

Kris Laferriere

Curriculum Vitae
klaferri@purdue.edu

EDUCATION

Purdue University, West Lafayette, IN Expected: Summer 2025
Department of Earth, Atmospheric, and Planetary Science
PhD in Planetary Science
Dissertation: Exploring volatile mass balance on the Moon and Mars through observations and modeling

University of Maryland, College Park, MD May 2020
Department of Astronomy, Department of Physics
B.S. in Astronomy (High Honors) and Physics
Honors Thesis: Exploring Spatial and Temporal Changes in Hydration across the Lunar South Pole

RESEARCH EXPERIENCE

Purdue University Fall 2020 - Present
Advisor: Ali Bramson
MDAP: The Mass Balance of Polar Ice on Mars from the Migration of Spiral Troughs
LDAP: Sources and Replenishment of Lunar Hydration on Diurnal Timescales

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 CO₂ 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, Kamden Maddox, Arunima Saha, Jessica Cyr Fall 2024 - Spring 2025
- Alex Gleason (Purdue PHYS), **Main Advisor: Ali Bramson** Fall 2022 - Spring 2023
- Ashwin Nomi (Purdue AAE), **Main Advisor: Ali Bramson** Fall 2021 - Spring 2022

HONORS AND AWARDS

Purdue University

- EAPS EXPO 3 Min Talk (Spring 2024).
- Department Teaching Honor Roll (Fall 2020; Spring 2023; Summer 2024).
- LPI Career Development Award (Spring 2023).
- Purdue Graduate Student Government Travel Award (Spring 2023).
- Certificate in College Teaching (Spring 2022).

University of Maryland, College Park

- High Honors in Astronomy (Spring 2020).

PROPOSALS

Named Student Member:

Sources and Replenishment of Lunar Hydration on Diurnal Timescales, PI: Ali Bramson, funded by NASA's Lunar Data Analysis Program (LDAP)

SERVICE

Conference Session Moderator:

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

Reviewer:

- Planetary Science Journal.
- Journal of Geophysical Research: Planets.

Department Service:

- 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

Department Mentor:

- 2022, 2023, 2024

PEER-REVIEWED PUBLICATIONS

U Undergraduate student author

1. **Laferriere, K. L.**, Bramson, A. M., ^UGleason, 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 review*.
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

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