

Dr. Joshua D. Lothringer

Department of Physics, Utah Valley University
800 W. University Pkwy.
Orem, UT 84058

Email: jlothringer@uvu.edu — Web: joshualothringer.faculty.uvu.edu

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Research Interests	Observing, modeling, and retrieving planetary, exoplanetary, brown dwarf, and stellar atmospheres.										
Positions	<table><tr><td>Assistant Professor Department of Physics, Utah Valley University Orem, UT</td><td>08/2021-Present</td></tr><tr><td>Postdoctoral Fellow Department of Physics and Astronomy, Johns Hopkins University Baltimore, MD</td><td>08/2019-08/2021</td></tr><tr><td>Graduate Assistant/Associate Lunar and Planetary Laboratory Tucson, AZ</td><td>08/2014-08/2019</td></tr><tr><td>Undergraduate Research Assistant Laboratory for Atmospheric and Space Physics Boulder, CO</td><td>10/2012-08/2014</td></tr><tr><td>Command Controller Mission Operations and Data Systems, Laboratory for Atmospheric and Space Physics Boulder, CO</td><td>05/2012-08/2014</td></tr></table>	Assistant Professor Department of Physics, Utah Valley University Orem, UT	08/2021-Present	Postdoctoral Fellow Department of Physics and Astronomy, Johns Hopkins University Baltimore, MD	08/2019-08/2021	Graduate Assistant/Associate Lunar and Planetary Laboratory Tucson, AZ	08/2014-08/2019	Undergraduate Research Assistant Laboratory for Atmospheric and Space Physics Boulder, CO	10/2012-08/2014	Command Controller Mission Operations and Data Systems, Laboratory for Atmospheric and Space Physics Boulder, CO	05/2012-08/2014
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Education	<table><tr><td><i>Doctor of Philosophy</i>, Planetary Science <i>Master of Science</i>, Planetary Science 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></td><td>08/2014-08/2019 12/2016</td></tr><tr><td><i>Bachelor of Arts</i>, Astronomy University of Colorado, Boulder CO Concentration: Astrophysics Minor: Philosophy</td><td>08/2010-12/2013</td></tr></table>	<i>Doctor of Philosophy</i> , Planetary Science <i>Master of Science</i> , Planetary Science 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>	08/2014-08/2019 12/2016	<i>Bachelor of Arts</i> , Astronomy University of Colorado, Boulder CO Concentration: Astrophysics Minor: Philosophy	08/2010-12/2013						
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Publications
incl. submitted

1. **Lothringer, J.D.**; Sing, D.K.; et al. “UV Absorption by Silicate Cloud Precursors in Ultra-hot Jupiter WASP-178b”, 2022, *Nature*, 604, 7904.
2. **Lothringer, J.D.**; et al. “A New Window into Planet Formation and Migration: Refractory-to-Volatile Elemental Ratios in Ultra-hot Jupiters”, 2021, *ApJ*, 914, 1.
3. **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.
4. **Lothringer, J.D.**; et al. “UV Exoplanet Transmission Spectral Features as Probes of Metals and Rainout”, 2020, *ApJL*, 898, 1.
5. **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.
6. **Lothringer, J.D.**; Barman, T. S. “The Influence of Host Star Spectral Type on Ultra-Hot Jupiter Atmospheres”, 2019, *ApJ*, 876, 1.
7. **Lothringer, J.D.**; et al. “Extremely Irradiated Hot Jupiters: Non-Oxide Inversions, H^- Opacity, and Thermal Dissociation of Molecules”, 2018, *ApJ*, 866, 1.
8. **Lothringer, J.D.**; et al. “An HST/STIS Optical Transmission Spectrum of Warm Neptune GJ 436b”, 2018, *AJ*, 155, 2.
9. *Gressier, A.; et al. “The Hubble PanCET Program: The near-UV transmission spectrum of WASP-79b”, Submitted (A&A).*
10. *Kasper, D; Bean, J. L.; Line, M. R.; Seifahrt, A; **Lothringer, J.D.**; et al. “Unifying High- and Low-resolution Observations to Constrain the Dayside Atmosphere of KELT-20b/MASCARA-2b”, Submitted (AJ).*
11. *Chachan, Y.; Knutson, H. A.; **Lothringer, J.D.**; Blake, G. A. “Breaking Degeneracies in Formation Histories by Measuring Refractory Content in Gas Giants”, Submitted (ApJ).*
12. *van Sluijs, L.; Birkby, J.L.; **Lothringer, J.D.**; et al. “Carbon monoxide emission lines reveal an inverted atmosphere in the ultra hot Jupiter WASP-33 b and indicate an eastward hot spot”, Submitted (MNRAS). *arXiv:2203.13234**
13. *Lee, E.; **Lothringer, J.D.**; et al. “Sunbathing under white light – 3D modelling of brown dwarf - white dwarf atmospheres with strong UV irradiation”, Submitted (MNRAS). *arXiv:2203.09854*.*
14. *Brade, J. et al. “A Mirage or an Oasis? Water Vapor in the Atmosphere of the Warm Neptune TOI-674 b”, Submitted (AJ). *arXiv:2201.04197*.*
15. *Kreidberg, L. et al. “Tentative Evidence for Water Vapor in the Atmosphere of the Neptune-Size Exoplanet HD 106315 c”, Accepted (AJ). *arXiv:2006.07444*.*
16. *Buzard, C. F.; Casewell, S.; **Lothringer, J.D.**; Blake, G. A. “Near-infrared spectra of the inflated post-common envelope brown dwarf NLTT 5306B”, 2022 *AJ*, 163, 6.*

17. Fu, G.; et al. “The Hubble PanCET program: Emission spectrum of hot Jupiter HAT-P-41b”, Accepted in AJ. arXiv:2202.12314.
18. Gibson, N. P.; Nugroho, S.K.; **Lothringer, J.D.**; et al. “Relative abundance constraints from high-resolution optical transmission spectroscopy of WASP-121b, and a fast model-filtering technique for accelerating retrievals”, 2022, MNRAS, 512, 3.
19. Reggiani, H; et al. “Evidence that the Hot Jupiter WASP-77 A b Formed Beyond Its Parent Protoplanetary Disk’s H₂O Ice Line”, 2022, AJ, 163, 4.
20. Fu, G.; Sing, D.K.; **Lothringer, J.D.**; et al. “Strong H₂O and CO Emission Features in the Spectrum of KELT-20b Driven by Stellar UV Irradiation”, 2022, ApJL, 925, 1.
21. Bruno, G.; et al. “Hiding in plain sight: observing planet-starspot crossings with the James Webb Space Telescope”, 2022, MNRAS, 509, 4.
22. Zhou, Y.; Apai, D.; Tan, X.; **Lothringer, J.D.**; “HST/WFC3 Complete Phase-resolved Spectroscopy of White Dwarf-Brown Dwarf Binaries WD 0137 and EPIC 2122”, 2022, AJ, 163, 1.
23. Fu, G. et al. “The Hubble PanCET program: Transit and Eclipse Spectroscopy of the Hot Jupiter WASP-74b”, 2021, AJ, 162, 6.
24. Sainsbury-Martinez, F.; Casewell, S.L.; **Lothringer, J.D.**; et al. “Exploring deep and hot adiabats as a potential solution to the radius inflation problem in brown dwarfs: Long-timescale models of the deep atmospheres of KELT-1b, Kepler-13Ab, and SDSS1411B”, 2021, A&A, 656, A128.
25. Merritt, S.R.; Gibson, N.P.; Nugroho, 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”, 2021, MNRAS, 506, 3.
26. 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”, 2021, AJ, 162, 3.
27. 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?”, 2021, MNRAS, 503, 4.
28. 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.
29. Guo, X.; Crossfield, I. J. M.; Dragomir, D.; Kosiarek, M. R.; **Lothringer, J.D.**; et al. “Updated Parameters and a New Transmission Spectrum of HD 97658b”, 2020, AJ, 195, 5.
30. 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.
31. Turner, J. D.; et al. “Detection of ionized calcium in the atmosphere of the ultra-hot Jupiter KELT-9b”, 2020, ApJL, 888, 1.

32. 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.
33. 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.
34. 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.
35. 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.
36. Fossati, L.; Koskinen, T.; **Lothringer, J. D.**; et al. “Extreme-ultraviolet Radiation from A-stars: Implications for Ultra-hot Jupiters ”, 2018, *ApJL*, 868, 2.
37. Bean, J.; et al. “The Transiting Exoplanet Community Early Release Science Program for JWST”, 2018, *PASP*, 130, 993.
38. Kilpatrick, B. M.; et al. “Community Targets for JWST’s Early Release Science Program: Evaluation of WASP-63b”, 2018, *ApJ*, 156, 3.
39. Bell, T. J.; et al. “The Very Low Albedo of WASP-12b from Spectral Eclipse Observations with Hubble”, 2017, *ApJL*, 847, 1.
40. Crossfield, I. J. M.; et al. “197 Candidates and 104 Validated Planets in K2’s First Five Fields”, 2016, *ApJS*, 226, 7.
41. 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.

Proceedings and Other Publications

1. Ardila, D. R.; et al. “The UV-SCOPE Mission: Ultraviolet Spectroscopic Characterization Of Planets and their Environments”, *SPIE Proceedings* (Submitted).
2. **Lothringer, J. D.** “Stellar specific intensity models used in ”Hiding in plain sight: observing planet-starspot crossings with the James Webb Space Telescope”, 2021, Zenodo Software package, id. 5609421.

Invited Talks and Seminars

1. “A JWST Program to Measure Mid-Infrared Silicate Cloud Features in Two L-Dwarfs.” The Brown Dwarf to Exoplanet Connection in the Era of JWST Splinter Session at Exoplanets IV. Las Vegas. May 2022.
2. Physics Colloquium. Department of Physics, Utah Valley University, Orem, UT. Sep. 2021.
3. HotSci. Space Telescope Science Institute. Virtual. Jul. 2021.

4. Exoplanet Lunch. Center for Astrophysics, Harvard University. Virtual. Jan. 2021.
5. Exoplanet Journal Club. Jet Propulsion Laboratory. Virtual. Jan. 2021.
6. Star and Planet Seminar. Imperial College London. Virtual. Oct. 2020.
7. Exocoffee. Max Planck Institute for Astronomy. Virtual. May. 2020.
8. Exoplanet Tea. Massachusetts Institute of Technology. Cambridge, MA. Oct. 2019.
9. Exoplanet Lunch. Center for Astrophysics, Harvard University. Cambridge, MA. Oct. 2019.
10. Wine & Cheese Seminar. Center for Astrophysical Sciences, Johns Hopkins University, Baltimore, MD. Sep. 2019.
11. Theoretical Astrophysics Program Graduate Research Prize Talk. University of Arizona. Tucson, AZ. Apr. 2019.
12. Exoplanet Seminar. DTU Space. Lyngby, Denmark. Feb. 2019.
13. Star and Planet Formation Seminar. Max Planck Institute for Astronomy. Heidelberg, Germany. Jul. 2016.

**Select
Conference
Presentations**

1. “The UV Transmission Spectrum of Ultra-hot Jupiter WASP-178b.” Exoplanets IV. Las Vegas. May 2022.
2. “The Importance of UV Opacity in Extremely Irradiated Objects.” Stars and Planets in the UV. Virtual. May. 2021.
3. “Re-Interpreting UV-Optical Transmission Spectra of Hot and Ultra-Hot Jupiters.” 237th AAS Winter Meeting. Virtual. Jan. 2021.
4. “Understanding Ultra-hot Jupiters Through Irradiated Brown Dwarfs.” 235th AAS Winter Meeting. Honolulu, HI. Jan. 2020.
5. “Highly Irradiated Brown Dwarfs as High-mass Ultra-hot Jupiters.” BDExoCon. University of Delaware. Newark, DE. Oct. 2019.
6. “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.
7. “Modeling the Most Extreme Jovian Atmospheres.” Exoplanets Around Hot Stars. Vanderbilt University, Nashville, TN. Jun. 2018. Oral Presentation.
8. “Self-Consistent Atmosphere Models of the Most Extreme Hot Jupiters.” American Astronomical Society Winter Meeting. Washington D.C. Jan. 2018. Oral Presentation.
9. “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.
10. “Characterizing Four Sub-Jovian Exoplanets with HST-STIS.” Exoplanets I. Davos, Switzerland. Jul. 2016. Poster Presentation.

Honors, Awards, and Grants +\$2,000,000	PI of NSF S-STEM Program	2022-2029
	-6-year scholarship, mentorship, and research program (\$1,499,862) “Promoting Engagement in Chemistry, Physics, and Earth Sciences”	
	PI/Co-PI of 2 <i>James Webb Space Telescope</i> Programs	
	-Program 2055 (\$100,211)	9.1 hours
	“Tracing Hot Jupiter Formation and Migration with Volatile and Refractory Elements Ratios”	
	-Program 2288 (\$113,998)	7.4 hours
	“Formation and Impact of Silicate Clouds on L Dwarfs”	
	Co-I on 4 <i>James Webb Space Telescope</i> Programs	150.3 hours
	PI of 4 <i>Hubble Space Telescope</i> Programs	
	-Program 16086 (\$86,995)	10 orbits
	“Comparing Escaping Metals and Heat Deposition in Ultra-hot Jupiters”	
	-Program 16142 (\$99,319)	AR Theory
	“The First Grid of White-Dwarf-Irradiated Brown Dwarf Atmosphere Models”	
	-Program 16270 (\$63,530)	20 orbits
	“Heavy Metal Bands: A Study of Escaping Ions from the Hottest Jovian Atmospheres”	
	-Program 16450 (\$45,465)	10 orbits
	“Measuring the Rock-to-Ice Ratio in an Exoplanet”	
	Co-I on 13 <i>Hubble Space Telescope</i> Programs	300+ orbits
	Co-I on 1 <i>Spitzer Space Telescope</i> Program	61 hours
	Scholarly Activities Committee Dissemination Grant (\$1,344)	2022
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 Travel Grant (\$700)	2015	
Science Phoenix Award - SORCE Mission Operations	2014	
Observing Experience	James Webb Space Telescope - NIRSpec, NIRCам, and MIRI	150+ hours
	Hubble Space Telescope - STIS and WFC3	300+ 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 - LMIRCам	1 night
	Morris W. Offit Telescope (JHU) - Optical CCD	1 night
Teaching and Mentorship	Undergraduate Research Mentor:	
	• Autumn Winch - Bryn Mawr College	2020-2022
	• <i>Co-Author on Lothringer et al. 2022</i>	
	• <i>Pre-Med Post-Bac at Johns Hopkins University</i>	
	• Austin Baldwin - Utah Valley University	2021-Present
	• <i>UVU URSCA Grant Recipient</i>	
	• Brayden Roberts - Utah Valley University	2022-Present
• Brian Seamons - Utah Valley University	2022-Present	
Instructor - ASTR-1080 - Life in the Universe	Fall 2022	

Instructor - PHSC-1000 - Survey of Physical Science	Spring 2022
Instructor - ASTR-1040 - Elementary Astronomy (3 Sections)	Fall 2022
Instructor - ASTR-1040 - Elementary Astronomy (3 Sections)	Spring 2022
Instructor - ASTR-1040 - Elementary Astronomy (3 Sections)	Fall 2021
Guest Instructor - Planets, Life, and the Universe	2020
Co-Instructor - Exoplanets & Their Atmospheres	2020
JHU Teaching Academy Certificate	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 MIDEX 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

**Select Press
Coverage &
Interviews**

Lothringer & Sing et al. 2022

- NASA/Hubble Press Release
- Sky & Telescope
- The Bad Astronomer, SyFy Wire
- The Miami Herald

Benneke et al. 2019

- SkyMania
- IndiaTV News

In the Community

- UVU Wins \$1.5M NSF S-STEM Scholarship Program
- Hutchings Museum Institute JWST First Images Event
- Hutchings Museum Institute JWST Launch Celebration
- MAVEN Mission to Mars Launch
- No Man's Sky Video Game

Outreach

JWST Subject Matter Expert

- Clarke Planetarium JWST Program
- Hutchings Museum Institute First Image Event

- Hutchings Museum Institute Launch Celebration
- STScI Outreach Program 2019-2021
 - 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 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 Affiliations

- American Astronomical Society Since 2014
- Phi Beta Kappa Member Since 2014
- Planetary Society Member Since 2011

Skills

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