Kyle Franson

Curriculum Vitae

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Education

Ph.D. Astronomy, The University of Texas at Austin Expected Spring 2025
Dissertation: *Efficiently Imaging Giant Planets Around Young Accelerating Stars*
Advisor: Dr. Brendan P. Bowler

M.A. Astronomy, The University of Texas at Austin December 2021
Thesis: *Dynamical Mass of the Young Brown Dwarf Companion HD 984 B*
Advisor: Dr. Brendan P. Bowler

B.S. Physics, University of Michigan Sep. 2015 – May 2019
Minor in Computer Science
Thesis: *Orbit Extension and Refinment for TNOs Found in the Dark Energy Survey*
Advisor: Dr. David W. Gerdes

Positions

The University of Texas at Austin

University Fellow	2024 – Present
NSF Graduate Research Fellow	2021 – 2024
Graduate Research Assistant	2019 – 2021

University of Michigan

Undergraduate Research Assistant	2016 – 2019

Research Interests

- Understanding the formation, evolution, and atmospheres of long-period giant planets.
- Efficiently discovering and imaging new giant planets through astrometric accelerations.
- Testing evolutionary models with direct mass measurements of substellar companions.

Awards and Honors

David Alan Benfield Memorial Fellowship in Astronomy	2024
University Graduate Continuing Fellowship	2024
UT Graduate School Professional Development Award	2022
NSF Graduate Research Fellowship	2021
Frank N. Edmonds, Jr. Memorial Fellowship in Astronomy	2021
McDonald Observatory B.O.V. Student Second Year Defense Award	2021

Grants

James Webb Space Telescope, NASA/STScI

$25k (Sci PI)	Establishing the Formation of AF Lep b with NIRCam: The Lowest-Mass Imaged Exoplanet with a Dynamical Mass	Cycle 2 DD

Keck Observing Support, NASA

$5k (Sci PI)	Establishing the Dynamical Mass and Orbit of AF Lep b	2023
$65k (Sci PI)	Imaging Giant Planets Around Young Accelerating Stars	2021 – 2023

WIYN NN-Explore Observing Support, NASA

$6k (Sci PI)	Optimizing Target Selection of Direct Imaging Planet Campaigns using Accelerating Stars	2021

PI Observing Programs

James Webb Space Telescope		
6.4 hours (PI)	Establishing the Formation of AF Lep b with NIRCam: The Lowest-Mass Imaged Exoplanet with a Dynamical Mass	JWST Cycle 2 DD
Keck Observatory		
6 nights (PI)	Imaging Giant Planets Around Young Accelerating Stars	NASA/Keck (2021A/B, 2022B, 2023A/B) NOIRLab/Keck (2023A, 2024A)
1 night (PI)	Establishing the Dynamical Mass and Orbit of the Giant Planet AF Lep b	NOIRLab/Keck (2024A) NASA/Keck (2023B)
Subaru		
4 nights (PI)	Imaging Giant Planets Around Young Accelerating Stars	Gemini-Subaru Exchange (2022A, 2023A/B, 2024B)
VLT/SPHERE		
56 hours (PI)	Imaging Giant Planets Around Young Accelerating Stars	ESO (P109 – P113)
WIYN		
7.3 nights (PI)	Optimizing Target Selection of Direct Imaging Campaigns using Accelerating Stars	NASA NN-Explore (2021B, 2022B, 2023A, 2024A, 2024B)
SOAR		
2.5 nights (PI)	Optimizing Target Selection of Direct Imaging Campaigns using Accelerating Stars	NOIRLab (2021A, 2021B, 2022B)
MINERVA-Australis		
108 hours (PI)	Enabling Dynamical Mass Measurements of Planets Around Accelerating Stars	NASA NN-Explore (2023A – 2024B)
Hobby-Eberly Telescope		
74 hours (PI)	Enabling Dynamical Mass Measurements of Planets Around Accelerating Stars	McDonald Observatory (2023-1 – 2024-2)
9 hours (PI)	Testing Evolutionary Models with a New Substellar Dynamical Mass	McDonald Observatory (2019-3, 2020-1, 2020-3)
Harlan J Smith Telescope		
22 nights (PI)	Optimizing Target Selection of Direct Imaging Campaigns using Accelerating Stars	McDonald Observatory (2021-3 – 2022-3, 2023-3 – 2024-2)

Scientific Presentations

Contributed Talk	Know Thy Star, Know Thy Planet 2, Pasadena CA	Feb. 2025
Invited Talk	JWST Weekly Briefing, Baltimore MD (virtual)	Jan. 2025
Contributed Dissertation Talk	AAS 245, National Harbor MD	Jan. 2025
Invited Talk	STScI ESPF Seminar, Baltimore MD	Dec. 2024
Invited Talk	CIERA Observational Astro Seminar, Evanston IL	Nov. 2024
Invited Talk	Caltech Seminar, Pasadena CA	Nov. 2024
Invited Talk	UT San Antonio Seminar, San Antonio TX	Oct. 2024
Invited Talk	University of Michigan SPF Seminar, Ann Arbor MI	Sep. 2024
Contributed Plenary Talk	Exoplanets V, Leiden NL	June 2024
Invited Talk	UC Santa Cruz PLUNCH Seminar, Santa Cruz CA	May 2024
Invited Talk	University of Hawaii IfA Seminar, Honolulu HI	April 2024
Contributed Talk	AAS 243 Winter Meeting, New Orleans LA	Jan. 2024
Invited Talk	Notre Dame Astrophysics Seminar, South Bend IN	Sep. 2023
Contributed Talk	GMT Community Science Meeting, Washington DC	Sep. 2023
Invited Talk	Exocoffee Seminar, MPIA (virtual)	July 2023
Contributed Talk	ERES VII, New Haven CT	June 2023

Contributed Talk	SACNAS NDiSTEM Conference, San Juan PR	Oct. 2022
Contributed Talk	Keck Science Meeting, Pasadena CA	Sep. 2022
Contributed Talk	In the Spirit of Lyot 2022, Leiden NL	June 2022

Publications

First-author publications: 5, Total publications: 26

First-Author Publications:

5. JWST/NIRCam 4–5 μm Imaging of the Giant Planet AF Lep b
Franson, K.; Balmer, W. O.; Bowler, B. P.; et al. [26 total]; 2024, ApJL, 974, L11

4. Astrometric Accelerations as Dynamical Beacons: A Giant Planet Imaged inside the Debris Disk of the Young Star AF Lep
Franson, K.; Bowler, B. P.; Zhou, Y.; et al. [16 total]; 2023, ApJL, 950, L19

3. Dynamical Mass of the Young Brown Dwarf Companion PZ Tel B
Franson, K.; Bowler, B. P.; 2023, AJ, 165, 246

2. Astrometric Accelerations as Dynamical Beacons: Discovery and Characterization of HIP 21152 B, the First T-Dwarf Companion in the Hyades
Franson, K.; Bowler, B. P.; Bonavita, M.; et al. [31 total]; 2023, AJ, 165, 39

1. Dynamical Mass of the Young Substellar Companion HD 984 B
Franson, K.; Bowler, B. P.; Brandt, T. D.; Dupuy, T. J.; Tran, Q. H.; Brandt, G. M.; Li, Y.; Kraus, A. L.; 2022, AJ, 163, 50

Second-Author and Third-Author Publications:

2. VLTI/GRAVITY Observations of AF Lep b: Preference for Circular Orbits, Cloudy Atmospheres, and a Moderately Enhanced Metallicity
Balmer, William O.; **Franson, K.**; Chomez, A.; et al. [30 total]; 2025, AJ, 169, 30

1. The Keck-HGCA Pilot Survey - II. Direct imaging discovery of HD 63754 B, a 20 au massive companion near the hydrogen burning limit
Li, Yiting; Brandt, T. D., **Franson, K.**; et al. [18 total]; 2024, MNRAS, 533, 3501

Additional Co-Author Publications:

19. The JWST Early Release Science Program for Direct Observations of Exoplanetary Systems. V. Do Self-consistent Atmospheric Models Represent JWST Spectra? A Showcase with VHS 1256–1257 b
Petrus, S.; Whiteford, N.; Patapis, P; et al. [122 total]; 2024, ApJL, 966, L11

18. Deep Paβ Imaging of the Candidate Accreting Protoplanet AB Aur b
Biddle, L. I.; Bowler, B. P.; Zhou, Y.; **Franson, K.**; Zhang, Z.; 2024, AJ, 164, 172

17. The discovery of two new benchmark brown dwarfs with precise dynamical masses at the stellar-substellar boundary
Rickman, E. L.; Ceva, W.; Matthews, E. C.; Ségransan, D.; Bowler, B. P.; Forveille, T.; **Franson, K.**; Hagelberg, J.; Udry, S.; Vigan, A.; 2024, A&A, 684, A88

16. The JWST Early Release Science Program for Direct Observations of Exoplanetary Systems. IV. NIRISS Aperture Masking Interferometry Performance and Lessons Learned
Sallum, S.; Ray, S.; Kammerer, J.; et al. [123 total]; 2024, ApJL, 963, L2

15. ELemental abundances of Planets and brown dwarfs Imaged around Stars (ELPIS). I. Potential Metal Enrichment of the Exoplanet AF Lep b and a Novel Retrieval Approach for Cloudy Self-luminous Atmospheres
Zhang, Z.; Mollière, P.; Hawkins, K.; Manea, C.; Fortney, J. J.; Morley, C. V.; Skemer, A.; Marley, M. S.; Bowler, B. P.; Carter, A. L.; **Franson, K.**; Maas, Z. G.; Sneden, C.; AJ, 166, 198

14. Surveying nearby brown dwarfs with HGCA: direct imaging discovery of a faint, high-mass brown dwarf orbiting HD 176535 A
Li, Y.; Brandt, T. D.; Brandt, G. M.; et al. [20 total]; 2023, MNRAS, 522, 5622

13. 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
Carter, A. L.; Hinkley, S.; Kammerer, J.; et al. [111 total]; 2023, ApJL, 951, L20

12. Rotation Periods, Inclinations, and Obliquities of Cool Stars Hosting Directly Imaged Substellar Companions: Spin-Orbit Misalignments Are Common
Bowler B. P.; Tran, Q. H.; Zhang, Z.; Morgan, M.; Ashok, K. B.; Blunt, S.; Bryan, M. L.; Evans, A. E.; **Franson, K.**; Huber, D.; Nagpal, V.; Wu, Y.; Zhou, Y.; 2023, AJ, 165, 164

11. 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
Miles, B. E.; Biller, B. A.; Patapis, P.; et al. [111 total]; 2023, ApJL, 946, L6

10. The McDonald Accelerating Stars Survey: Architecture of the Ancient Five-planet Host System Kepler-444
Zhang, Z.; Bowler, B. P.; Dupuy, T. J.; et al. [14 total]; 2023, AJ, 165, 2

9. A Jupiter Analog Orbiting The Nearby M Dwarf GJ 463
Endl, M.; Robertson, P.; Cochran, W. D.; MacQueen, P. J.; Bowler, B. P.; **Franson, K.**; Holcomb, R.; Beard, C.; Isaacson, H.; Howard, A. W.; Lubin, J.; 2022, AJ, 164, 6

8. A Mini-Neptune from TESS and CHEOPS Around the 120 Myr Old AB Dor Member HIP 94235
Zhou, G.; Wirth, C. P.; Huang, C. X.; et al. [39 total]; 2022, AJ, 163, 289

7. The McDonald Accelerating Stars Survey (MASS): Discovery of a Long-period Substellar Companion Orbiting the Old Solar Analog HD 47127
Bowler, B. P.; Endl, M.; Cochran, W. D.; et al. [15 total]; 2021, ApJL, 913, L26

6. The McDonald Accelerating Stars Survey (MASS): White Dwarf Companions Accelerating the Sun-like Stars 12 Psc and HD 159062
Bowler, B. P.; Cochran, W. C.; Endl, M.; **Franson, K.**; Brandt, T. D.; Dupuy, T. J.; MacQueen, P. J.; Kratter, K. M.; Mawet, D.; Ruane, G.; 2021, AJ, 161, 106

5. Dynamical Classification of Trans-Neptunian Objects Detected by the Dark Energy Survey
Khain, T.; Becker, J. C.; Lin, H. W.; et al. [56 total]; 2020, AJ, 159, 133

4. Trans-Neptunian Objects Found in the First Four Years of the Dark Energy Survey
Bernardinelli, P. H.; Bernstein, G. M.; Sako, M.; et al. [65 total]; 2020, ApJS, 247, 32

3. Evidence for color dichotomy in the primordial Neptunian Trojan population
Lin, H. W.; Gerdes, D. W.; Hamilton, S. J.; et al. [48 total]; 2019, Icarus, 321, 426

2. Dynamical Analysis of Three Distant Trans-Neptunian Objects with Similar Orbits
Khain, T.; Becker, J. C.; Adams, F. C.; et al. [66 total]; 2018, AJ, 156, 6

1. Discovery and Dynamical Analysis of an Extreme Trans-Neptunian Object with a High Orbital Inclination
Becker, J. C.; Khain, T.; Hamilton, S. J.; et al. [66 total]; 2018, AJ, 156, 81

Service and Outreach

Referee for A&A, ApJ	2023 – Present
TAURUS/REU Programs	
Seminar Co-Lead	Summer 2022 – Present
Informal Mentor	Summer 2021 – Present
Starbound Foundation (*Elementary School Planetarium Outreach*)	
Co-Organizer & Volunteer	Fall 2021 – Present
UT Girl Day Volunteer	Spring 2020 – Present
Equity & Inclusion Discussion Group	Spring 2020 – Present
Secretary	Fall 2024 – Present
UT Astronomy Undergraduate Mentor	Spring 2019 – Present

Press Coverage

- **A Giant Planet Imaged Inside the Debris Disk of the Young Star AF Lep** (Franson et al. 2023): [NYTimes], [Sky & Telescope], [Universe Today], [Keck Observatory], [McDonald Observatory]