

# ÉMILIE ANNE LAFLÈCHE

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## EDUCATION

**Ph.D., Earth, Atmospheric, and Planetary Sciences** August 2021 - Present  
Department of Earth, Atmospheric, and Planetary Sciences, Purdue University  
Advisor: Prof. Stephanie Olson

**B.Sc., First-Class Honours Planetary Sciences** August 2018 - June 2021  
Department of Earth and Planetary Sciences, McGill University  
Advisor: Prof. Richard Léveillé

## RESEARCH EXPERIENCE

**Geological Sampling Research Coordinator** January 2023 – Present  
*LunAres Research Station*

- Leading and remotely coordinating all geological research studies conducted during crewed missions at LunAres Research Station, an analog space simulation environment in Poland.

**Ph.D. Student** August 2021 – Present  
*Department of Earth, Atmospheric, and Planetary Sciences, Purdue University*  
Advisor: Prof. Stephanie Olson

- Modeling biospheric seasonality on early Earth and Earth-like exoplanets to assess its impacts on the evolution of life and evaluate its potential application as an exoplanet biosignature.

**Honours Undergraduate Researcher** January 2020 – August 2021  
*Department of Earth and Planetary Sciences, McGill University*  
Advisor: Prof. Richard Léveillé

- Experimentally precipitated Mg-clay minerals from ambient temperature biotic solutions to critically evaluate the conditions leading to favorable biosignature preservation in clays.

**Summer Exploration Research Intern** May 2020 – August 2020  
*Institute for Earth and Space Exploration, University of Western Ontario*  
Advisor: Prof. Catherine Neish

- Examined images of lunar impact melt deposits at a range of wavelengths using data from NASA's Lunar Reconnaissance Orbiter and used ArcGIS tools to extract data regarding the physical properties of the melt deposits.
- Led team project to draft a mission concept proposal to the Moon's Tsiolkovskiy crater.

**Trottier Summer Intern** May 2019 – August 2019  
*Institute for Research on Exoplanets (iREx), Université de Montréal*  
Advisor: Prof. Nicolas Cowan (McGill University)

- Mapped and simulated terrestrial exoplanets in reflected light based on disk-integrated photometry and constructed surface albedo maps in Python.

## HONOURS AND AWARDS

Royal Astronomical Society of Canada (RASC) President's Award	June 2022
David Harrigan Memorial Prize	June 2021
Logan Scholarship in Geological and Biological Sciences	August 2020
Osisko Scholarship in Earth and Planetary Sciences	August 2020, August 2019
NSERC Undergraduate Student Research Award	May 2019
Trottier Excellence Grant for Summer Interns	May 2019

## PUBLICATIONS

Jernigan, J., **Lafèche, É. A.**, Burke, A., & Olson, S. L. (2023). Superhabitability of High-Obliquity and High-Eccentricity Planets. *The Astrophysical Journal*, 944(2), 205.

## CONFERENCE PRESENTATIONS

- Lafèche, É. A.**, Jernigan, J., Schwieterman, E. W., & Olson, S. L. (2023, May). *Modeling Seasonality in the Biospheres of Early Earth and Earth-like Exoplanets*. In 2023 Astrobiology Graduate Conference.
- Lafèche, É. A.**, Jernigan, J., Schwieterman, E. W., & Olson, S. L. (2023, May). *Modeling Oxygen Seasonality on Early Earth and Earth-like Exoplanets*. In 2023 Oxygen In Planetary Biospheres Workshop.
- Lafèche, É. A.**, Jernigan, J., Schwieterman, E. W., & Olson, S. L. (2023, May). *Modeling Oxygen Seasonality on Early Earth and Earth-like Exoplanets*. In 2023 Oxygen In Planetary Biospheres Conference.
- Lafèche, É. A.**, Jernigan, J., Schwieterman, E. W., & Olson, S. L. (2022, December). *Modeling Biospheric Seasonality for Early Earth and Earth-like Exoplanets*. In 2022 AGU Fall Meeting.
- Lafèche, É. A.**, Jernigan, J., Schwieterman, E. W., & Olson, S. L. (2022, July). *Modeling Seasonality for Early Earth and Earth-like Exoplanets*. In 2022 Goldschmidt Conference.
- Lafèche, É. A.**, Schwieterman, E. W., & Olson, S. L. (2022, May). *Modelling N Cycle Seasonality for Early Earth and Earth-like Exoplanets*. In 2022 Astrobiology Science Conference.
- Lafèche, É. A.**, Kells, K. P. J., Lambier, S. J., Neish, C. D., Osinski, G. R., Cross, M., & Tornabene, L. (2021, March). *Proposed Lunar Sample Return Mission at Tsiolkovskiy Crater*. In 52nd Lunar and Planetary Science Conference (No. 2548, p. 1363).
- Neish, C. D., **Lafèche, É. A.**, & Patterson, G. W. (2021, March). *Physical Properties of Lunar Impact Melt Deposits*. In Lunar and Planetary Science Conference (No. 2548, p. 1589).
- Lafèche, É. A.**, Kells, K. P. J., Lambier, S. J., Neish, C. D., Osinski, G. R., Cross, M., & Tornabene, L. (2020, November). *Proposed Lunar Sample Return Mission at Tsiolkovskiy Crater*. In SGAC/MSSA Networking and Lightning Talks, Canadian Space Summit 2020.
- Lafèche, É. A.**, & Cowan, N. J. (2019, October). *Mapping Exoplanet Surfaces with Time-Resolved Photometry using Exocartographer*. In Montreal Space Symposium 2019.

## **RESEARCH ADVISING**

**Jonathan Jernigan**, Purdue Physics undergraduate August 2022 - Present  
*“Superhabitability of High-Obliquity and High-Eccentricity Planets”*

## **OUTREACH**

**Student-Analog Astronaut Training Program Lead** October 2022 - Present  
*Space and Earth Analogs Research Chapter (SEARCH), Purdue University*

**Outreach Committee Member** October 2021 - June 2022  
*Department of Earth, Atmospheric and Planetary Sciences, Purdue University*

**NextGen Committee Founder, Chair** August 2020 - January 2022  
*Royal Astronomical Society of Canada*

**Educational Outreach Team Lead** September 2019 - June 2021  
*McGill Space Group*