KATELYN FRIZZELL

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EDUCATION

Master's Student: Earth and Planetary Science *2023 (anticipated)*
Rutgers University
Advisor: Dr. Lujendra Ojha
GPA: 4.0
Department Excellence Fellowship Awarded

Bachelor of Science: Geophysics *June 2019*
Western Washington University
Advisor: Dr. Melissa Rice
GPA: 3.63
Minor in Astronomy

RESEARCH EXPERIENCE

CIDER 2022: Earth's evolution as an inhabited world *Summer 2022*
Cooperative Institute for Dynamic Earth Research: Junior Attendee

- Attended multidisciplinary lectures and tutorials on planetary formation and interiors, surfaces and their habitability, atmospheres, biologic processes and metabolisms, and climate, and planetary processes and observations.
- Collaborated with scientists from across all disciplines/career stages to identify important research questions that can be advanced through interdisciplinary collaboration.
- Organized junior participant discussions for pitching topics and pitched 2 separate project ideas to the senior scientists. AGU abstract submitted for this work.

EVA Exercise at Meteor Crater *October 15-16, 2021*
Virtual Science Operations Center Participant (LPI-CLSE/SSERVI)

- Designed and developed an astronaut traverse based on limited data of the field site
- Communicated with an 'astronaut' in the field through a SciCom with the goal of maximizing the scientific return of an EVA
- Participated in a debriefing after the EVA to discuss what was learned and what could have been done differently

LPI Exploration Science Summer Intern Program (ESSI) *June 1 – August 6, 2021*
LPI/CLSE/SSERVI Virtual Summer Intern
Advisor: David Kring

- Worked with other early-career scientists to design and develop a lunar impact model that generates stratigraphic ice and ejecta columns in the lunar south pole in Python
- Presented model results to a panel of scientists and focused on the utility for future landed and crewed missions such as Artemis and VIPER
- Research will be presented at the Lunar and Planetary Science Conference in 2021
- A publication is in review for this research (see below)

Johns Hopkins Applied Physics Laboratory, Laurel MD *Sept. 2019 – Aug. 2020*
Planetary Science Leased Worker, CRISM Calibration/Data Processing
Advisors: Frank Seelos and David Humm

- Worked in depth with IDL calibration code to fix an issue with spectral wavetables for one of the observing modes under the instruction of calibration lead
- Created and refined a data processing step to remove undesirable noise structure from spectral image cubes
- Worked with complex mathematics to remove unnecessary data from image mosaics for linear and nonlinear optimization
- Assisted with the Mars 2020 team CRISM/CTX mapping effort in ENVI
- Organized and hosted virtual LPSC for APL employees with the help of collaborators

Lucy Student Pipeline Accelerator and Competency Enabler *Fall 2019*
(L'SPACE) Virtual NASA Proposal Writing and Evaluation Experience
(NPWEE) Academy

- Worked with scientists and engineers to propose a selectable innovative idea/solution to NASA's needs through ideation, proposal writing, and evaluation of NASA-focused proposals
- Identified and successfully communicated critical elements needed to carry out the work necessary to deliver what was being proposed while learning to work and communicate effectively in a team to optimize the project and follow through on tasks to meet deadlines
- Submitted proposal and quad chart to the NASA Marshall Chief Technologist for review, and act as a proposal reviewer for 3 other L'SPACE proposals

Lucy Student Pipeline Accelerator and Competency Enabler *Summer 2019*
(L'SPACE) Virtual Mission Concept Academy

- Designed and developed a Discovery-class NASA mission with the purpose of characterizing hydrocarbon seas on the surface of Titan, Saturn's largest moon
- Acted as deputy project manager and science team lead to facilitate group efficiency during mission design phase
- Attended weekly 1.5-hour classes and actively participated in all program activities
- Virtually collaborated with other students to complete objectives regarding mission design while following a schedule to complete individual and team class assignments

Mars Research Lab, Western Washington University, Bellingham WA *Summer 2019*
Post-Baccalaureate Research Assistant

- Utilized IDL in order to analyze the spectral/mineralogical diversity in images taken by the Mastcam instrument on the Curiosity rover in Gale Crater, Mars
- Worked collaboratively with other research students and the MSL team to develop a large Mastcam spectral database and keep it up to date
- Compared Mastcam mineralogical distributions and spectra to transformed orbital images in a continuation of a senior thesis for the purpose of simulating rover images on the surface

Mars Research Lab, Western Washington University, Bellingham WA *2018-2019*
Undergraduate Research Assistant
Advisor: Dr. Melissa Rice

- Utilized IDL in order to analyze the spectral/mineralogical diversity in images taken by the Mastcam on the Curiosity rover in Gale Crater, Mars
- Worked collaboratively with other undergraduate and graduate students to develop a large Mastcam spectral database
- Completed senior thesis involving radiometric transforms on CRISM hyperspectral images to create analogues for what the Mars 2020 rover will see *in situ*

Johns Hopkins University Applied Physics Laboratory, Laurel MD *Summer 2018*
APL/NASA Intern
Advisor: Dr. Frank Seelos

- Worked extensively with IDL programming in order to process and optimize spectral images taken of Mars from orbit using the CRISM hyperspectral imaging instrument aboard the Mars Reconnaissance Orbiter
- Used Singular Value Decomposition/Least Squares optimization and graph theory to further optimize images
- Contributed to a presentation at the Mars 2020 Landing Site Workshop
- Presented research at the 50th Lunar and Planetary Science Conference

SERVICE AND OUTREACH

Executive Chair of the Student Community, IAGD *2022-2024*
(International Association for Geoscience Diversity)
Responsible for engagement with student members, while advocating for new student opportunities within the IAGD. Directly manages the process for promoting and awarding the Student Pathways Scholarships. Will work to foster a sense of inclusivity within the geoscience community, and work with the Executive Committee to create professional development or educational opportunities for students.

Amateur Astronomers Inc., Invited Lecture *(anticipated) Nov. 2022*

Judge for the 53rd LPSC Stephen E. Dwornik Student Award *March 2022*

Rutgers EPS Graduate Student Organization (GSO) President *2021-Present*
Organized graduate student participation in faculty hiring process, ran monthly GSO meetings, and worked to develop both a department-specific TA training workshop as well as an equity and reporting workshop for EPS graduate students. Other duties involved volunteering to run the booth at Rutgers day and volunteering for the Geology Museum's outreach events.

Guest Lecture, Rutgers University *September 17th, 2021*
Invited to give a stand-in lecture about NASA and mission science for the Planet Mars class offered in the Earth and Planetary Sciences Department.

Invited Speaker, PhIS (Physicists for Inclusion in STEM) *Summer 2021*
Western Washington University
Attended event as an alumnus invited speaker to guide undergraduates in physics and astronomy in the graduate school application process.

Society of Economic Geologists (SEG) Club Secretary *2018-2019*
Worked with President and Vice President to create and organize club schedule including meetings, activities and events. Facilitated outreach at campus events to promote diversity and inclusion in STEM at an annual event called MixItUp.

WORKSHOPS

NSF URGE Program (Unlearning Racism in Geoscience) *January 18 - May 7, 2021*
Rutgers University Pod Participant

- Attended bi-monthly webinar sessions to deepen understanding about the effects of racism on the participation and retention of POC in geoscience
- Read relevant literature and listened to expert opinions and personal experiences to help develop anti-racist policies
- Discussed anti-racist strategies with the Rutgers university URGE pod in weekly meetings

Flagship Concepts for Astrobiology at Enceladus *January 16-17, 2020*
Student Note-Taker

- Observed and noted discussions on potential payloads for different mission architectures as well as the relative merit of different life detection measurements
- Facilitated small group discussions during breakout sessions
- Witnessed the inner-workings and complexities of mission development from a team in preparation for the upcoming decadal survey

PRESENTATIONS/PUBLICATIONS

Frizzell, K. R., Ojha, L., Karunatillake, S., "Data from InSight Lander Provide Constraints on Martian Crustal Heat Flow Estimates," *JGR: Planets [in prep]*

Frizzell, K. R., et al., "Liquid Water Stability Zones on Super-Mars Exoplanets: Implications for Subsurface Astrobiology," *2022 AGU Abstract [in review]*

Udovicic, C. J., **Frizzell, K. R.,** et al., "Modeling the Effects of Basin Impacts and Ballistic Sedimentation on Polar Ice Stratigraphy within Lunar Craters," *JGR: Planets [in review]*

Frizzell, K. R., Ojha, L., and Karunatillake, S., "Revising Estimates of Martian Crustal Heat Flow: Implications for Basal Melting in Noachian Mars," *53rd Lunar and Planetary Science Conference,* Abstract #2229. (poster presentation)

Frizzell, K. R., Ojha, L., "Using VNIR Band Center Location as a Proxy for Paleo-Hydroclimate on Mars: A Case Study," *53rd Lunar and Planetary Science Conference,* Abstract #2297. (poster presentation)

Tai Udovicic, C. J., **Frizzell, K. R.,** et al., "Modeling the Effects of Basin Impacts and Ballistic Sedimentation on Ice in Lunar Cold Traps," *53rd Lunar and Planetary Science Conference,* Abstract #1528. (talk)

Patterson, R. V., **Frizzell, K. R.,** et al., "In Situ Resource Utilization Investigations of Potential Artemis Landing Site 105, Lunar South Pole," *53rd Lunar and Planetary Science Conference,* Abstract #1637. (poster presentation)

Meyer, M. L., **Frizzell, K. R.,** et al., "Geomorphic and Resource Analysis of the VIPER Landing Site of the Artemis Program," *53rd Lunar and Planetary Science Conference,* Abstract #1621. (poster presentation)

Tarnas, J., Stack Morgan, K., Parente, M., Mustard, J., Koeppel, A., Moore, K., Horgan, B., Seelos, F., Cloutis, E., Kelemen, P., Flannery, D., Brown, A., **Frizzell, K.,** Pinet, P., "Origin of carbonate-bearing rocks in Jezero crater: Implications for ancient habitability in subsurface environments," *Earth and Space Science Open Archive*, 82, 2021.

Frizzell, K., Bermingham, K., Meyer, B., "Utilizing Nucleosynthetic Models and Jupyter Notebooks to Constrain the Building Blocks of the Solar System," *52nd Lunar and Planetary Science Conference*, Abstract # 2650. E-Poster presentation with live session (due to COVID-19), March 2021.

Bermingham, K., Meyer, B., **Frizzell, K.,** "Isotopic Constraints on the Building Blocks of the Solar System," *52nd Lunar and Planetary Science Conference*, Abstract # 2107 [W322]. Virtual Talk (due to COVID-19), March 2021.

Meyer, B., Bermingham, K., **Frizzell, K.,** "NRLEE Nucleosynthesis," *52nd Lunar and Planetary Science Conference*, Abstract # 2598 [M103]. Virtual Talk (due to COVID-19), March 2021.

Frizzell, K., Seelos, F., Humm, D., Murchie, S., and Hash, C., "Implementation of a Residual Correction in the MRO CRISM VNIR Mapping Strip Data Processing Pipeline," *51st Lunar*

and Planetary Science Conference, Abstract # 2377. E-Poster presentation (due to COVID-19), March 2020.

Seelos, F., **Frizzell, K.,** Humm, D., Murchie, S., and Hash, C., "The CRISM MultiSpectral* VNIR (MSV) Data Set — A Unique Global Spectral Mapping Resource [*Effectively Hyperspectral]," *51st Lunar and Planetary Science Conference,* Abstract # 2464. E-Poster presentation (due to COVID-19), March 2020.

Frizzell, K., Rice, M., and Seelos, F., "Simulating Mastcam Spectroscopy by Radiometrically Transforming CRISM Images: A Comparison Between Rover Traverse and Orbital Data," *Ninth International Conference on Mars,* Abstract # 6409. Poster presentation, July 2019.

Frizzell, K., Seelos, F., and Rice, M., "Mars Hyperspectral Data Processing in the Jezero Crater and NE Syrtis Region: Implication for Mineralogical Analysis," *50th Lunar and Planetary Science Conference,* Abstract # 2204. Poster presentation, March 18-22nd, 2019.

Frizzell, K., "Mars Spectral Data Processing," *Astronomy Northwest by Southwest 2018,* Poster Presentation, November 3rd-4th, 2018

F. Seelos, **K. Frizzell**, S. Cartwright, and the CRISM SOC, "A regional view of surface spectral/color variability at the 2020 candidate sites derived from CRISM mapping data." *4th Mars 2020 Landing Site Workshop*. October 16th, 2018

TEACHING EXPERIENCE

Rutgers University, New Brunswick, NJ *Fall 2022 to Present*
Academic Tutor, Academic Services for Student Athletes

- Tutored Rutgers student athletes one-on-one and in study groups for subjects like geology, math, and physics
- Practiced engaging the students in active learning and guiding them towards a deeper understanding of the learning material

Rutgers University, New Brunswick, NJ *Fall 2021 to Present*
Teaching Assistant, Earth and Planetary Sciences Department

- Instructed online asynchronous earthquakes and volcanoes class without the presence of a professor as well as an introductory Planet Earth class with ~300 students.
- Organized class schedule and grading policy

Western Washington University, Bellingham WA *Fall 2017 to Spring 2018*
Laboratory Teaching Assistant, Physics and Astronomy Department

- Instructed introductory physics laboratory sections of 15-20 students with minimal faculty supervision
- Implemented student-centered teaching practices
- Received formal training in laboratory instruction and pedagogy

COMPUTER SKILLS

Programming: Python, MatLab, IDL, Mathematica, Jupyter Notebooks

Applications: ENVI, ArcGIS, CRISM CAT, GitHub, Microsoft Office (Word, Excel, PPT, etc.), MerTools, LaTex, Google Colab.

Platforms: Mac, Linux, Windows, WSL

HONORS AND AWARDS

Rutgers Earth and Planetary Science Department Excellence Fellowship *2020*

AWG-PNW Janet Cullen Tanaka Scholarship *2019*
A $1200 scholarship awarded to one female student per year in the Pacific Northwest that is "committed to completing a bachelor's degree and pursuing a career or graduate work in the geosciences."

David Engebretson Award *2018*
Scholarship awarded to one Western Washington University student per year with "exceptional promise for future contributions to scholarly achievement within the Earth Sciences."

PROFESSIONAL TRAINING

Scanning Electron Microscope Training
Western Washington University, Bellingham WA, 2019

Rapid Prototyping Workshop
Johns Hopkins University Applied Physics Lab, Laurel MD, 2018
Certification for the use of rapid prototyping (3D-Printing) technology