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_2 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

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:

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

OUTREACH

Auburn High School

- Guest Lectures - Astronomy 1, Astronomy 2, AP Physics 1, AP Physics 2 — April 30, 2024

University of Maryland

College of Mathematics and Natural Sciences — Apr 2017 - May 2020

- Panelist - 10 Open Houses as CMNS Recruitment Ambassador
- Met with 5 prospective students in Physics and/or Astronomy
- Held Q&A on STEM at UMD with middle school students from Chapel Hill-Carrboro City, NC Schools

Public Talks:

- *Metallicity of Open Star Clusters Using Beat Cepheids* — Spring 2018
  with C. Bambic, V. Carvajal, and C. Hinrichs at UMD Physical Science Complex
- *Exploring the Cepheid PM-Relation in M31 with iPFT* — Fall 2017
  with C. Harada and M. Sitaram at UMD Observatory

Fitchburg State University, Upward Bound Math and Science

- Residential Counselor (Teaching Assistant, Tutor, Mentor, and Residential Assistant) — Summer 2018

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

PEER-REVIEWED PUBLICATIONS

U *Undergraduate student author*

1. **Laferriere, K. L.**, Bramson, A. M., [U]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 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.
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.
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 .

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., Patternson, 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., Klidaras, 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*.