Jonathan Brande

jbrande@ku.edu, jbrande.github.io

PhD Candidate, Department of Physics and Astronomy, University of Kansas

Education

2020 – (**Expected 2025**): PhD Physics, Dept. of Physics & Astronomy, University of Kansas

2020 – (**Expected 2024**): MS Computational Physics, Dept. of Physics & Astronomy, University of Kansas

2013 – 2017: BS Astronomy, Minor Computer Science, Dept. of Astronomy, University of Maryland, College Park

Research and Employment

2020 – Present: PhD Research - KU Dept. of Physics & Astronomy

Characterization of transiting planets in the Neptune Desert with transmission spectroscopy from ground and space. Discovered evidence of water vapor on warm Neptune TOI-674 b. Contributing to `Eureka!`, a JWST time-series spectroscopic reduction/analysis pipeline and applying it to JWST data through the Transit-ERS team. Advisor - Prof. Ian Crossfield

Fall 2020: Graduate TA - KU Dept. of Physics & Astronomy

Taught, graded three sections of introductory physics labs. Supervisor - Prof. Jennifer Delgado

2018 – 2020: Faculty Research Asst. - NASA Goddard, UMD Dept. of Astronomy

Exoplanet tool development and validation for the Exoplanet Modeling and Analysis Center. Advisor - Dr. Avi Mandell

Simulated the feasibility of using JWST/MIRI for direct imaging of gaseous planets around nearby M-dwarfs. Advisors - Dr. Thomas Barclay, Dr. Elisa Quintana

TESS planet discovery and characterization with lightcurve modeling and transit timing variation analyses of TESS targets, including the L98-59 system. Advisors - Dr. Thomas Barclay, Dr. Elisa Quintana

2017 – 2018: Undergraduate Research - UMD Dept. of Astronomy

Efficient algorithms for representing the complex gravity fields of asteroids using analytic evaluations of the gravity of cubic mass elements. Advisor - Prof. Doug Hamilton

Astronomy Education Tools - Also produced a 3-D orbital visualization tool for the Department's Astronomy Workshop website, to support Dr. Hamilton's astronomy education efforts.

2017: Undergraduate Tutoring Coordinator - UMD Dept. of Astronomy

4 hours/wk tutoring, acting tutor/faculty liaison, scheduled student tutoring hours.

2016: NASA Space Grant Intern, Harvard/Smithsonian CfA, Chandra X-Ray Center

Developed 3D telemetry display to allow at-a-glance health and status diagnostics of Chandra spacecraft. - Supervisor - Mark Baski

2013 – 2015: Summer Intern, Engineering and Innovative Technology Development Lab, Univ. Alabama at Birmingham

Developed telemetry monitoring software to support UAB-developed "Polar" cold stowage hardware. Supervisor - Dr. Lee Moradi

Publications

refereed: 20 / first author: 3 / citations: 731 / h-index: 11 (2024-04-05)

First-Author Publications

Brande, Jonathan; Crossfield, Ian J. M.; Kreidberg, Laura; Morley, Caroline V.; *et al.*, 2024, *Clouds and Clarity: Revisiting Atmospheric Feature Trends in Neptune-size Exoplanets*, The Astrophysical Journal, **961** (arXiv:2310.07714)

Brande, Jonathan; Crossfield, Ian J. M.; Kreidberg, Laura; Oklopčić, Antonija; *et al.*, 2022, *A Mirage or an Oasis? Water Vapor in the Atmosphere of the Warm Neptune TOI-674 b*, The Astronomical Journal, **164**, 197 (arXiv:2201.04197) [5 citations]

Brande, Jonathan; Barclay, Thomas; Schlieder, Joshua E.; Lopez, Eric D.; & Quintana, Elisa V., 2020, *The Feasibility of Directly Imaging Nearby Cold Jovian Planets with MIRI/JWST*, The Astronomical Journal, **159**, 18 (arXiv:1911.02022) [7 citations]

Refereed Publications

Powell, Diana; Feinstein, Adina D.; Lee, Elspeth K. H.; Zhang, Michael; *et al.* (incl. **Brande, J.**), 2024, *Sulfur dioxide in the mid-infrared transmission spectrum of WASP-39b*, Nature, **626**, 979

Roy, Pierre-Alexis; Benneke, Björn; Piaulet, Caroline; Gully-Santiago, Michael A.; *et al.* (incl. **Brande, J.**), 2023, *Water Absorption in the Transmission Spectrum of the Water World Candidate GJ 9827 d*, The Astrophysical Journal, **954** (arXiv:2309.10845) [5 citations]

Hejazi, Neda; Crossfield, Ian J. M.; Nordlander, Thomas; Mansfield, Megan; *et al.* (incl. **Brande, J.**), 2023, *Elemental Abundances of the Super-Neptune WASP-107b's Host Star Using High-resolution, Near-infrared Spectroscopy*, The Astrophysical Journal, **949**, 79 (arXiv:2304.03808) [2 citations]

JWST Transiting Exoplanet Community Early Release Science Team; Ahrer, Eva-Maria; Alderson, Lili; Batalha, Natalie M.; *et al.* (incl. **Brande, J.**), 2023, *Identification of carbon dioxide in an exoplanet atmosphere*, Nature, **614**, 649 (arXiv:2208.11692) [108 citations]

Rustamkulov, Z.; Sing, D. K.; Mukherjee, S.; May, E. M.; *et al.* (incl. **Brande, J.**), 2023, *Early Release Science of the exoplanet WASP-39b with JWST NIRSpec PRISM*, Nature, **614**, 659 (arXiv:2211.10487) [101 citations]

Feinstein, Adina D.; Radica, Michael; Welbanks, Luis; Murray, Catriona Anne; *et al.* (incl. **Brande, J.**), 2023, *Early Release Science of the exoplanet WASP-39b with JWST NIRISS*, Nature, **614**, 670 (arXiv:2211.10493) [71 citations]

Alderson, Lili; Wakeford, Hannah R.; Alam, Munazza K.; Batalha, Natasha E.; *et al.* (incl. **Brande, J.**), 2023, *Early Release Science of the exoplanet WASP-39b with JWST NIRSpec G395H*, Nature, **614**, 664 (arXiv:2211.10488) [89 citations]

Ahrer, Eva-Maria; Stevenson, Kevin B.; Mansfield, Megan; Moran, Sarah E.; *et al.* (incl. **Brande, J.**), 2023, *Early Release Science of the exoplanet WASP-39b with JWST NIRCam*, Nature, **614**, 653 (arXiv:2211.10489) [65 citations]

Bell, Taylor; Ahrer, Eva-Maria; **Brande, Jonathan**; Carter, Aarynn; *et al.*, 2022, *Eureka!: An End-to-End Pipeline for JWST Time-Series Observations*, The Journal of Open Source Software, **7**, 4503 (arXiv:2207.03585) [31 citations]

Damiano, Mario; Hu, Renyu; Barclay, Thomas; Zieba, Sebastian; *et al.* (incl. **Brande, J.**),

2022, *A Transmission Spectrum of the Sub-Earth Planet L98-59 b in 1.1-1.7 μm*, The Astronomical Journal, **164**, 225 (arXiv:2210.10008) [7 citations]

Crossfield, Ian J. M.; Malik, Matej; Hill, Michelle L.; Kane, Stephen R.; *et al.* (incl. **Brande, J.**), 2022, *GJ 1252b: A Hot Terrestrial Super-Earth with No Atmosphere*, The Astrophysical Journal, **937** (arXiv:2208.09479) [18 citations]

Renaud, Joe P.; Lopez, Eric; **Brande, Jonathan**; Cruz-Arce, Carlos E.; *et al.*, 2022, *The Exoplanet Modeling and Analysis Center at NASA Goddard*, Research Notes of the American Astronomical Society, **6**, 185 (arXiv:2209.04005)

Cacciapuoti, Luca; Kostov, Veselin B.; Kuchner, Marc; Quintana, Elisa V.; *et al.* (incl. **Brande, J.**), 2022, *The TESS Triple-9 Catalog: 999 uniformly vetted exoplanet candidates*, Monthly Notices of the Royal Astronomical Society, **513**, 102 (arXiv:2203.15826) [10 citations]

Kostov, Veselin B.; Kuchner, Marc J.; Cacciapuoti, Luca; Acharya, Sovan; *et al.* (incl. **Brande, J.**), 2022, *Planet Patrol: Vetting Transiting Exoplanet Candidates with Citizen Science*, Publications of the Astronomical Society of the Pacific, **134**, 44401 [3 citations]

Gilbert, Emily A.; Barclay, Thomas; Schlieder, Joshua E.; Quintana, Elisa V.; *et al.* (incl. **Brande, J.**), 2020, *The First Habitable-zone Earth-sized Planet from TESS. I. Validation of the TOI-700 System*, The Astronomical Journal, **160**, 116 (arXiv:2001.00952) [90 citations]

Vidaurri, Monica; Wofford, Alia; **Brande, Jonathan**; Black-Planas, Gabriel; *et al.*, 2020, *Absolute Prioritization of Planetary Protection, Safety, and Avoiding Imperialism in All Future Science Missions: A Policy Perspective*, Space Policy, **51**, 101345 (arXiv:1907.05834) [2 citations]

Kostov, Veselin B.; Schlieder, Joshua E.; Barclay, Thomas; Quintana, Elisa V.; *et al.* (incl. **Brande, J.**), 2019, *The L 98-59 System: Three Transiting, Terrestrial-size Planets Orbiting a Nearby M Dwarf*, The Astronomical Journal, **158**, 32 (arXiv:1903.08017) [100 citations]

Preprints & White Papers

Barclay, Thomas; Sheppard, Kyle B.; Latouf, Natasha; Mandell, Avi M.; *et al.* (incl. **Brande, J.**), 2023, *The transmission spectrum of the potentially rocky planet L 98-59 c*, ArXiv (arXiv:2301.10866) [7 citations]

Invited Talks

Clouds and Clarity: Revisiting Atmospheric Feature Trends in Neptune-size Exoplanets
2023, `petitRADTRANS` Atmospheric Retrieval Workshop, MPIA Heidelberg.

Clouds and Clarity: Revisiting Atmospheric Feature Trends in Neptune-size Exoplanets
2023, JPL Virtual Exoplanet Lecture Series.

Clouds and Clarity: Revisiting Atmospheric Feature Trends in Neptune-size Exoplanets
2023, American Museum of Natural History, Astro-Seminar.

JWST's First Year of Science
2023, Astronomical Society of Kansas City, March General Meeting.

Planets and Stars from Ground and Space: Research at the KU ExoLab
2022, Exoplanet Seminar, Carnegie Institution for Science, Earth and Planets Laboratory.

Water Vapor in the Atmosphere of TOI-674 b
2022, ExoCoffee, Atmospheric Physics of Exoplanets Dept., MPIA Heidelberg

Exoplanet Science With JWST,
2021, Nebraska Physics & Astronomy Summit, University of Nebraska, Lincoln
The Invisible Sky With JWST,
2021, Ruckman Public Lecture, University of Nebraska, Lincoln
Exploring Exoplanets,
2021, At-Home Planetarium Series, Fernbank Science Center
Exoplanets @ NASA,
2020, Terrapin Astronomical Society, University of Maryland, College Park
The Feasibility of Directly Imaging Cold Planets with MIRI/JWST,
2019, Sciences and Exploration Directorate Director's Seminar, NASA Goddard Space Flight Center
Planet Hunting with the James Webb Space Telescope,
2019, University of Maryland Observatory Open House, University of Maryland, College Park

Proposals Awarded Time

IRTF 2021A027 (PI: Crossfield) *The Helium Exosphere of a TESS-Discovered Warm Neptune* - 3 half-nights
HST Cycle 27, GO 15856 (PI: Barclay), *Searching for Secondary Atmospheres in a System of Benchmark Worlds* - 28 orbits
HST Cycle 28, GO 16448 (PI: Barclay), *Confirming a tentative detection of an atmosphere around a potentially rocky planet* - 8 orbits
JWST Cycle 2, AR 3207 (PI: Gao), *Lifting the Veil: An Open Source Haze Model for Exoplanet Atmospheric Characterization*
JWST Cycle 2, GO 3231 (PI: Crossfield), *Panchromatic Phase Curve of the Highest-S/N Hot Neptune* - 25 hours
JWST Cycle 2, AR 3273 (PI: Stevenson), *Eureka!: An Open-Source Pipeline for JWST Time-Series Observations*
JWST Cycle 3, GO 5959 (PI: Feinstein), *KRONOS: Keys to Revealing the Origin and Nature Of sub-neptune Systems* - 130 hours
WIYN/NEID 2024A-635910 (PI: Crossfield) *A3C RVs: Atmospheres, Activity, Architectures, & Compositions of Sub-Neptunes* - 1.24 nights
Keck/KPF NASA Key Strategic Mission Support - 2024A-N080 (PI: Crossfield) *A3C RVs: Atmospheres, Activity, Architectures, & Compositions of Sub-Neptunes with KPF* - 10 nights

Observing Experience

IRTF/iSHELL - 1.5 nights

Keck/NIRC2 - 2 nights

Keck/KPF - 3.5 nights

Awards and Honors

Graduate Student Travel Award, Department of Physics & Astronomy, University of Kansas, 2024 - *$750*

Summer Graduate Research Scholarship, University of Kansas, 2023 - *$6,000*

Professional Service & Outreach Efforts

Astrobites Science Writer, 2022 – Present

Letters to a Pre-Scientist Pen Pal, 2022 – 2023

KU Astronomy Nights, Public Telescope Observing and Planetarium Shows, 2021 – Present

Referee: The Astronomical Journal

Graduate Student Representative, Dept. of Physics & Astronomy Department Assembly, 2021 – Present

Executive Secretary: TESS GI Program, NASA-ROSES XRP

LOC, NASA GSFC SEEC Symposium 2019: "Rocky Exoplanets in the Era of JWST: Theory and Observation"

International Observe the Moon Night, NASA GSFC, 2019

Apollo 50 Festival, National Mall, NASA GSFC, 2019

Great American Eclipse, Camp Ramah Darom, GA, 2017