L/T binary WISE 1049AB*
- JWST Cycle 1 (GO-02640, PI: W. Best), *A Census to the Bottom of the IMF in Westerlund 2: Atmospheres, Disks, Accretion, and Demographics.*
- JWST Cycle 1 (GO-02311, 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, MNRAS, Nature Astronomy, 3–5 manuscripts per year.
- NASA Exoplanet Research Program panel reviewer
- Canadian Time Allocation (CanTAC) Committee
- 2021 UT Austin Department of Astronomy graduate admission committee
- James Webb Space Telescope Proposal Reviewer (Cycle 2)
- 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

- Guest lecturer for graduate-level exoplanet class. Two 75 min lectures.

- 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.

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

2023	Colloquium, Herzberg Astronomy & Astrophysics, National Research Council of Canada
2/2023	Colloquium, University of Virginia, Charllottesville, VA
2/2023	SPF Seminar, University of Michigan, Ann Arbor, MI
1/2023	Origins Seminar, University of Arizona, Tucson, AZ
12/2022	Caltech Tea talk, Caltech, Pasadena, CA
11/2022	SPF Seminar, UT Austin
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.**
11 published first-author papers (+1 submitted). 2 student-led papers.
36 total publications (Jul 2023). Total citations: 1167.

First-author papers:

1. Yifan Zhou, Brendan P. Bowler, Haifeng Yang, et al.
   UV-Optical Emission of AB Aur b is Consistent with Scattered Stellar Light. In: AAS Journals, submitted (2023)

2. Yifan Zhou, Brendan P. Bowler, Dániel Apai, et al.
   Roaring Storms in the Planetary-mass Companion VHS 1256-1257 b: Hubble Space Telescope Multiepoch Monitoring Reveals Vigorous Evolution in an Ultracool Atmosphere. In: AJ 164.6, 239 (Dec. 2022), p. 239. [ADS]

3. Yifan Zhou, Aniket Sanghi, Brendan P. Bowler, et al.
   HST/WFC3 Hα Direct-imaging Detection of a Pointlike Source in the Disk Cavity of AB Aur. In: ApJL 934.1, L13 (July 2022), p. L13. [ADS]

4. Yifan Zhou, Dániel Apai, Xianyu Tan, et al.
   HST/WFC3 Complete Phase-resolved Spectroscopy of White-dwarf-brown-dwarf Binaries WD 0137 and EPIC 2122. In: AJ 163.1, 17 (Jan. 2022), p. 17. [ADS]

5. Yifan Zhou, Brendan P. Bowler, Kevin R. Wagner, et al.
   Hubble Space Telescope UV and Hα Measurements of the Accretion Excess Emission from the Young Giant Planet PDS 70 b. In: AJ 161.5, 244 (May 2021), p. 244. [ADS]

6. Yifan Zhou, Dániel Apai, Luigi R. Bedin, et al.
   Cloud Atlas: High-precision HST/WFC3/IR Time-resolved Observations of Directly Imaged Exoplanet HD 106906b. In: AJ 159.4, 140 (Apr. 2020), p. 140. [ADS]

7. Yifan Zhou, Dániel Apai, Luigi R. Bedin, et al.
   Cloud Atlas: High-precision HST/WFC3/IR Time-resolved Observations of Directly Imaged Exoplanet HD 106906b. In: AJ 159.4, 140 (Apr. 2020), p. 140. [ADS]

8. Yifan Zhou, Dániel Apai, Ben W. P. Lew, et al.
   Cloud Atlas: High-contrast Time-resolved Observations of Planetary-mass Companions. In: AJ 157.3, 128 (Mar. 2019), p. 128. [ADS]

9. Yifan Zhou, Dániel Apai, Stanimir Metchev, et al.
   Cloud Atlas: Rotational Modulations in the L/T Transition Brown Dwarf Companion HN Peg B. in: AJ 155.3, 132 (Mar. 2018), p. 132. [ADS]

10. Yifan Zhou, Dániel Apai, Ben W. P. Lew, et al.
    A Physical Model-based Correction for Charge Traps in the Hubble Space Telescope's Wide Field Camera 3 Near-IR Detector and Its Applications to Transiting Exoplanets and Brown Dwarfs. In: AJ 153.6, 243 (June 2017), p. 243. [ADS]

11. Yifan Zhou, Dániel Apai, Glenn H. Schneider, et al.
    Discovery of Rotational Modulations in the Planetary-mass Companion 2M1207b: Intermediate Rotation

Period and Heterogeneous Clouds in a Low Gravity Atmosphere. In: ApJ 818.2, 176 (Feb. 2016), p. 176. [ADS]

12. Yifan Zhou, Gregory J. Herczeg, Adam L. Kraus, et al.
Accretion onto Planetary Mass Companions of Low-mass Young Stars. In: ApJL 783.1, L17 (Mar. 2014), p. L17. [ADS]

Student-led papers:

13. Aniket Sanghi, Yifan Zhou, and Brendan P. Bowler.
Efficiently Imaging Accreting Protoplanets from Space: Reference Star Differential Imaging of the PDS 70 Planetary System Using the HST/WFC3 Archival PSF Library. In: AJ 163.3, 119 (Mar. 2022), p. 119. [ADS]

14. Zhanbo Zhang, Yifan Zhou, Benjamin V. Rackham, et al.
The Near-infrared Transmission Spectra of TRAPPIST-1 Planets b, c, d, e, f, and g and Stellar Contamination in Multi-epoch Transit Spectra. In: AJ 156.4, 178 (Oct. 2018), p. 178. [ADS]

Co-author papers:

15. Aarynn L. Carter, Sasha Hinkley, Jens Kammerer, et al.
The JWST Early Release Science Program for Direct Observations of Exoplanetary Systems I: High-contrast Imaging of the Exoplanet HIP 65426 b from 2 to 16 μm. In: ApJL 951.1, L20 (July 2023), p. L20. [ADS]

16. Kyle Franson, Brendan P. Bowler, Yifan Zhou, et al.
Astrometric Accelerations as Dynamical Beacons: A Giant Planet Imaged inside the Debris Disk of the Young Star AF Lep. In: ApJL 950.2, L19 (June 2023), p. L19. [ADS]

17. Rachael C. Amaro, Dániel Apai, Yifan Zhou, et al.
Hotter than Expected: Hubble Space Telescope (HST)/WFC3 Phase-resolved Spectroscopy of a Rare Irradiated Brown Dwarf with Strong Internal Heat Flux. In: ApJ 948.2, 129 (May 2023), p. 129. [ADS]

18. Brendan P. Bowler, Quang H. Tran, Zhoujian Zhang, et al.
Rotation Periods, Inclinations, and Obliquities of Cool Stars Hosting Directly Imaged Substellar Companions: Spin-Orbit Misalignments Are Common. In: AJ 165.4, 164 (Apr. 2023), p. 164. [ADS]

19. Zhoujian Zhang, Brendan P. Bowler, Trent J. Dupuy, et al.
The McDonald Accelerating Stars Survey: Architecture of the Ancient Five-planet Host System Kepler-444. In: AJ 165.2, 73 (Feb. 2023), p. 73. [ADS]

20. Brittany E. Miles, Beth A. Biller, Polychronis Patapis, et al.
The JWST Early-release Science Program for Direct Observations of Exoplanetary Systems II: A 1 to 20 μm Spectrum of the Planetary-mass Companion VHS 1256-1257 b. In: ApJL 946.1, L6 (Mar. 2023), p. L6. [ADS]

21. Elspeth K. H. Lee, Joshua D. Lothringer, Sarah L. Casewell, et al.
Sunbathing under white light – 3D modelling of brown dwarf - white dwarf atmospheres with strong UV irradiation. In: arXiv e-prints, arXiv:2203.09854 (Mar. 2022), arXiv:2203.09854. [ADS]

22. Sasha Hinkley, Aarynn L. Carter, Shrishmoy Ray, et al.
The JWST Early Release Science Program for the Direct Imaging and Spectroscopy of Exoplanetary Systems. In: PASP 134.1039, 095003 (Sept. 2022), p. 095003. [ADS]

23. Kayli Glidic, Everett Schlawin, Lindsey Wiser, et al.
Atmospheric Characterization of Hot Jupiter CoRoT-1 b Using the Wide Field Camera 3 on the Hubble Space Telescope. In: AJ 164.1, 19 (July 2022), p. 19. [ADS]

24. Elspeth K. H. Lee, Joshua D. Lothringer, Sarah L. Casewell, et al.
Sunbathing under white light – 3D modelling of brown dwarf - white dwarf atmospheres with strong UV irradiation. In: arXiv e-prints, arXiv:2203.09854 (Mar. 2022), arXiv:2203.09854. [ADS]

25. Taichi Uyama, Chen Xie, Yuhiko Aoyama, et al.
Keck/OSIRIS Paβ High-contrast Imaging and Updated Constraints on PDS 70b. In: AJ 162.5, 214 (Nov. 2021), p. 214. [ADS]

26. Patricio E. Cubillos, Dylan Keating, Nicolas B. Cowan, et al.
Longitudinally Resolved Spectral Retrieval (ReSpect) of WASP-43b. In: ApJ 915.1, 45 (July 2021), p. 45. [ADS]

27. Brendan P. Bowler, Michael Endl, William D. Cochran, et al.
The McDonald Accelerating Stars Survey (MASS): Discovery of a Long-period Substellar Companion Orbiting the Old Solar Analog HD 47127. In: ApJL 913.2, L26 (June 2021), p. L26. [ADS]

28. Ludmila Carone, Paul Mollière, Yifan Zhou, et al.
Indications for very high metallicity and absence of methane in the eccentric exo-Saturn WASP-117b. In: A&A 646, A168 (Feb. 2021), A168. [ADS]

29. Ben W. P. Lew, Dániel Apai, Mark Marley, et al.
Cloud Atlas: Unraveling the Vertical Cloud Structure with the Time-series Spectrophotometry of an Unusually Red Brown Dwarf. In: ApJ 903.1, 15 (Nov. 2020), p. 15. [ADS]

30. Brendan P. Bowler, Yifan Zhou, Caroline V. Morley, et al.
Strong Near-infrared Spectral Variability of the Young Cloudy L Dwarf Companion VHS J1256-1257 b. In: ApJL 893.2, L30 (Apr. 2020), p. L30. [ADS]

31. 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. In: AJ 159.3, 125 (Mar. 2020), p. 125. [ADS]

32. Paulo A. Miles-Páez, Stanimir Metchev, Dániel Apai, 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. In: ApJ 883.2, 181 (Oct. 2019), p. 181. [ADS]

33. Elena Manjavacas, Dániel Apai, Ben W. P. Lew, et al.
Cloud Atlas: Rotational Spectral Modulations and Potential Sulfide Clouds in the Planetary-mass, Late T-type Companion Ross 458C. in: ApJL 875.2, L15 (Apr. 2019), p. L15. [ADS]

34. 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. In: AJ 157.3, 101 (Mar. 2019), p. 101. [ADS]

35. J. J. Spake, D. K. Sing, T. M. Evans, et al.
Helium in the eroding atmosphere of an exoplanet. In: Nature 557.7703 (May 2018), pp. 68–70. [ADS]

36. Elena Manjavacas, Dániel Apai, Yifan Zhou, et al.
Cloud Atlas: Discovery of Rotational Spectral Modulations in a Low-mass, L-type Brown Dwarf Companion to a Star. In: AJ 155.1, 11 (Jan. 2018), p. 11. [ADS]

37. Ben W. P. Lew, Daniel Apai, Yifan Zhou, et al.
Cloud Atlas: Discovery of Patchy Clouds and High-amplitude Rotational Modulations in a Young, Extremely Red L-type Brown Dwarf. In: ApJL 829.2, L32 (Oct. 2016), p. L32. [ADS]