Casey Brinkman

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Professional Appointments

Trottier Space Institute Fellow — **Montréal, QC, Canada**
McGill University, Supervisor: Nic Cowan — *2025-Present*

Education

Ph.D. in Astronomy, University of Hawai'i at Mānoa Institute for Astronomy — **Honolulu, HI**
Advisors: Dan Huber and Lauren Weiss — *2018 – 2024*
Planets Made of Star Stuff: The Diversity of Earth-Sized Exoplanet Compositions In Relation To Their Host Star

B.S. in Physics (Honors), University of Vermont — **Burlington, VT**
Advisors: Joanna Rankin and Dipanjan Mitra — *2013 – 2017*

Relevant Employment

Berkeley SETI Research Center, University of California at Berkeley — **Berkeley, CA**
Intern/Junior Specialist — *2017-2018*

Awards and Honors

Graduate: NSF Graduate Research Fellowship Recipient — *Fall 2020-Fall 2024*
SETI Forward Prize (at Drake Awards) — *Spring 2019*
Rodger Doxsey Travel Prize — *Fall 2023*
Undergraduate: David Juenker Prize for Academic Excellence in Physics — *Spring 2017*
College of Arts and Sciences Honors — *Spring 2017*

Research Highlights

I study the diversity of Earth-sized exoplanet compositions in relation to their host stars. I use ground-based radial velocity instruments to measure planet masses, space-based photometry to measure planet radius, and geologically informed modeling to discover the compositions of rocky planets. Since planets and their host stars are born from the same primordial Star Stuff, I then compare the chemical composition of the planets to that of the star they orbit. So far, my work:

- Demonstrated that many "Super-Mercuries" are actually Earth-like, and questions whether they exist at all.
- Explores the existence of gaseous envelopes around small planets and the possibility of an evaporated silicate mantel.
- Suggests a direct relationship between planet composition and host star abundances instead of a steep correlation.

Publications

6 First Author | 31 Contributing Author (listed at end of CV)| >1000 Total Citations | h-index 13 | ADS Library

- "The Compositions of Rocky Planets in Close-In Orbits Tend to be Earth-like", **Casey Brinkman**, Lauren Weiss, Daniel Huber et al., Submitted 2024
- "Revisiting the Relationship Between Rocky Exoplanet and Stellar Compositions: Reduced Evidence for a Super-Mercury Population", **Casey Brinkman**, Alex Polanski, Daniel Huber et al. 2024, AJ 168, 281
- "TOI-561 b: A Low Density Ultra-Short Period "Rocky" Planet around a Metal-Poor Star", **Casey Brinkman**, Lauren M Weiss, Fei Dai et al. 2023, AJ 165, 3
- "Kepler-102: Masses and Compositions for a Super-Earth and Sub-Neptune Orbiting an Active Star", **Casey Brinkman**, James Cadman, Lauren Weiss et al., 2023, AJ 165, 2.
- "Investigation of the mode-switching phenomenon in pulsar B0329+54 through polarimetric analysis", **Casey Brinkman**, Dipanjan Mitra, and Joanna Rankin 2019, MNRAS 484, 2.
- "No Pulsar Left Behind: Timing, pulse-sequence polarimetry and emission morphology for 12 pulsars"**Casey Brinkman**, Paulo Freire, Joanna Rankin, and Kevin Stovall 2017, MNRAS 474, 2

Selected Conferences and Presentations

Talks: Extreme Solar Systems V, Christchurch — *March 2024*
American Astronomical Society Meeting, New Orleans — *January 2024*
Rocky Worlds II, Oxford — *July 2022*
Keck Science Meeting, Pasadena — *September 2024*
Keck Science Meeting, Virtual — *September 2021*

Invited Seminar, Harvard-Smithsonian Center for Astrophysics *Sept 2024*
Invited Seminar, Trottier Institute for Research on Exoplanets *Sept 2024*
Invited Seminar, University of Notre Dame Department of Physics *January 2022*
Posters: TESS/Kepler Astroseismic Consortium, Honolulu *July 2023*
Protostars and Planets VII, Kyoto *April 2023*

Observing Experience and Time Allocation

Keck Observatory: 9 nights awarded, 38 nights observing experience *Fall 2020-Fall 2023*
Gemini North Observatory: 9 nights awarded *Fall 2020-Fall 2023*
Canada France Hawaii Telescope: 5 hours awarded *Fall 2020-Fall 2023*
Green Bank Observatory: 50 hours observing experience *Summer 2017-Summer 2018*
Parkes Radio Telescope: 140 hours observing experience *Summer 2017-Summer 2018*
Arecibo Observatory: 70 hours observing experience *Spring 2014-Spring2017*

Teaching

Lab: Primary Instructor, Introductory Astronomy *Fall 2019 - Spring 2020*
Teaching Assistant, Introductory Astronomy *Fall 2018 - Spring 2019*
Class: Teaching Assistant, Introductory and Upper Level Astronomy *Fall 2018 - Spring 2020*
Undergraduate: Teaching Assistant and Primary Lab Instructor *Fall 2015 – Spring 2017*
Recitation Leader and Grader *Fall 2015 – Spring 2017*

Service and Outreach

Graduate Student Representative *Fall 2021-Fall 2022*
EquiTea Founder and Member *Fall 2020-Present*
Academic Labor United Organizing Chair *Fall 2021-Spring 2023*
Graduate Student Organization, Department Representative *Fall 2019-Fall 2020*
Maunakea Scholars Program Mentor *Fall 2018 – Spring 2024*
UH Institute for Astronomy Outreach, 30+ Events *Autumn 2018 - Summer 2024*

Professional References

Dr. Daniel Huber: University of Hawaii at Manoa | Primary Dissertation Advisor | huberd@hawaii.edu
Dr. Lauren Weiss: University of Notre Dame | Co-Dissertation Advisor | lmweiss4@nd.edu
Dr. Diana Valencia: University of Toronto | Research Collaborator | diana.valencia@utoronto.edu

Additional Papers

- "TOI-6324b: An Earth-Mass Ultra-Short-Period Planet Transiting a Nearby M Dwarf", Lee, Dai, Howard et al. including Brinkman, AJ, Submitted 2025
- "Planet Masses, Radii, and Orbits from NASA's K2 Mission", Howard, Sinukoff, Blunt et al. including Brinkman, ApJS, Accepted 2025
- "TESS Giants Transiting Giants. VI. Newly Discovered Hot Jupiters Provide Evidence for Efficient Obliquity Damping after the Main Sequence", Saunders, Grunblatt, Chontos et al. including Brinkman, AJ, 168, 2 (2024)
- "An Earth-sized Planet on the Verge of Tidal Disruption", Dai, Howard, Halverson et al. including Brinkman, AJ 2024
- "The California Legacy Survey V. Chromospheric Activity Cycles in Main Sequence Stars", Isaacson, Howard, Fulton et al. including Brinkman, ApJS 2024
- "The TESS-Keck Survey XX: 15 New TESS Planets and a Uniform RV Analysis of all Survey Targets", Polanski, Lubin, Beard et al. including Brinkman, AJ 2024
- "The TESS-Keck Survey. XXII. A sub-Neptune Orbiting TOI-1437", Pidhorodetska, Gilbert, Kane et al. including Brinkman, AJ 2024
- "Planet Hunters TESS V: a planetary system around a binary star, including a mini-Neptune in the habitable zone", Eisner, Grunblatt, Barragan et al. including Brinkman, AJ 2024
- "A Tale of Two Peas-In-A-Pod: The Kepler-323 and Kepler-104 Systems", Thomas, Weiss, Isaacson et al. including Brinkman, AJ 2024
- "The TESS-Keck Survey. XII. A Dense 1.8 R Ultra-Short-Period Planet Possibly Clinging to a High-Mean-Molecular-Weight Atmosphere After the First Gyr", Rubenzahl, Dai, Howard et al. including Brinkman, AJ 2024
- "The TESS-Keck Survey. XVIII. A sub-Neptune and spurious long-period signal in the TOI-1751 system", Desai, Turtelboom, Harada et al. including Brinkman, AJ 2024
- "Giant Outer Transiting Exoplanet Mass (GOT 'EM) Survey. IV. Long-term Doppler Spectroscopy for 11 Stars Thought to Host Cool Giant Exoplanets", Dalba, Kane, Isaacson et al. including Brinkman, AJ 2024
- "The TESS-Keck Survey XVII: Precise Mass Measurements in a Young, High Multiplicity Transiting Planet System using Radial Velocities and Transit Timing Variations", Beard, Robertson, Dai et al. including Brinkman, AJ 2023
- "TESS Giants Transiting Giants V – Two hot Jupiters orbiting red-giant hosts", Pereira, Grunblatt, Psaridi et al. including Brinkman, MNRAS 2023

- "Investigating the Atmospheric Mass Loss of the Kepler-105 Planets Straddling the Radius Gap", Householder, Weiss, Owen et al. including Brinkman, AJ 2023
- "The TESS-Keck Survey. XVI. Mass Measurements for 12 Planets in Eight Systems", Murphy, Batalha, Scarsdale et al. including Brinkman, AJ 2023
- "A close-in giant planet escapes engulfment by its star", Hon, Huber, Rui et al. including Brinkman, Nature 2023
- "The TESS-Keck Survey. XV. Precise Properties of 108 TESS Planets and Their Host Stars", MacDougall, Petigura, Gillbert et al. including Brinkman, AJ 2023
- "The Kepler Giant Planet Search. I: A Decade of Kepler Planet-host Radial Velocities from W. M. Keck Observatory", Weiss, Isaacson, Howard et al. including Brinkman, AJ 2023
- "TOI-1136 is a Young, Coplanar, Aligned Planetary System in a Pristine Resonant Chain", Dai, Matsuda, Beard et al. including Brinkman, AJ 2022
- "A Tendency Toward Alignment in Single-Star Warm Jupiter Systems", Rice, Wang, Wang et al. including Brinkman, AJ 2022
- "The TESS-Keck Survey. XIII. An Eccentric Hot Neptune with a Similar-Mass Outer Companion around TOI-1272", MacDougall, Petigura, Fetherolf et al. including Brinkman, AJ 2022
- "The TESS-Keck Survey. XI. Mass Measurements for Four Transiting sub-Neptunes orbiting K dwarf TOI-1246", Turtelboom, Weiss, Dressing et al. including Brinkman, AJ 2022
- "The TESS-Keck Survey. VIII. Confirmation of a Transiting Giant Planet on an Eccentric 261 day Orbit with the Automated Planet Finder Telescope", Dalba, Kane, Dragomir et al. including Brinkman, AJ 2022
- "TESS Giants Transiting Giants II: The hottest Jupiters orbiting evolved stars", Grunblatt, Saunders, Sun et al. including Brinkman, AJ 2022
- "The TESS-Keck Survey. VI. Two Eccentric sub-Neptunes Orbiting HIP-97166", MacDougall, Petigura, Angelo et al. including Brinkman, AJ 2021
- "Stellar Obliquities in Long-period Exoplanet Systems (SOLES) I: The Spin-Orbit Alignment of K2-140 b", Rice, Wang, Howard et al. including Brinkman, AJ 2021
- "Constraining the Orbit and Mass of epsilon Eridani b with Radial Velocities, Hipparcos IAD-Gaia DR2 Astrometry, and Multi-epoch Vortex Coronagraphy Upper Limits", Llop-Sayson, Wang, Ruffio et al. including Brinkman, AJ 2021
- "TKS X: Confirmation of TOI-1444b and a Comparative Analysis of the Ultra-short-period Planets with Hot Neptunes", Dai, Howard, Batalha et al. including Brinkman, AJ 2021
- "An extreme magneto-ionic environment associated with the fast radio burst source FRB 121102", Michilli, Seymoure, Hessels et al. including Brinkman, Nature 2018
- "Highest Frequency Detection of FRB 121102 at 4-8 GHz Using the Breakthrough Listen Digital Backend at the Green Bank Telescope", Gajjar, Siemion, Price et al. including Brinkman, ApJ 2018