

# Kris Laferriere

*Curriculum Vitae*  
klaferri@purdue.edu

## EDUCATION

---

- PhD in Planetary Science** Expected: Summer 2025  
*Purdue University, West Lafayette, IN*  
Department of Earth, Atmospheric, and Planetary Science
- Certificate in Foundations in College Teaching** Spring 2022  
*Purdue University, West Lafayette, IN*  
Center for Innovative Learning
- B.S. in Astronomy (High Honors) and Physics** 2016 - 2020  
*University of Maryland, College Park, MD*  
Department of Astronomy, Department of Physics

## RESEARCH EXPERIENCE

---

- Purdue University** Fall 2020 - Present  
*Advisor: Ali Bramson*  
The Mass Balance of Polar Ice on Mars from the Migration of Spiral Troughs (funding NASA MDAP)  
Sources and Replenishment of Lunar Hydration on Diurnal Timescales (funding NASA LDAP)
- University of Maryland, Department of Astronomy** Fall 2019 - Fall 2020  
*Advisor: Lori Feaga and Jessica Sunshine*  
*Project Title:* Evolution of hydration signatures from the Lunar South Pole utilizing Deep Impact HRI-IR
- NASA Marshall Space Flight Center, Meteoroid Environment Office** Summer 2019  
*Advisor: Althea Moorhead*  
*Project Title:* Survey of low speed meteor showers using NASA All Sky Fireball Network
- University of Maryland, Department of Astronomy** Spring 2018 - Spring 2019  
*Advisor: Lori Feaga and Jessica Sunshine*  
*Project Title:* Exploring the morphology of the CO<sub>2</sub> and dust coma of Comet 9P with DCT and Spitzer-IRAC

## TEACHING

---

- EAPS 105 - The Planets** Summer 2024  
*Purdue University, Department of Earth, Atmospheric, and Planetary Sciences*  
Co-Instructor, 4 Week Accelerated Summer Course
- EAPS100 - Planet Earth** Spring 2023  
*Purdue University, Department of Earth, Atmospheric, and Planetary Sciences*  
Grader, Online
- EAPS111 - Physical Geology 120** Fall 2020  
*Purdue University, Department of Earth, Atmospheric, and Planetary Sciences*  
Teaching Assistant, 2 Lab sections
- ASTR120 - The Solar System** Fall 2019  
*University of Maryland, Department of Astronomy*  
Academic Peer Mentor, Major Introduction Course

## UNDERGRADUATES ADVISED

---

- Matthew Scheer (Purdue EAPS) Fall 2024 - Spring 2025
- Kamden Maddox (Purdue EAPS) Fall 2024 - Spring 2025
- Arunima Saha (Purdue EAPS) Fall 2024 - Spring 2025
- Jessica Cyr (Purdue EAPS) Fall 2024 - Spring 2025
- Alex Gleason (Purdue PHYS) Fall 2022 - Spring 2023
- Ashwin Nomi (Purdue AAE) Fall 2021 - Spring 2022

## HONORS AND AWARDS

---

### *External*

- LPI Career Development Award (Spring 2023).

### *Purdue University*

- EAPS EXPO 3 Min Talk (Spring 2024).
- Department Teaching Honor Roll (Fall 2020; Spring 2023; Summer 2024).
- Purdue Graduate Student Government Travel Award (Spring 2023).

### *University of Maryland, College Park*

- High Honors in Astronomy (Spring 2020).

## PROPOSALS

---

Sources and Replenishment of Lunar Hydration on Diurnal Timescales, PI: Ali Bramson, *Author and Named Student Member*. Funded by NASA's Lunar Data Analysis Program (LDAP). Total value: \$465,422

## SERVICE

---

Reviewer: Planetary Science Journal, Journal of Geophysical Research: Planets.

Conference Session Moderator:

- Mars Part 2, Division of Planetary Science Conference 2024
- Modern Climate Plus, 8th International Mars Polar Science Conference 2024.
- Lunar Polar Volatiles: A Remote Sensing Perspective, Lunar and Planetary Science Conference 2024.
- The Martian Cryosphere: A Frozen Red Planet, Lunar and Planetary Science Conference 2022.

Department Service:

- First Year Graduate Student Mentor: *Purdue EAPS*, 2022-2024
- EAPS Graduate Student Association President, *Purdue EAPS*, Fall 2022 - Spring 2023
- Equity, Diversity, and Inclusion Committee (Grad Rep.), *Purdue EAPS*, Fall 2021 - Spring 2022
- Diversity, Equity, and Inclusion Committee (Undergrad Rep.), *UMD Astronomy*, 2017-2020

## PEER-REVIEWED PUBLICATIONS

---

*U Undergraduate student author*

1. **Laferriere, K. L.**, Bramson, A. M., <sup>U</sup>Gleason, A., (2024), Quantities of ballistically hopping water molecules on the Moon: A resolution to the discrepancy in surface and exospheric hydration observations, *JGR Planets*, *in revision*.
2. **Laferriere, K. L.**, Bramson, A. M., Smith, I. B., (2024), Mars' North Polar Spiral Trough Migration Paths as revealed through 3D Radar Mapping, *JGR Planets*, 129(8), [doi:10.1029/2023JE007996](https://doi.org/10.1029/2023JE007996).
3. Izquierdo, K., Bramson, A. M., McClintock, T., **Laferriere, K. L.**, Byrne, S., Bapst, J., Smith, I. B., (2023), Local Ice Accumulation and Retreat Rates at the North Pole of Mars from Bayesian Fit to Trough Migration Paths, *JGR Planets* 128(10), [doi:10.1029/2023JE007964](https://doi.org/10.1029/2023JE007964).
4. **Laferriere, K. L.**, Sunshine, J. M., Feaga, L. M., (2022), Variability of Hydration across the Southern Hemisphere of the Moon as observed by Deep Impact, *JGR Planets*, 127(8), [doi:10.1029/2022JE007361](https://doi.org/10.1029/2022JE007361).

## CONFERENCE ABSTRACTS

---

1. **Laferriere, K. L.**, Bramson, A. M., (2024), Exploring trends in lunar hydration as tied to surface illumination using the Imaging Infrared Spectrometer aboard Chandrayaan-2, *56th DPS*.
2. Bramson, A. M., Hutchison, G. D., **Laferriere, K. L.**, Stickle, A. M., Patterson, G. W., Jozwiak, L. M., Neish, C. D., Rivera-Valentín, E. G., (2024), Permanently and seasonally shadowed regions in Amundsen Crater as viewed by Mini-RF bistatic radar observations, *56th DPS*.
3. **Laferriere, K. L.**, Bramson, A. M., Izquierdo, K., Mchlintock, T. (2024), Regional Variability in Ice Mass Balances Rates from North Polar Trough Migration Paths on Mars, *8th International Mars Polar Science Conference*, 6022.
4. **Laferriere, K. L.**, Bramson, A. M., Gleason, A., (2024), Transport and Retention of Lunar Hydration on Diurnal Timescales, *55th LPSC*.
5. **Laferriere, K. L.**, Izquierdo, K., Bramson, A. M., Smith, I. B., McClintock, T. (2024), Lateral Variability in Ice Mass Balance Rates Along a Polar Trough on Mars, *55th LPSC*.
6. Li, S., Sunshine, J. M., **Laferriere, K. L.**, Feaga, L. M., (2024), Understanding the Speciation of Lunar Surface Hydration through Skewed-Gaussian Deconvolution of the 3-Micron Absorption of the Deep Impact Data, *55th LPSC*.
7. **Laferriere, K. L.**, Izquierdo, K., Bramson, A. M., Smith, I. B., McClintock, T. (2023), Inferring past climate on Mars through mapping and simulating trough migration paths recorded in polar ice stratigraphy, *55th DPS*.
8. Gleason, A., **Laferriere, K. L.**, Bramson, A. M., (2023), Effects of Roughness on Diurnal Hydration Transportation on the Lunar Surface, *55th DPS*.
9. Izqueirdo, K., **Laferriere, K. L.**, Bramson, A., McClintock, T., Byrne, S., Bapst, J., Smith, I. B., (2023), A Bayesian modeling approach applied to migrating polar troughs to infer ice deposition rates on Mars, *55th DPS*.
10. **Laferriere, K. L.**, Bramson, A., Izquierdo, K., McClintock, T. (2023), Mars' polar paleoclimate as revealed through thermophysical modeling of trough migration, *TherMoPS IV*.
11. **Laferriere, K. L.**, Bramson, A., Gleason, A. (2023), Temperature Driven Transport of Lunar Hydration on Diurnal Timescales, 1047, *54th LPSC*.
12. Kring, D., Bamber, E., Blance, A., Brezfelder, J., Faucher, J., Flom, A., Lehman Franco, K., Harris, E., Jhoti, E., **Laferriere, K.**, Martin, A., Meyer, M., Pamerleau, I., Plan, A., Roberts, E., Shubham, S., Slumba, K., Zimmermann, N., Barrett, T., (2023), Cascading Boulder and Boulder Track Experiment at Barringer Meteorite Crater (AKA Meteor Crater), Arizona, 2186, *54th LPSC*.

13. Sori, M. M., **Laferriere, K. L.**, Burkman, K. S., Herring, J., Klidas, A., Manelski, H. T., McGlasson, R. A., Menten, S. M., Pamerleau, I. F., Pérez-Cortés, S. L., (2023), Hollows as a Source for Mercury's Polar Organics, 1103, *54th LPSC*.
14. **Laferriere, K. L.**, Bramson, A. M., Smith, I. B. (2022), Mars North Polar Spiral Trough Migration Paths Variations Revealed by 3D Radar Mapping, *53rd LPSC*.
15. Izquierdo, K., Bramson, A. M., McClintock, T., **Laferriere, K. L.**, (2022), Mass Balance of Martian Polar Ice from Bayesian Fit to Trough Migration Paths, 1706, *53rd LPSC*.
16. **Laferriere, K. L.**, Bramson, A. M., Smith, I. B. (2021), Mars' North Polar Spiral Trough Migration Paths as Revealed through 3D Radar Mapping, *AGU Fall Meeting*.
17. **Laferriere, K. L.**, Sunshine, J. M., Feaga, L. M. (2021), Spatial and temporal variability of lunar hydration across the southern hemisphere as observed by Deep Impact, *AGU Fall Meeting*.
18. **Laferriere, K. L.**, Bramson, A. M., Smith, I. B., (2021), 3D Mapping of Migration Paths of Mars' North Polar Spiral Troughs, 1631, *52nd LPSC*.
19. **Laferriere, K.**, Moorhead, A., (2019), Survey of low speed meteor showers, *NASA Marshall Space Flight Center Poster Expo*.

## OUTREACH

---

- |  |                     |
|--|---------------------|
| Auburn High School   | April 30, 2024      |
| <ul style="list-style-type: none"> <li>• Guest Lecture - Astronomy 1, Astronomy 2, AP Physics 1, AP Physics 2</li> </ul>   |                     |
| University of Maryland, College of Mathematics and Natural Sciences  | Apr 2017 - May 2020 |
| <ul style="list-style-type: none"> <li>• Panelist - 10 Open Houses as CMNS Recruitment Ambassador</li> <li>• Met with 5 prospective students in Physics and/or Astronomy</li> <li>• Held Q&amp;A with middle school students from Chapel Hill-Carrboro City, NC Schools on STEM at UMD</li> </ul>  |                     |
| Fitchburg State University, Upward Bound Math and Science  | Summer 2018         |
| <ul style="list-style-type: none"> <li>• Residential Counselor (Teaching Assistant, Tutor, Mentor, and Residential Assistant)</li> </ul>   |                     |
| University of Maryland   |                     |
| <ul style="list-style-type: none"> <li>• Public Talk at UMD: <i>Metallicity of Open Star Clusters Using Beat Cepheids</i> with C. Bambic, V. Carvajal, and C. Hinrichs. <span style="float: right;">Spring 2018</span></li> <li>• Public Talk at UMD Observatory: <i>Exploring the Cepheid PM-Relation in M31 with iPFT</i> with C. Harada and M. Sitaram. <span style="float: right;">Fall 2017</span></li> </ul> |                     |