Dr. Joshua D. Lothringer

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Department of Physics and Astronomy, Johns Hopkins University
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Research Interests Planetary, Exoplanetary, Brown Dwarf, and Stellar Atmospheres

Education

Doctor of Philosophy, Planetary Science 08/2014-08/2019
Master of Science, Planetary Science 12/2016
University of Arizona, Tucson, AZ
Advisor: Prof. Travis Barman
Dissertation: *Characterizing the Atmospheres of Planet Populations: From Sub-Jovian to Ultra-hot Jupiter Exoplanets*

Bachelor of Arts, Astronomy 08/2010-12/2013
University of Colorado, Boulder CO
Concentration: Astrophysics
Minor: Philosophy

Research and Technical Experience

Postdoctoral Fellow 08/2019-Present
Department of Physics and Astronomy, Johns Hopkins University
Baltimore, MD

- Modeling, retrieving, and observing exoplanet atmospheres with Prof. David Sing.

Graduate Assistant/Associate 08/2014-08/2019
Lunar and Planetary Laboratory
Tucson, AZ

- Observed and modeled sub-Jovian and hot Jupiter atmospheres with Prof. Travis Barman and Prof. Ian Crossfield. Developed the PHOENIX Exoplanet Retrieval Algorithm (PETRA).

Undergraduate Research Assistant 10/2012-08/2014
Laboratory for Atmospheric and Space Physics
Boulder, CO

- Developed data reduction procedures and efficient atmospheric model retrievals for the Imaging Ultra-Violet Spectrometer (IUVS) on the Mars Atmosphere and Volatile Mission (MAVEN).

Command Controller 05/2012-08/2014
Mission Operations and Data Systems,
Laboratory for Atmospheric and Space Physics
Boulder, CO

- Operated, planned, and analyzed telemetry for 6 NASA missions, including the *Kepler* space telescope.

Publications
incl. submitted

1. ***Lothringer, J.D.**; Casewell, S. "Atmosphere Models of Brown Dwarfs Irradiated by White Dwarfs: Analogues for Hot and Ultra-Hot Jupiters", Submitted (ApJ).*
2. **Lothringer, J.D.**; et al. "UV Exoplanet Transmission Spectral Features as Probes of Metals and Rainout", Accepted (ApJL). arXiv:2005.02528.
3. **Lothringer, J.D.**; Barman, T. S. "The PHOENIX Exoplanet Retrieval Algorithm and Using H^- Opacity as a Probe in Ultra-hot Jupiters", 2020, AJ, 159, 6.
4. **Lothringer, J.D.**; Barman, T. S. "The Influence of Host Star Spectral Type on Ultra-Hot Jupiter Atmospheres", 2019, ApJ, 876, 1.
5. **Lothringer, J.D.**; et al. "Extremely Irradiated Hot Jupiters: Non-Oxide Inversions, H^- Opacity, and Thermal Dissociation of Molecules", 2018, ApJ, 866, 1.
6. **Lothringer, J.D.**; et al. "An HST/STIS Optical Transmission Spectrum of Warm Neptune GJ 436b", 2018, AJ, 155, 2.
7. Fu, G.; Drake, D.; Dragomir, D.; **Lothringer, J.D.**; et al. "The Hubble PanCET program: Transit and Eclipse Spectroscopy of the Strongly Irradiated Giant Exoplanet WASP-76b", Submitted (AJ). arXiv:2005.02568.
8. Kreidberg, L.; et al. "Tentative Evidence for Water Vapor in the Atmosphere of the Neptune-Size Exoplanet HD 106315 c", Submitted (AJ). arXiv:2006.07444.
9. Guo, X.; Crossfield, I. J. M.; Dragomir, D.; Kosiariek, M. R.; **Lothringer, J.D.**; et al. "Updated Parameters and a New Transmission Spectrum of HD 97658b", 2020, AJ, 195, 5.
10. Gibson, N. P.; et al. "Detection of Fe I in the atmosphere of the ultra-hot Jupiter WASP-121b, and a new likelihood-based approach for Doppler-resolved spectroscopy", 2020, MNRAS, 493, 2.
11. Turner, J. D.; et al. "Detection of ionized calcium in the atmosphere of the ultra-hot Jupiter KELT-9b", 2020, ApJL, 888, 1.
12. Benneke, B.; Wong, I.; Piaulet, C.; Knutson, H. A.; Crossfield, I. J. M.; **Lothringer, J. D.**; et al. "Water Vapor on the Habitable Zone Exoplanet K2-18b", 2019, ApJL, 887, 1.
13. Benneke, B.; Knutson, H. A.; **Lothringer, J. D.**; et al. "A Sub-Neptune Exoplanet with a Low-Metallicity Methane-Depleted Atmosphere and Mie-Scattering Clouds", 2019, *Nature Astronomy*, 361.
14. Steinrück, M. E.; Parmentier, V.; Showman, A; **Lothringer, J. D.**; Lupu, R. E. "The Effect of Disequilibrium Carbon Chemistry on the Atmospheric Circulation and Phase Curves of Hot Jupiter HD 189733b", 2019, ApJ, 880, 1.
15. Crossfield, I. J. M.; **Lothringer, J. D.**; et al. "Unusual Isotopic Ratios in a Low-Mass Stellar Binary Formed From Supernova Ejecta", 2019, ApJL, 871, 1.
16. Fossati, L.; Koskinen, T.; **Lothringer, J. D.**; et al. "Extreme-ultraviolet Radiation from A-stars: Implications for Ultra-hot Jupiters ", 2018, ApJL, 868, 2.
17. Bean, J.; et al. "The Transiting Exoplanet Community Early Release Science Program for JWST", 2018, PASP, 130, 993.
18. Kilpatrick, B. M.; et al. "Community Targets for JWST's Early Release Science Program: Evaluation of WASP-63b", 2018, ApJ, 156, 3.
19. Bell, T. J.; et al. "The Very Low Albedo of WASP-12b from Spectral Eclipse Observations with Hubble", 2017, ApJL, 847, 1.
20. Crossfield, I. J. M.; et al. "197 Candidates and 104 Validated Planets in K2's First Five Fields", 2016, ApJS, 226, 7.

21. Stevenson, K. B.; Lewis, N. K.; Bean, J. L.; Beichman, C.; Fraine, J; Kilpatrick, B. M.; Krick, J. E.; **Lothringer, J.D.** et al. "Transiting Exoplanet Studies and Community Targets for JWST's Early Release Science Program", 2016, PASP, 128, 967.

Posters and Presentations

1. "Understanding Ultra-hot Jupiters Through Irradiated Brown Dwarfs." 235th AAS Winter Meeting. Honolulu, HI. Jan. 2020.
2. "Highly Irradiated Brown Dwarfs as High-mass Ultra-hot Jupiters." BDEXoCon. University of Delaware. Newark, DE. Oct. 2019.
3. "The Extreme Atmospheres of Ultra-hot Jupiter." Exoplanet Tea. MIT. Cambridge, MA. Oct. 2019.
4. "The Extreme Atmospheres of Ultra-hot Jupiter." Exoplanet Lunch. Harvard University. Cambridge, MA. Oct. 2019.
5. "The Extreme Atmospheres of Ultra-hot Jupiters." University of Arizona. Tucson, AZ. Apr. 2019. Theoretical Astrophysics Program Graduate Research Prize **Invited Talk**.
6. "Characterizing the Atmospheres of Exoplanet Populations: From Sub-Jovian to Ultra-hot Jupiter Exoplanets." DTU Space. Lyngby, Denmark. Feb. 2019. **Invited Talk**.
7. "Characterizing the Atmospheres of Exoplanet Populations: From Sub-Jovian to Ultra-hot Jupiter Exoplanets." American Astronomical Society Winter Meeting. Seattle, WA. Jan. 2019. Oral Presentation.
8. "The PHOENIX ExoplaneT Retrieval Algorithm (PETRA) and a New Look at Ultra-Hot Jupiters." AAS Division for Planetary Sciences Meeting. Knoxville, TN. Oct. 2018. Poster Presentation.
9. "Modeling the Most Extreme Jovian Atmospheres." Exoplanets Around Hot Stars. Vanderbilt University, Nashville, TN. Jun. 2018. Oral Presentation.
10. "Self-Consistent Atmosphere Models of the Most Extreme Hot Jupiters." American Astronomical Society Winter Meeting. Washington D.C. Jan. 2018. Oral Presentation.
11. "HST/STIS Observations of GJ 436b: A Warm-Neptune JWST GTO Target."Enabling Transiting Exoplanet Science with JWST. Space Telescope Science Institute, Baltimore, MD. Jul. 2017. Poster Presentation.
12. "Characterizing Four Sub-Jovian Exoplanets with HST-STIS." Exoplanets I. Davos, Switzerland. Jul. 2016. Poster Presentation.
13. "Determining the Atmospheric Nature of Super-Earth and Sub-Neptune Exoplanets." American Astronomical Society Winter Meeting. Orlando, FL. Jan. 2016. Poster Presentation.
14. "Determining the Atmospheric Nature of Super-Earth and Sub-Neptune Exoplanets." Enabling Transiting Exoplanet Science with JWST. Space Telescope Science Institute, Baltimore, MD. Nov. 2015. Poster Presentation.
15. "Determining the Atmospheric Nature of Super-Earth and Sub-Neptune Exoplanets." 2015 Sagan Exoplanet Summer Workshop. California Institute of Technology, Pasadena, California. Jul. 2015. Poster Presentation.

Honors, Awards, and Grants

PI of 3 Hubble Space Telescope Programs	In Progress
-Program 16086 ($86,995)	*10 orbits*
"Comparing Escaping Metals and Heat Deposition in Ultra-hot Jupiters"	
-Program 16142 (Budget TBD)	*AR Theory*
"The First Grid of White-Dwarf-Irradiated Brown Dwarf Atmosphere Models"	
-Program 16270 (Budget TBD)	*20 orbits*
"Heavy Metal Bands: A Study of Escaping Ions from the Hottest Jovian Atmospheres"	
Theoretical Astrophysics Program Graduate Research Prize ($500)	2019
Galileo Circle Scholar ($3,000)	2016, 2019
1st Place - The Art of Planetary Science - Data Art Category	2015
Graduate and Professional Student Council Travel Grant ($250)	2015
2015 Sagan Workshop Financial Aid ($700)	2015
Science Phoenix Award - SORCE Mission Operations	2014

Teaching, Service, and Other Experience

AAS Journals and A&A Referee	
Hubble Space Telescope Reviewer	
Canadian Time Allocation Committee Reviewer	
NASA Review Panel Executive Secretary	
JHU Teaching Academy Certificate	In Progress
JWST ERS Working Group	2017-Present
JHU Summer Teaching Institute	2020
JHU Undergraduate Summer Program Organizer	2020
AAS Chambliss Poster Award Judge	2019, 2020
LPL Incoming Graduate Student Mentor	2017-2019
LPL Men's Diversity and Inclusion Auxiliary	2016-2019
LPL Outreach Program	2014-2019
LPL Conference Organizing Committee	2015-2017
Visiting Student - Max Planck Institute for Astronomy, Germany	06-07/2016
Pima Community College GED Prep Math Tutor	2015-2016
Graduate and Professional Student Council Travel Grant Judge	2015
Graduate Teaching Assistant and Guest Lecturer — PTYS 170B2	Fall 2014
LASP MAVEN Launch Outreach	2014

Observing Experience

Hubble Space Telescope - STIS and WFC3	PI on 30 orbits, Co-I on 450+ orbits
MMT - SWIRC and ARIES	10+ nights
Sommers-Bausch Observatory - Optical CCD	7 nights
W.M. Keck Observatory - OSIRIS	2 nights
Large Binocular Telescope - LMIRCam	1 night

Professional Affiliations

American Astronomical Society — Junior Member	Since 2014
Phi Beta Kappa Member	Since 2014
Planetary Society Member	Since 2011

Skills

IDL, Python, Fortran, Perl, Bash, Matlab, and Mathematica

References

Prof. Travis Barman barman@lpl.arizona.edu
- Lunar and Planetary Laboratory, University of Arizona

Prof. Ian Crossfield ianc@ku.edu
- Department of Physics and Astronomy, Kansas University

Prof. David Sing dsing@jhu.edu
- Department of Physics and Astronomy, Johns Hopkins University

Prof. Jayne Birkby jbirkby@uva.nl
- Anton Panneokoek Institute for Astronomy, University of Amsterdam