Leah E. Sacks

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Education

Western University, London, ON, Canada Start date: January 2021
Doctor of Philosophy in Geology and Planetary Science (expected Dec. 2024)
Topic: Tectonics and Structural Geology of Icy Satellites

Western University, London, ON, Canada September 2018-December 2020
Master of Science in Geology and Planetary Science (defended Oct. 2020)
Thesis title: *Hargraves Crater Ejecta and Implications for Impact Ejecta Processes*

Carleton College, Northfield, MN September 2013-June 2017
Bachelor of Arts in Geology, *cum laude*
Senior Thesis Title: *Grain-Scale Methods and Paleoenvironmental Analysis of the Stimson Formation, Gale Crater, Mars*

Publications

- Edwards CS, Piqueux S, Hamilton VE, Fergason RL, Herkenhoff KE, Vasavada AR, Bennett KA, **Sacks LE**, Lewis K, Smith MD. 2018. The Thermophysical Properties of the Bagnold Dunes, Mars: Ground-truthing Orbital Data. Journal of Geophysical Research: Planets.123(5):1307-26.

Abstracts

- **Sacks LE,** Tornabene LL, Osinski GR, McEwen AS and Sopoco RM. 2020. HiRISE Band Ratios and CRISM Spectral Results at Hargraves Crater. Lunar and Planetary Science Conference 51, abstract 3014. (*Poster not presented due to COVID-19*)

- Hill PJ, Simpson SL, Xie T, Morse ZR, **Sacks LE**, Osinski GR, Cloutis EA, Caudill CM, Christoffersen P, Marion CL, Newman JD. 2020. CanMoon Science Interpretation Team: Insights into Volcanic Flows in Lanzarote. Lunar and Planetary Science Conference 51, abstract 2152. (*Poster not presented due to COVID-19*)

- Morse ZR, Tornabene LL, **Sacks LE**, Andres CN, Yingling WA, Osinski GR, Cloutis EA, Marion CL, Christoffersen PA. 2020. CanMoon Analogue Mission Pre-Mission Remote Sensing and Traverse Planning. Lunar and Planetary Science Conference 51, abstract 1254. (*Poster not presented due to COVID-19*)

- **Sacks LE**, Tornabene LL, Osinski GR, Sopoco R, McEwen AS. 2019. Hargraves-Type Ejecta on Mars: Implications for Impact Ejecta Processes. Lunar and Planetary Science Conference 50, abstract 2904.

- **Sacks LE**, Edgar LA, Edwards CS and Anderson RB. 2017. Grain Scale Analyses of the Murray and Stimson Formations Using Data from the Mars Science Laboratory Mars Hand Lens Imager and the ChemCam Remote Micro Imager. Lunar and Planetary Science Conference 48, abstract 2595.

- **Sacks LE**, Edgar LA, Edwards CS, and Anderson RB. 2016. Grain-Scale Analyses of Curiosity Data at Marias Pass, Gale Crater, Mars: Methods Comparison and Depositional Interpretation. AGU Fall Meeting Abstracts, abstract P23B-2166.

Field and Lab Research Experience

USGS Astrogeology Science Center June 2016-August 2016
Research Experience for Undergraduates (REU), USGS, Flagstaff, AZ
- Researched grain-scale features on Mars and gathered data from Mars Science Laboratory images
- Assessed grain-scale data collection methods
- Presented research in a formal oral presentation and written paper

New Zealand Field School Study Abroad Program January 2016-March 2016
Carleton Off-Campus Studies, Carleton College and New Zealand
- Studied formations along subduction zones, volcanic arcs, accretionary wedges, core complexes, and the Alpine Fault
- Worked in teams of 2-5 students to solve geologic problems
- Improved skills working with Bruntons, stratigraphic assessment, and seismic analysis

Carleton College Geology Department June 2015-August 2015
Summer Assistant, Carleton College
- Researched and applied methods for mineralogical identification and petrographic analysis in thin-section
- Developed resources and guides for Mineralogy and Petrology students

Teaching Experience

Institute for Earth and Space Exploration September 2018- Present
Outreach Graduate Teaching Assistant and Volunteer, Western University

- Has taught up to 30 children at a time of all ages in classrooms with space related activities
- Volunteers and works events catered to the public to inform about space
- Prepares activities and presentations for classroom visits

Graduate Teaching Assistant September 2018- April 2020
Western University

- Taught Introduction to Geology and Tectonics labs
- Worked with students to complete labs and learn lab material
- Assisted students outside of class with questions and labs
- Proctored and implemented both class and lab exams

Teaching Assistant March 2016- June 2016
Carleton College

- Facilitated student lab completion and lab setup
- Assisted 30 students outside of class with questions and homework
- Reviewed class material for students as necessary

Mission and Project Experience

HiRISE Science and Operations Planning Volunteer September 2018-Present
PI: Alfred McEwen (UA, LPL), Co-I Livio Tornabene

- Assisted Livio Tornabene to complete a full HiRISE planning cycle in October 2019
- Participates in bi-weekly meetings to assess viability of potential HiRISE targets and assign priority
- Submits targets on Mars surface related to thesis research for consideration at bi-weekly priority meetings

CSA-LEAD CanMoon Analogue Mission Instrument Lead May 2019-August 2019
Co-PIs Dr. Gordon Osinski and Dr. Ed Cloutis, Western University

- Vis-NIR ASD Instrument Lead on a mission funded by the Canadian Space Agency
- Processed and interpreted real time spectral data within visible and near infrared wavelengths in ENVI
- Targeted the Vis-NIR instrument as part of the science team in mission control while a field team worked remotely

CSA-LEAD CanMoon Analogue Mission Remote Sensing Team May 2019-August 2019
Co-PIs Dr. Gordon Osinski and Dr. Ed Cloutis, Western University

- Processed and interpreted Landsat and ASTER data ahead of time as part of the pre-mission remote sensing team using ENVI and ArcGIS
- Prepared and presented final datasets at landing site workshop
- Acted as a remote sensing resource and guided other team members workshops

High Altitude Balloon Outreach Team Member July 2019-August 2019
Student Partnership Project Lead: Matthew Svensson, Partnership with the CSA and CNES through SEDS Canada, Western University

- Documented payload preparation and balloon launch for social media
- Supervised seven high school outreach team members in preparing presentations on mock payloads and in working with the mission team
- Supported primary engineering operations team members during launch

Computer and Technical Skills

Computer Skills

- Proficiency with: ENVI Spectral analysis, JMARS, ArcGIS, Windows and Mac operating systems, Microsoft Office Suite, Java programming language, Adobe Illustrator, Zoom Video Conferencing Software
- Familiarity with: ISIS, oGas, R (statistics package), ImageJ

Technical Skills

- Familiarity with: Handheld Vis-NIR spectroscopy, LIBS (Laser Induced Breakdown Spectroscopy), Scanning Electron Microscopy (SEM), Anisotropy of Magnetic Susceptibility (AMS), geode seismography, gravimetry, magnetometry, and petrographic thin section preparation and analysis, spectroscopy

Datasets

- Proficiency with: HiRISE (High Resolution Imaging Science Experiment), CRISM (Compact Reconnaissance Imaging Spectrometer for Mars), CTX (Context Camera), ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer), Landsat 8, and ASD Vis-NIR spectral datasets

Leadership Experience

Planetary Science Graduate Student Council Secretary September 2019 -August 2020
Western University

- Documents and maintains graduate council meeting minutes
- Assists graduate council president with preparation for events, recruiting, and publicity
- Participates in the executive council meetings of the Institute for Earth and Space Exploration in the absence of the President and Vice President of the council.

Awards and Honors

- Western University Global Opportunities Award ($2000) – Awarded to a student to support travel to an international location for an opportunity that will promote global awareness

- Duncan Stewart Fellowship-Awarded to one junior and one senior student by the geology faculty at Carleton College for excellence in scholarship, ability to work independently, and potential for scientific growth in geology: 2016

Professional Memberships

- Sigma Xi-Carleton College Chapter: 2017
- American Geophysical Union: 2016-2017
- Geological Society of America: 2019-2021

Co-Curricular

- *Member*, Western University Earth Sciences Department Intramural Softball Team: 2019
- *Captain*, Carleton College Archery Club: 2014-2017
- *Member*, Carleton College Synchrony Student Dance Group 2015-2017