JAMES MCFADDEN

103 S 4th St, Lafayette IN 47901 | 310.745.6280 | mcfadde8@purdue.edu

EDUCATION

Purdue University
Planetary Science, Ph.D.   **Aug 2019 - Present**

University of California, Santa Cruz
Earth Sciences with Planetary Focus, B.S.   **Jan 2015 – June 2017**

Santa Monica College
General Sciences, A.A.   **Sep 2010 – June 2014**

TEACHING EXPERIENCE

Fusion Academy, Los Gatos
Teacher/Mentor   **Oct 2017 – Aug 2019**
Developed and taught Earth and Space Science, Marine Biology, and General
Biology curriculum at middle and high school levels.
Supervisor: Amy Baur, Director of Campus and Science Department

RESEARCH EXPERIENCE

Purdue University
PhD Research   **Aug 2019 - Present**
With scanning and transmission electron microscopy techniques, Apollo 17
lunar core regolith chemistry and microstructure are analyzed to determine
impacts of space weathering with regards to depth and lunar surface processes
such regolith mixing and overturn.

Supervisor: Dr. Michelle Thompson, Assistant Professor

University of California, Santa Cruz
Volunteer Research Assistant   **Nov 2017 – June 2019**
Used SELENE (Kaguya), Clementine, and Lunar Prospector mosaics to analyze
lunar surface spectral properties and elemental abundances with respect to space
weathering.

Supervisor: Dr. Ian Garrick-Bethell, Associate Professor

University of California, Santa Cruz
Senior Capstone   **Nov 2016 - June 2017**
Project involved analysis of lunar spectral features and surface iron to determine
a relationship between perceived iron quantities and space weathering.

Supervisor: Dr. Ian Garrick-Bethell, Associate Professor

FELLOWSHIPS AND AWARDS

Graduate: NASA Planetary Sciences Division Travel Grant   **2022**
Microscopy and Microanalysis Student Scholar Award   **2022**
Michael C. Gardner Memorial Award   **2022**
H. Jay Melosh Planetary Engagement Fund   **2022**
LPI Career Development Award   **2022**
Indiana Space Grant Consortium Fellowship   **Aug 2020 – June 2021**

Purdue University's Ross Fellowship | **Aug 2022 – June 2023**
Aug 2019 – June 2023

Undergraduate: Dean's Honors, Winter and Spring Quarters | **2017**

OUTREACH

Boys and Girls Clubs of Greater Lafayette, IN | **Sep 2021 – April 2022**
Outreach Organizer
Began and currently developing an outreach program within my lab group with
goals to expose local youths to the planetary sciences.

PUBLICATIONS

McFadden J., Garrick-Bethell I., Sim C.K., Kim S.S., Hemingway D., 2019. Iron content determines how space weathering flux variations affect lunar soils. *Icarus*, vol. 333, pp. 323-342.

PRESENTATIONS

McFadden, J.A., Thompson, M.S., Keller, L.P., Christoffersen, R., Morris, R.V., Shearer, C., the ANGSA Science Team, 2023. Determining surface exposure ages of regolith grains in lunar core samples 73002 by investigating solar particle irradiation damage. *54th Lunar and Planetary Science Conference,* Abstract #1767.

McFadden, J.A., Thompson, M.S., Keller, L.P., Christoffersen, R., Morris, R.V., Shearer, C., the ANGSA Science Team, 2022. Evaluating the Surface Exposure Timescales Derived from Solar Energetic Particle Track Densities for Grains from Apollo 17 Core Samples 73002. *ANGSA Workshop* Abstract #2025.

McFadden, J.A., Thompson, M.S., Keller, L.P., Christoffersen, R., Morris, R.V., Shearer, C., the ANGSA Science Team, 2022. Surface exposure timescales of apollo core sample 73002 space weathered grains. *85th Annual Meeting of the Meteoritical Society* Abstract #6418.

McFadden, J.A., Thompson, M.S., Keller, L.P., Christoffersen, R., Morris, R.V., Shearer, C., the ANGSA Science Team, 2022. Evaluation of Space Weathering and Surface Exposure Timescales for Lunar Soils in Apollo 17 Core Sample 73002 through Electron Microscopy. *Microscopy and Microanalysis Meeting 2022* Presentation #703.

McFadden, J.A., Thompson, M.S., Keller, L.P., Christoffersen, R., Morris, R.V., Shearer, C., the ANGSA Science Team, 2022. Evaluating space weathering and surface exposure time-scales for grains from Apollo 17 core sample 73002. *53rd Lunar and Planetary Science Conference* Abstract #1539.

McFadden J., Garrick-Bethell I., Sim C.K., Kim S.S., Hemingway D., 2019. Dependence of space weathering on soil iron content and the brightness of Reiner Gamma swirl. *50th Lunar and Planetary Science Conference*. Abstract #2251.

SKILLS

MATLAB and Python Programming Languages
- MATLAB used as the primary means to manipulate, analyze, process and graphically represent mosaic data.
- Course Highlight: The Dynamic Earth. Geologic processes were modeled using MATLAB.
- Course Highlight: Scientific Computing. Data processing in multivariable systems and graphical representation using Python.

Petrological Analysis
- Course Highlight: Igneous and Metamorphic Petrology. In depth analysis of igneous and metamorphic specimens via thin section.

Microsoft Word, PowerPoint, and Excel
- Course Highlight: Hydrology. Hydrological data collected at various locations in Santa Cruz County. Processed, analyzed, and graphically represented through extensive use of Microsoft Excel.
- Course Highlight: Tectonics. Microsoft Excel used as primary means to process and analyze plate tectonic motion and activity.
- Organized, designed, and presented lectures using Microsoft PowerPoint in current teaching position.

Field Experience
- Course Highlight: Field Geology. Sedimentary specimens and tectonic features analyzed at various sites surrounding Monterey Bay. Data was presented through the creation of geologic maps, stratigraphic columns, cross sections, and field reports.

Electron Microscopy
- PhD research involves extensive use of Scanning Electron Microscopy (SEM), Focus Ion Beam Scanning Electron Microscopy (FIB-SEM), Transmission Electron Microscopy (TEM) and Energy Dispersive X-Ray (EDX) in order to chemically and structurally analyze lunar regolith.