

Eleanor (Ellie) L. Moreland

she/her

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EDUCATION

- Ph.D. in Earth, Environmental and Planetary Science**, Rice University *Expected December 2026*
Advisor: Dr. Kirsten Siebach
- B. A. in Geology**, Washington University in St. Louis May 2021
Cum Laude with Thesis and Highest Distinction in Earth and Planetary Sciences
Advisor: Dr. Raymond Arvidson

HONORS & AWARDS

- **NASA Group Achievement Award**, Mars 2020 Jezero Western Fan & Margin Units Team (July 2025)
- Texas Area Planetary Science Conference Travel Grant (September 2025)
- Geological Society of America South Central Section Travel Grant (September 2025)
- **Douglas and Martha Lou Broussard Fellowship** for high academic records and outstanding qualifications for advanced studies in Earth, Environmental and Planetary Sciences (May 2025)
- **Texas Space Grant Consortium Graduate Fellowship** for excellence in academics, interest in space, and recommendations (January 2025)
- Women in Natural Sciences Travel Grant, Rice University (June 2024)
- Best Poster Presentation Award, Rice Industry Geoscience Series (April 2023)
- **Alison Henning Teaching Award** for outstanding graduate teaching assistants in the Earth, Environmental and Planetary Sciences at Rice University (May 2023)
- **Harold Levin Award** for outstanding undergraduate teaching assistants in the Earth and Planetary Sciences at Washington University in St. Louis (May 2021)
- **Courtney Werner Memorial Prize** for outstanding academic achievement in the Earth and Planetary Sciences at Washington University in St. Louis (May 2021)
- Summer Undergraduate Research Award, Washington University in St. Louis (May 2019)
- 3x Academic All-American, Women's Soccer, University Athletic Association (2017-2021)
- Washington University Dean's list 7 semesters (2017-2021)

PROFESSIONAL EXPERIENCE

- Mars 2020 Science and Operations Team Student Collaborator**, NASA 2021 – present
- Student collaborator on the Planetary Instrument for X-ray Lithochemistry (PIXL) team
 - Communicate between project science and engineering to support uplink operations
- Siebach Lab Graduate Research Assistant**, Rice University 2021 – present
- Developed and deployed the novel Mineral Identification by Stoichiometry (MIST) algorithm (mist.rice.edu)
 - Performing mineral identifications in geochemical data from the PIXL instrument
- Dee Lab Graduate Research Assistant**, Rice University 2022 – 2025
- Translated between planetary geology and paleoclimate subject matter experts to create a new, open-source, intermediate-complexity lake model for simulating paleolakes sites on Mars
 - Initiated collaboration with Dr. Michael Mischna at NASA JPL for Mars climate model data
- NASA Mission Design Planetary Science Summer School Internship**, NASA JPL May – August 2025
- Selected to participate in 3-month intensive mission design program with scientists and engineers to design a science-driven robotic planetary mission concept to Enceladus
 - Directed the cost and schedule of the interdisciplinary team as Project Manager, led the proposal strategy as a replacement Capture Strategist

- Pitched mission concept to NASA review panel

Remote Sensing Lab Undergraduate Research Assistant, Washington University 2020 – 2021

- Processed and interpreted orbital and ground-based datasets to understand dynamics, sorting, and geochemistry of aeolian deposits in Gale Crater, Mars
- Collaborated with Dr. Richard Morris at NASA JSC ARES for new laboratory spectroscopic measurements

Aqueous Geochemistry Lab Undergraduate Research Assistant, Washington University 2019 – 2020

- Performed glove box experiments, took measurements (UV-VIS, ICP-MS, XRD), and made calculations (Geochemist's Workbench) to investigate the stoichiometric capability of chlorate to oxidize Fe(II) and form Fe(III)-bearing minerals in Mars-relevant fluids and the effects of low temperature on the kinetic efficiency

PEER-REVIEWED PUBLICATIONS – ACCEPTED

2026

10. Orenstein, B.J., Flannery, D.T., Jones, M.W., **Moreland, E.L.**, Siebach, K.L., Tice, M.M., Treiman, A.H., et al. (2026). [Igneous and sedimentary origins of Jezero crater units from X-ray crystal mapping on Mars](#). *Communications Earth & Environment*. DOI: 10.1038/s43247-026-03227-2
9. **Moreland, E.L.**, Dee, S., Jiang, Y., Bischof, G., Mischna, M., Hartigan, N., Russell, J., Moores, J., and Siebach, K. (2026). [Seasonal ice cover could allow liquid lakes to persist in a cold Mars paleoclimate](#). *Editors' Highlight in AGU Advances*, 7, e2025AV001891. DOI: 10.1029/2025AV001891

2025

8. **Moreland, E. L.**, Siebach, K. L., Costin, G., Tice, M. M., Hurowitz, J. A., Treiman, A. H., et al. (2025). [Multiple episodes of fluid alteration in Jezero crater indicated by MIST mineral identifications in PIXL XRF data from the first 1100 sols of the Mars 2020 mission](#). *Journal of Geophysical Research: Planets*, 130, e2024JE008797. DOI: 10.1029/2024JE008797
7. Hurowitz, J.A., Tice, M.M., Allwood, A.C., ... , **Moreland, E.L.** et al. [Redox-driven mineral and organic associations in Jezero Crater, Mars](#). *Nature* 645, 332–340 (2025). DOI: 10.1038/s41586-025-09413-0
6. Siebach, K. L., **Moreland, E. L.**, Costin, G., & Jiang, Y. (2026). [MIST: An Online Tool Automating Mineral Identification by Stoichiometry](#). *Computers & Geosciences* 206(106021). DOI: 10.1016/j.cageo.2025.106021

2024

5. Seelos, F.P., Seelos, K.D., Murchie, S.L., ... , **Moreland, E.L.** et al. (2024). [The CRISM Investigation in Mars Orbit: Overview, History, and Delivered Data Products](#). *Icarus*, 419(115612). DOI: 10.1016/j.icarus.2023.115612.

2022

4. Mitra, K., **Moreland, E.L.**, Ledingham, G.J., and Catalano, J.G. (2022). [Formation of manganese oxides on early Mars due to active halogen cycling](#). *Nature Geoscience*. DOI: 10.1038/s41561-022-01094-y.
3. **Moreland, E. L.**, Arvidson, R. E., Morris, R. V., Conduis, T., Hughes, M. N., Weitz, C. M., & VanBommel, S. J. (2022). [Orbital and in situ investigation of the Bagnold dunes and Sands of Forvie, Gale crater, Mars](#). *Journal of Geophysical Research: Planets*, 127(e2022JE007436). In Special Issue "The Curiosity Rover's Investigation of Glen Torridon and the Surrounding Area." DOI: 10.1029/2022JE007436.
2. Mitra, K., **Moreland, E.L.**, Knight, A., and Catalano, J.G. (2022). [Rates and Products of Iron Oxidation by Chlorate at Low Temperatures \(0 to 25 °C\) and Implications for Mars Geochemistry](#). *ACS Earth and Space Chemistry*, 6(2). DOI: 10.1021/acsearthspacechem.1c00379.

2020

1. Mitra, K., **Moreland, E.L.**, and Catalano, J.G. (2020). [Capacity of chlorate to oxidize Ferrous Iron: Implications for Iron Oxide Formation on Mars](#). *Minerals*, 10(9). Feature Paper in Special Issue "Expanding Views of Clays, Oxides, and Evaporites on Aquaplanets in the Solar System." DOI: 10.3390/min10090729.

PEER-REVIEWED PUBLICATIONS – SUBMITTED & IN REVISION

3. Sinclair, K.P., Ramo, K., Tice, M.M., Hurowitz, J.A., **Moreland, E.L.**, Catline, D., et al. (submitted). Low-Temperature Carbonation and Silicification of Ultramafic Rocks in Jezero Crater's Eastern Margin Unit.
2. Bedford, C.C., Ravanis, E., Weins, R.C., Clavé, E., Forni, O., Aramendia, J.M.M., **Moreland, E.**, et al. (submitted). Investigating the origin and lake-associated alteration of the olivine-rich Margin unit in Jezero crater, Mars.
1. **Moreland, E.L.**, Bramble, M., Siebach, K.L., Pascuzzo, A.C., Morris, M., VanBommel, S.J., Jones, M., Siljeström, S., Srivastava, A., Treiman, A.H., Hurowitz, J. (submitted). Alteration of a mantle-derived dunite boulder in Jezero Crater, Mars.

OTHER PUBLICATIONS

1. **Moreland, Eleanor**, "Mineralogy of Aeolian Deposits in Gale Crater, Mars: The Bagnold Dunes to Glen Torridon" (2021). Senior Honors Papers / Undergraduate Theses. 34. DOI: 10.7936/xct8-8j21

TEACHING & MENTORING

Teaching Assistant Experience

- **Teaching Assistant Remote Sensing, Rice University graduate and undergraduate course (Fall 2022)**
- **Teaching Assistant *What's the Curiosity Rover Doing This Week***, Washington University in St. Louis undergraduate course (Spring 2021)
- **Teaching Assistant *Earth and the Environment***, Washington U. undergraduate course (Spring 2020)

Class Lectures

- **Chemistry of the Solar System**, University of Texas San Antonio (10/16/2025)
Stoichiometric Identification of Minerals from the Mars 2020 Mission
- **Remote Sensing**, Rice University (10/6/2022)
Orbital and In-Situ Investigation of the Bagnold Dunes and Sands of Forvie, Gale Crater, Mars

Past Undergraduate Advisees

- Seunggyu Shin (Fall 2024)
Expanding a Hierarchical Monte Carlo Unmixing Approach for Complex Geochemical Datasets
- Ariaan Ghatate (Spring 2024)
A novel Hierarchical Monte Carlo Unmixing Approach for Complex Geochemical Datasets
- Nyla Hartigan (2022 – 2024)

INVITED TALKS

2025

- Limitless Lounge Educator Program, virtual (December 4)
Perseverance at the Frontier of Mars Exploration
- Houston Geological Society Environmental and Engineering Geology, Houston, TX (October 15)
Perseverance at the Frontier of Mars Exploration

2024

- Rice University Graduate Student Flash Talks, Rice University, Houston, TX (November 1)
Identifying Minerals on Mars

OUTREACH, COMMUNITY SERVICE, & SCIENCE COMMUNICATION

Ongoing efforts

- 15 blog posts written for the Mars 2020 Mission [\[link\]](#)
- Rice GeoUnion Equity & Inclusion Committee Co-Chair
- President of Association for Women Geoscientists Rice University Chapter

2026

- Advisor for organizing the 2026 Houston Communicating Science Conference
- Exploring Geology on Mars lecture with “Exploring by the Seat of Your Pants” [\[link\]](#) (virtual, March 25)
- Ran a booth at Rice EEPS Open House (February 28)
- Consulted expert for Dr. Scott Solomon’s book “*Becoming Martian*” (published February 17)
- Lecturer for Skype a Scientist (virtual, February 12)
- Event co-planner and workshop leader for Girl Scouts of San Jacinto Climate Challenge (January 31)

2025

- Partner on the Houston Dynamo Special Olympics Unified Soccer Team
- Member of Unlearning Racism in the Geosciences (URGE) Rice University Pod
- Guest expert for high school projects focused on human missions to Mars (virtual, December 2)
- Organized a “Science Engagement Workshop” for Rice undergraduates (November 14)
- Lecturer for Skype a Scientist (virtual; November 5, 17, 19)
- Guest speaker at Rice University Planetary Science Academy for high schoolers (June 24 & July 8)
- Ran a booth at Rice EEPS Open House (May 3)
- Ran a booth at YES Prep North Rankin Elementary STEM Night (April 30)
- Judge for Rice Undergraduate Research Symposium (April 16) and Shapiro Showcase (April 23)
- Co-Organizer of the 2025 Houston Communicating Science Conference (April 12)
- Early career panelist for NASA Here-to-Observe participants (virtual, April 7)
- Houston ISD Teacher Professional Development on Mars Exploration (March 26 & 29)
- Workshop co-lead and presenter at the Space Exploration Educators Conference (February 7)
- Guest expert for Elementary school SciNOW Clubs (January 27, 30)
- Science Writer for EEPS News [\[link\]](#) (January 14)

2024

- PIXL Team Early Career Liaison
- Partner on the Houston Dynamo Special Olympics Unified Soccer Team
- Houston ISD Middle School Planetary Exploration Day (December 7)
- Workshop leader for Girl Scouts of San Jacinto Climate Challenge (November 2)
- Houston ISD Teacher Professional Development on Mars Exploration (April 27)
- Geology Expert at Girl Scouts of San Jacinto “Rock Stars” Geology Day (April 20)

2023

- Outreach Chair for Rice University GeoUnion
- Partner on the Houston Dynamo Special Olympics Unified Soccer Team
- Workshop leader for Girl Scouts of San Jacinto Climate Challenge (November 4)
- Science writer for EEPS News [\[link\]](#) (August 16)

2022

- Outreach Chair for Rice University GeoUnion
- Co-Officer for the Youth Science Workshop
- Co-President of the Washington University Geology Club
- Ran a booth at NASA and Rice University 60th Anniversary Celebration of the Moonshot Speech (September 12)
- Workshop leader for Girl Scouts of San Jacinto Climate Challenge (October 15)

FIELD EXPERIENCES

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|---|-----------------------|
| Structure of the Gardnos Impact Crater, Norway, with Mars 2020 Science Team | 1 day, June 2025 |
| Geology of Arkansas Field Trip, Fayetteville, AR | 4 days, April 2022 |
| Terrestrial Depositional Systems Field Trip, Panther Creek, Houston, TX | 1 day, February 2022 |
| Costal processes in Galveston, TX, for attendees of the SEPM Conference (Co-leader) | 1 day, September 2022 |

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| Costal processes field trip in Galveston, TX | 1 day, March 2022 |
| Geologic Mapping of the Colorado Plateau, Utah and Arizona | 5 days, March 2020 |
| Field Geology course field trip in Patagonia, Argentina | 6 days, March 2019 |

PRESS RELEASES

- Rice News 1/5/2026: Thin ice may have protected lake water on frozen Mars [\[link\]](#)
- Rice News 9/17/2025: New Mars research reveals multiple episodes of habitability in Jezero Crater [\[link\]](#)
- Rice News 9/12/2025: Rice Ph.D. student explores Mars by day, builds inclusion through soccer by night [\[link\]](#)
- Rice News 8/20/2025: Rice scientists launch powerful new online tool to streamline mineral identification [\[link\]](#)

CONFERENCE ABSTRACTS

*Presenting author

2026

38. **Moreland, E. L.**, Siebach, K. L., Tice, M. M., Schmidt, M., VanBommel, S. J., Hurowitz, J. A. (2026). [Geochemical Diversity of Upper Fan Sedimentary Rocks from Mars 2020 PIXL](#). 57th LPSC, Houston, TX. Abstract #1306 [oral].
37. Hausrath, E. M., Martinez, E., Treiman, A. H., Ramo, K., Jones, M. W. M., **Moreland, E.**, et al. (2026). [A PIXL Examination of Potential Clay Minerals in the Crater Rim Region of Jezero Crater, Mars](#). 57th LPSC, Houston, TX. Abstract #1499.
36. Liu, Y., Treiman, A. H., Schmidt, M. A., Tice, M. M., Jones, M. W., VanBommel, S. J., et al. (incl. **Moreland, E. L.**) (2026). [Discovery of Ancient Granitic Components Outside Jezero Crater, Mars](#). 57th LPSC, Houston, TX. Abstract #1322.

2025

35. **Moreland, E. L.**, Siebach, K. L., Costin, G., Tice, M., Hurowitz, J., Treiman, A. et al. (2025). Stoichiometric Minerals in PIXL Data from the Mars 2020 Mission. Texas Area Planetary Science Conference (TAPS), San Antonio, TX. Abstract TAPS2025-060 [oral].
34. **Moreland, E.**, Siebach, K., Costin, G., Tice, M., Hurowitz, J., Treiman, A., et al. (2025). [Stoichiometric Minerals in PIXL Data from the Mars 2020 Mission](#). GSA Connects, San Antonio, TX. DOI: 10.1130/abs/2025am-10307 [oral].
33. Shin, S., **Moreland, E. L.**, Ghatate, A., Siebach, K. L. (2025). Expanding a Hierarchical Monte Carlo Unmixing Approach for Complex Geochemical Datasets. In *Rice Natural Sciences Undergraduate Research Symposium*.
32. **Moreland, E. L.**, Siebach, K. L., Hurowitz, J. A., Bedford, C. C., Treiman, A. H. (2025). [Stoichiometric Mineral Identifications and Uncertainties from Sols 900–1400 of the Mars 2020 Mission with PIXL and MIST](#). 56th LPSC, Houston, TX. Abstract #2474 [poster].
31. Gasda, P. J., Kalucha, H., Broz, A., **Moreland, E.**, Czarnecki, S., Lanza, N., et al. (2025). [Diagenesis in Mars Crater Sediments](#). 56th LPSC, Houston, TX. Abstract #1612.
30. Bedford, C. C., Ravanis, E., Wiens, R. C., Clavé, E., Forni, O., Aramendia, et al. (incl. **Moreland, E.**) (2025). [Investigating the Origin and Alteration History of the Margin Unit in Jezero Crater, Mars, with the SuperCam Instrument](#). 56th LPSC, Houston, TX. Abstract #1946.
29. Hurowitz, J. A., Tice, M. M., Allwood, A. C., Cable, M. L., Hand, K. P., Murphy, A. E., et al. (incl. **Moreland, E. L.**) (2025). [The Detection of a Potential Biosignature by the Perseverance Rover on Mars](#). 56th LPSC, Houston, TX. Abstract #2581.

2024

28. Treiman, A., Hurowitz, J., Tice, M. M., Moreland, E. L., Liu, Y., Orenstein, B. J., et al. (2024) [Origin of Jezero Crater's Margin Unit: Textural and Chemical Constraints from the PIXL Instrument on M2020](#). GSA Connects, Anaheim, CA. DOI: 10.1130/abs/2024AM-401940

27. **Moreland, E. L.**, Siebach, K. L., Costin, G., Jiang, Y., Tice, M. M., Hurowitz, J. A., et al. (2024). [Identifying Stoichiometric Minerals in PIXL Data from the First Three Years of the Mars 2020 Mission Using the MIST Algorithm](#). *10th International Conference on Mars*, Pasadena, CA. Abstract #3077.
26. Russell, P. S., D. A. Paige, E. L. Cardarelli, S. E. Hamran, T. Berger, K. L. Siebach, and E. L. Moreland*. (2024). [RIMFAX GPR Observations of the Jezero Crater Western Fan and Its Transition to the Margin Unit](#). *10th International Conference on Mars*, Pasadena, CA. Abstract #3298.
25. K. L., Tice, M. M., Hurowitz, J. A., **Moreland, E. L.**, Simon, J. I., Schmidt, M. E. et al. (2024) [Observations of Coarse-Grained Fluviodeltaic Rocks in the Jezero Western Fan and Gale Crater: Implications for Sedimentary Rock Formation and Mars Sample Return](#). *10th International Conference on Mars*, Pasadena, CA. Abstract #3076.
24. **Moreland, E. L.**, Siebach, K. L., Liu, Y., Treiman, A. H., Tice, M. M., Hurowitz, J. A., et al. (2024). [Falcon Lake: An Olivine-Rich Boulder in Jezero Crater, Mars](#). *55th LPSC*, Houston, TX. Abstract #2030 [poster].
23. **Moreland, E. L.**, Siebach, K. L., Costin, G., Jiang, Y., Clark, B. C. (2024). [How Does Instrument Uncertainty Affect Stoichiometric Identification of Minerals in the Jezero Crater Floor?](#) *55th LPSC*, Houston, TX. Abstract #1987 [poster].
22. Tice, M. M., Hurowitz, J. A., Siebach, K. L., **Moreland, E. L.**, Kizovski, T. V., Schmidt, M. E., et al. (2024). [Regional Paleoenvironments Recorded in Sedimentary Rocks of the Western Fan-Delta, Jezero Crater, Mars](#). *55th LPSC*, Houston, TX. Abstract #2181.
21. Siebach, K. L., Tice, M. M., Hurowitz, J. A., **Moreland, E. L.**, Van Beek, J. K., Kizovski, T. V., et al. (2024). [PIXL Analyses of Sedimentary Rocks in the Mars 2020 Perseverance Upper Fan Campaign in Jezero Crater](#). *55th LPSC*, Houston, TX. Abstract #2365.
20. Labrie, J., Schmidt, M. E., Hallis, L. J., Moore, N. E., Grunder, A. L., L. Shiraishi, et al. (incl. **Moreland, E. L.**) (2024). [PIXL Breadboard Analyses of Mars 2020/Mars Sample Return Jezero Crater Floor Analogue Rocks](#). *55th LPSC*, Houston, TX. Abstract #2115.
19. Treiman, A. H., Hurowitz, J. A., Clark, B. C., Liu, Y., Hernandez-Montenegro, J. D., M. M. Tice, et al. (incl. **Moreland, E. L.**) (2024). [Mount Meeker: A Boulder of Aluminous Melt Rock in Jezero Crater, Mars](#). *55th LPSC*, Houston, TX. Abstract #1283.
18. Siljeström, S., Farley, K. A., Bosak, T., Calef III, F. J., Czaja, A. D., Garcynski, B., et al. (incl. **Moreland, E. L.**) (2024). [Sampling the Margin Unit of Jezero Crater, Mars for future Mars Sample Return](#). *55th LPSC*, Houston, TX. Abstract #1848.
17. Gasda, P. J., Kalucha, H., Comellas, J., **Moreland, E.**, Wolf, U., Brown, A., et al. (2024). [Models of Serpentine Formation Conditions in Jezero Crater](#). *55th LPSC*, Houston, TX. Abstract #2138.
16. Siebach, K., **Moreland, E.***, Costin, G., Jiang, Y. (2024). [Automated Mineral Identification by Stoichiometry \(MIST\): A Tool for Geochemical Dataset Standardization](#). *34th Goldschmidt Conference*, Chicago, IL. Abstract 23779 [oral].

2023

15. **Moreland, E. L.**, Dee, S., Jiang, Y., Bischof, G., Mischna, M., Hartigan, N., et al. (2023). [An Intermediate-Complexity Model for Simulating Lacustrine Environments on Early Mars](#). *AGU Fall Meeting*, San Francisco, CA. Abstract EP53B-08 [oral].
14. Gasda, P. J., Kalucha, H., Comellas, J., **Moreland, E.**, Wolf, Z. U., Brown, A. J., et al. (2023). [Constraining the Alteration Conditions in the Lower Delta of Jezero Crater](#). *AGU Fall Meeting*, San Francisco, CA. Abstract P41E-3226.
13. **Moreland, E. L.**, Siebach, K. L., Costin, G., Jiang, Y., Tice, M. M., Kizovski, T. V., et al. (2023). [Crystal Chemistry of Primary and Secondary Minerals in the Jezero Crater Floor](#). *54th LPSC*, Houston, TX. Abstract #2196 [poster].
12. Kizovski, T. V., O'Neil, L., Schmidt, M., Hurowitz, J., Treiman, A., Pedersen, D., et al. (incl. **Moreland, E. L.**) (2023). [Minor minerals in the Jezero Crater delta analyzed by PIXL—Provenance and Mars sample return implications](#). *54th LPSC*, Houston, TX. Abstract #2855.

2022

11. Siebach, K. L., Costin, G., **Moreland, E. L.**, Jiang, Y. (2022). [MIST: An Online Tool Automating Mineral Identification by Stoichiometry in Geochemical Datasets](#). *AGU Fall Meeting*, Chicago, IL. Abstract V42A-04.

10. **Moreland, E. L.**, Siebach, K. L., Costin, G., Jiang, Y., VanBommel, S., Kizovski, T., et al. (2022). [Stoichiometric Mineral Identifications in Mars 2020 Perseverance PIXL Data Using the Automated MIST Algorithm](#). *AGU Fall Meeting*, Chicago, IL. Abstract P55A-06 [oral].
9. Siebach, K. L., Costin, G., **Moreland, E.**, Jiang, Y. (2022). [MIST: An Algorithm for Automating Mineral Identification by Stoichiometry](#). *International Mineralogical Association 23rd Meeting*, Lyon, France. Abstract OL40_5.

2021

8. **Moreland, E. L.**, Arvidson, R. E. (2021). [Compositional Variance of Aeolian Deposits in Gale Crater, Mars](#). *52nd LPSC*, Houston, TX. Abstract #2397 [poster].
7. Condu, T., Arvidson, R. E., Moreland, E. L. (2021). [CRISM-Derived Modal Mineralogy and Thermal Inertia for Oxia Planum](#). *52nd LPSC*, Houston, TX. Abstract #1670.

2020

6. **Moreland, E. L.**, Arvidson, R. E., Christian, J. R. (2020). [Windblown Basaltic Sands on the Northern Slopes of Mount Sharp and Adjacent Plains, Gale Crater, Mars](#). *AGU Fall Meeting, online only due to COVID-19*. Abstract EP018-0004 [E-poster].
4. Christian, J. R., Arvidson, R. E., O'Sullivan, J. A., **Moreland, E. L.** (2020). [High Spatial Resolution Thermal Inertia Mapping of Mount Sharp and Northern Plains, Gale Crater, Mars](#). *AGU Fall Meeting, online only due to COVID-19*. Abstract P069-0013.
3. **Moreland, E. L.**, Mitra, K., Catalano, J. G. (2020). [Stoichiometric Efficiency of Iron Oxidation by Chlorate on Mars](#). *51st LPSC, cancelled due to COVID-19*. Abstract #1033.
2. Mitra, K., **Moreland, E. L.**, Ledingham, G. J., Arvidson, R. E., Catalano, J. G. (2020). [Dissolved Manganese Oxidation by Bromate and Chlorate: An Alternate Hypothesis of Manganese Oxide Formation on Mars](#). *51st LPSC, cancelled due to COVID-19*. Abstract #1068.
1. Mitra, K., **Moreland, E. L.**, Catalano, J. G. (2020). [Fe\(II\) Oxidation and Fe\(III\) Mineral Production by Chlorate at Mars-Relevant Temperatures](#). *51st LPSC, cancelled due to COVID-19*. Abstract #1069.