

Dr. Joshua D. Lothringer

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Baltimore, MD 21210
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- Research Interests** Observing, modeling, and retrieving planetary, exoplanetary, brown dwarf, and stellar atmospheres.
- Education**
- | | |
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| <i>Doctor of Philosophy</i> , Planetary Science | 08/2014-08/2019 |
| <i>Master of Science</i> , Planetary Science | 12/2016 |
| University of Arizona, Tucson, AZ | |
| Advisor: Prof. Travis Barman | |
| Dissertation: <i>Characterizing the Atmospheres of Planet Populations: From Sub-Jovian to Ultra-hot Jupiter Exoplanets</i> | |
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| <i>Bachelor of Arts</i> , 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 | |
| | |
| Graduate Assistant/Associate | 08/2014-08/2019 |
| Lunar and Planetary Laboratory
Tucson, AZ | |
| | |
| Undergraduate Research Assistant | 10/2012-08/2014 |
| Laboratory for Atmospheric and Space Physics
Boulder, CO | |
| | |
| Command Controller | 05/2012-08/2014 |
| Mission Operations and Data Systems,
Laboratory for Atmospheric and Space Physics
Boulder, CO | |
- Publications**
incl. submitted
- Lothringer, J.D.**; et al. “A New Window into Planet Formation and Migration: Refractory-to-Volatile Elemental Ratios in Ultra-hot Jupiters”, Accepted (ApJ).
 - Lothringer, J.D.**; Casewell, S. “Atmosphere Models of Brown Dwarfs Irradiated by White Dwarfs: Analogues for Hot and Ultra-Hot Jupiters”, 2020, ApJ, 905, 163.

3. **Lothringer, J.D.**; et al. “UV Exoplanet Transmission Spectral Features as Probes of Metals and Rainout”, 2020, ApJL, 898, 1.
4. **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.
5. **Lothringer, J.D.**; Barman, T. S. “The Influence of Host Star Spectral Type on Ultra-Hot Jupiter Atmospheres”, 2019, ApJ, 876, 1.
6. **Lothringer, J.D.**; et al. “Extremely Irradiated Hot Jupiters: Non-Oxide Inversions, H^- Opacity, and Thermal Dissociation of Molecules”, 2018, ApJ, 866, 1.
7. **Lothringer, J.D.**; et al. “An HST/STIS Optical Transmission Spectrum of Warm Neptune GJ 436b”, 2018, AJ, 155, 2.
8. Merritt, S.R.; Gibson, N.P.; Nurgroho, S.K.; de Mooij, E.J.W.; Hooton, M.J.; **Lothringer, J.D.** et al. “An inventory of atomic species in the atmosphere of WASP-121b using UVES high-resolution spectroscopy”, Submitted (MNRAS).
9. Rathcke, A. et al. “HST PanCET Program: A Complete Near-UV to Infrared Transmission Spectrum for the Hot Jupiter WASP-79b”, Submitted (AJ).
10. Fu, G.; Drake, 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*.
11. 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*.
12. Wilson, J.; Gibson, N.P.; **Lothringer, J.D.**; et al. “Gemini/GMOS Optical Transmission Spectroscopy of WASP-121b: signs of variability in an ultra-hot Jupiter?”, Accepted (MNRAS).
13. Mikal-Evans, T. et al. “Transmission Spectroscopy for the Warm sub-Neptune HD 3167c: Evidence for Molecular Absorption and a Possible High Metallicity Atmosphere”, 2021, AJ, 161, 1.
14. 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.
15. 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.
16. Turner, J. D.; et al. “Detection of ionized calcium in the atmosphere of the ultra-hot Jupiter KELT-9b”, 2020, ApJL, 888, 1.
17. 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.

18. 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.
19. 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.
20. 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.
21. Fossati, L.; Koskinen, T.; **Lothringer, J. D.**; et al. “Extreme-ultraviolet Radiation from A-stars: Implications for Ultra-hot Jupiters ”, 2018, *ApJL*, 868, 2.
22. Bean, J.; et al. “The Transiting Exoplanet Community Early Release Science Program for JWST”, 2018, *PASP*, 130, 993.
23. Kilpatrick, B. M.; et al. “Community Targets for JWST’s Early Release Science Program: Evaluation of WASP-63b”, 2018, *ApJ*, 156, 3.
24. Bell, T. J.; et al. “The Very Low Albedo of WASP-12b from Spectral Eclipse Observations with Hubble”, 2017, *ApJL*, 847, 1.
25. Crossfield, I. J. M.; et al. “197 Candidates and 104 Validated Planets in K2’s First Five Fields”, 2016, *ApJS*, 226, 7.
26. 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.

**Invited Talks
and Seminars**

1. Exoplanet Lunch. Center for Astrophysics, Harvard University. Virtual. Jan. 2021.
2. Exoplanet Journal Club. Jet Propulsion Laboratory. Virtual. Jan. 2021.
3. Star and Planet Seminar. Imperial College London. Virtual. Oct. 2020.
4. Exocoffee. Max Planck Institute for Astronomy. Virtual. May. 2020.
5. Exoplanet Tea. Massachusetts Institute of Technology. Cambridge, MA. Oct. 2019.
6. Exoplanet Lunch. Center for Astrophysics, Harvard University. Cambridge, MA. Oct. 2019.
7. Theoretical Astrophysics Program Graduate Research Prize Talk. University of Arizona. Tucson, AZ. Apr. 2019.
8. Exoplanet Seminar. DTU Space. Lyngby, Denmark. Feb. 2019.
9. Star and Planet Formation Seminar. Max Planck Institute for Astronomy. Heidelberg, Germany. Jul. 2016.

**Select
Conference
Presentations**

1. “Re-Interpreting UV-Optical Transmission Spectra of Hot and Ultra-Hot Jupiters.” 237th AAS Winter Meeting. Virtual. Jan. 2021.
2. “Understanding Ultra-hot Jupiters Through Irradiated Brown Dwarfs.” 235th AAS Winter Meeting. Honolulu, HI. Jan. 2020.
3. “Highly Irradiated Brown Dwarfs as High-mass Ultra-hot Jupiters.” BDEX-oCon. University of Delaware. Newark, DE. Oct. 2019.
4. “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.
5. “Modeling the Most Extreme Jovian Atmospheres.” Exoplanets Around Hot Stars. Vanderbilt University, Nashville, TN. Jun. 2018. Oral Presentation.
6. “Self-Consistent Atmosphere Models of the Most Extreme Hot Jupiters.” American Astronomical Society Winter Meeting. Washington D.C. Jan. 2018. Oral Presentation.
7. “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.
8. “Characterizing Four Sub-Jovian Exoplanets with HST-STIS.” Exoplanets I. Davos, Switzerland. Jul. 2016. Poster Presentation.

**Honors,
Awards,
and Grants**

PI of 4 <i>Hubble Space Telescope</i> Programs	
-Program 16086 (\$86,995)	<i>10 orbits</i>
“Comparing Escaping Metals and Heat Deposition in Ultra-hot Jupiters”	
-Program 16142 (\$99,319)	<i>AR Theory</i>
“The First Grid of White-Dwarf-Irradiated Brown Dwarf Atmosphere Models”	
-Program 16270 (\$63,530)	<i>20 orbits</i>
“Heavy Metal Bands: A Study of Escaping Ions from the Hottest Jovian Atmospheres”	
-Program 16450 (\$45,465)	<i>10 orbits</i>
“Measuring the Rock-to-Ice Ratio in an Exoplanet”	
Co-I on 5 <i>Hubble Space Telescope</i> Programs	<i>250+ orbits</i>
PI or Co-PI of 2 <i>James Webb Space Telescope</i>	
-Program 2055 (Budget TBD)	<i>9.1 hours</i>
“Tracing Hot Jupiter Formation and Migration with Volatile and Refractory Elements Ratios”	
-Program 2288 (Budget TBD)	<i>7.4 hours</i>
“Formation and Impact of Silicate Clouds on L Dwarfs”	
Co-I on 4 <i>James Webb Space Telescope</i> Programs	<i>150.3 hours</i>
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
Observing Experience	Hubble Space Telescope - STIS and WFC3	250+ orbits
	MMT - SWIRC and ARIES	12 nights
	Sommers-Bausch Observatory (CU-Boulder) - Optical CCD	9 nights
	W.M. Keck Observatory - OSIRIS	2 nights
	Large Binocular Telescope - LMIRCam	1 night
	Morris W. Offit Telescope (JHU) - Optical CCD	1 night
Teaching and Mentorship	Mentor:	
	• Autumn Winch - Bryn Mawr Undergraduate	2020-Present
	• Zafar Rustamkulov - Johns Hopkins Graduate	2019-Present
	JHU Teaching Academy Certificate	2020
	Guest Instructor - Planets, Life, and the Universe	2020
	Co-Instructor - Exoplanets & Their Atmospheres	2020
	JHU Summer Teaching Institute Workshop	2020
	LPL Incoming Graduate Student Mentor	2017-2019
	Pima Community College GED Prep Math Tutor	2015-2016
	Graduate Teaching Assistant and Guest Lecturer — PTYS 170B2	Fall 2014
Service and Other Experience	AAS Journals Reviewer	
	Astronomy & Astrophysics Reviewer	
	Hubble Space Telescope Proposal Reviewer	
	Canadian Time Allocation Committee Reviewer	
	NSF Review Panelist	
	NASA Review Panel Executive Secretary	
	UV-Scope Mission Concept Science Team	2020-Present
	JWST ERS Working Group	2017-Present
	JHU/STScI Undergraduate Summer Program Organizer	2020
	AAS Chambliss Poster Award Judge	2019, 2020
	LPL Men's Diversity and Inclusion Auxiliary	2016-2019
	LPL Conference Organizing Committee	2015-2017
	Visiting Student - Max Planck Institute for Astronomy, Germany	06-07/2016
	Graduate and Professional Student Council Travel Grant Judge	2015
Outreach	STScI Outreach Program	2019-Present
	-Space Astronomy Summer Program Presenter and Organizer	
	-Easy as Pi - Society of American Military Engineers	
	Reddit /r/AskScience Panel Member	2015-Present
	LPL Outreach Program	2014-2019
	-Summer Science Saturdays	
	-Tucson Festival of Books	
	-Art of Planetary Science	
	-Bennuval: An Evening of Space, Art, and Music	
	“What Can We Learn from Exoplanet Atmospheres?”	Apr. 2018.
	-Exoplanet Lecture Series, Flandrau Planetarium, Tucson, AZ	

“Exoplanet Atmospheres on the Cutting Edge of Astronomy” Mar. 2018
 -Tucson Amateur Astronomy Association, Tucson, AZ
 The American International School of Muscat Science Project Expert 2018,
 2019
 Chaparral High School Career Expert 2018
 “Going to Mars” Jan. 2014
 -The American International School of Muscat, Muscat, Oman
 LASP MAVEN Launch Outreach 2014

Professional American Astronomical Society Since 2014
Affiliations Phi Beta Kappa Member Since 2014
 Planetary Society Member Since 2011

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