

# ELEANOR L. MORELAND

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## EDUCATION

**Doctor of Philosophy in Earth, Environmental, and Planetary Science** *Expected 2026*

Rice University, Houston, TX

Advisor: Dr. Kirsten Siebach

**Bachelor of Arts in Geology** May 2021

Washington University in St. Louis, St. Louis, MO

*Cum Laude* with Thesis and Highest Distinction in Earth and Planetary Sciences

Thesis: Mineralogy of Aeolian Deposits in Gale Crater, Mars: The Bagnold Dunes to Glen Torridon

Advisor: Dr. Raymond E. Arvidson

## AWARDS AND PRIZES

**Harold Levin Award**, Washington University in St. Louis May 2021

Outstanding Job as Assistant to the Instructor

**Courtney Werner Memorial Prize**, Washington University in St. Louis May 2021

Outstanding Achievement in Earth and Planetary Sciences

**Dean's List**, Washington University in St. Louis Dec. '17, '19, '20; May '18, '19, '20, '21

Semester GPA  $\geq 3.60$

**Academic All-American**, University Athletic Association Dec. 2018, 2019, 2020

**Summer Undergraduate Research Award**, Washington University in St. Louis May 2019

Award of \$4,000 to conduct summer research in Earth and Planetary Sciences

## PUBLICATIONS

### Referred Journal Articles

- 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* (accepted).
- Mitra, K., **Moreland, E.L.**, and Catalano, J.G. (2021). 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."*

### Conference Proceedings: Poster Presentations

- Moreland, E.L.**, Arvidson, R.E., 2021, Compositional Variance of Aeolian Deposits in Gale Crater, Mars. In 52<sup>nd</sup> LPSC, Abstract ID #2397
- Condu, T., Arvidson, R.E., **Moreland, E.L.**, 2021, CRISM-Derived Modal Mineralogy and Thermal Inertia for Oxia Planum. In 52<sup>nd</sup> LPSC, Abstract ID #1670.
- 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. In *AGU Fall 2020* (EP018-0004).
- Mitra, K., **Moreland, E.L.**, Ledingham, G.J., Arvidson, R.E. and Catalano, J.G., 2020, Manganese Oxide Formation by Oxyhalogens: Faster Alternatives to Oxygen as Mn Oxidants on Mars. In *AGU Fall 2020* (P041-03).
- 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. In *AGU Fall 2020* (P069-0013).

6. **Moreland, E.L.**, Mitra, K., and Catalano, J.G., 2020, Stoichiometric Efficiency of Iron Oxidation by Chlorate on Mars. In 51<sup>st</sup> LPSC, Abstract ID #1033.
7. Mitra, K., **Moreland, E.L.**, Ledingham, G.J., Arvidson, R.E. and Catalano, J.G., 2020, Dissolved Manganese Oxidation by Bromate and Chlorate: An Alternate Hypothesis of Manganese Oxide Formation on Mars. In 51<sup>st</sup> LPSC, Abstract ID #1068.
8. Mitra, K., **Moreland, E.L.**, and Catalano, J.G., 2020, Fe(II) Oxidation and Fe(III) Mineral Production by Chlorate at Mars-Relevant Temperatures: Reaction Rates & Mineral Products. In 51<sup>st</sup> LPSC, Abstract ID #1069.

## FIELD EXPERIENCE

**Colorado Plateau, Utah (2020); Johnson Shut-Ins, Missouri (2019); Patagonia, Argentina (2019)**

## RESEARCH EXPERIENCE

### Rice University

Siebach Laboratory

Aug. 2021 – *ongoing*

Graduate Student; Advisor: *Prof. Kirsten Siebach*

- Algorithm for Mineral Identification by Stoichiometry (MIST): Develop a working algorithm to analyze data returned from the PIXEL instrument on the Mars 2020 Perseverance rover.

### Washington University in St. Louis

Remote Sensing Laboratory

Jan. 2020 – Dec. 2021

Research Assistant; Advisor: *Prof. Raymond E. Arvidson*

- Investigation of Basaltic Sands in Gale Crater, Mars: Process and interpret orbital and ground-based datasets to understand current aeolian dynamics in Gale Crater. Utilize MATLAB code to model the composition and grain sizes of deposits near the Curiosity Rover's traverses.

Aqueous Geochemistry & Mineralogy Laboratory

Jan. 2019 – Dec. 2019

Undergraduate Research Assistant; Advisor: *Prof. Jeffrey G. Catalano*

- Capacity of Chlorate to Oxidize Ferrous Iron: Investigate the stoichiometric capability of chlorate to oxidize Fe(II) and form Fe(III)-bearing minerals in Mars-relevant fluids and potential effects of lower temperature.

## PRESENTATIONS

- **Washington University Earth and Planetary Sciences Colloquia**, Senior Theses Presentations and Awards, Spring 2021. "Mineralogy of Aeolian Deposits in Gale Crater, Mars: The Bagnold Dunes to Glen Torridon".
- **Washington University Undergraduate Research Symposium**, 2019. "Efficiency of Fe(II) Oxidation by Chlorate on Mars".
- **Brown Bag Series**, Washington University Earth & Planetary Sciences Department, 2019. "Our Trip to Patagonia".

## TEACHING & MENTORING EXPERIENCE

- **Teaching Assistant**, "What's the Curiosity Rover Doing this Week?", Washington University in St. Louis. Spring 2021.
- **Washington University Geology Club**, Co-President. 2019 – 2021.
- **Teaching Assistant**, "Earth and the Environment", Washington University in St. Louis. Spring 2020.