

Name: Dr. Zachary Morse

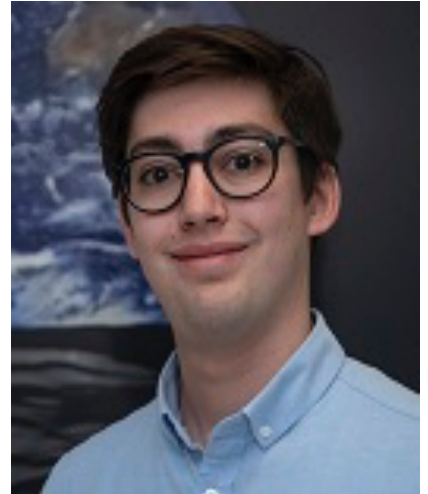
Code: 698

Home institution: Howard University

Name of task: 698.014

What do you do for CRESST:

I am a postdoctoral research scientist working with the NASA Solar System Exploration Research Virtual Institute (SSERVI) Remote, In Situ, and Synchrotron Studies for Science and Exploration 2 (RISE2) team. I work directly with Theme 2 of RISE2 - Maximizing Exploration Opportunities - led by Dr. Kelsey Young at the NASA Goddard Space Flight Center. My work with the RISE2 team involves testing handheld geologic field instruments at terrestrial field sites that are analogous to the lunar surface, as well as researching approaches to data management, data visualization, and communication between members of a scientific field team and a remote mission control. This work will culminate with a robust analogue lunar surface mission that will provide valuable data and practice for the upcoming Artemis lunar surface missions.



What is your background:

I grew up in the small town of Harpers Ferry, West Virginia right on the border with the National Historical Park there. I graduated from West Virginia University in 2013 with a bachelor's degree in Geology and a minor in GIS & Remote Sensing. I then went on to receive a PhD from Western University in London, Ontario, Canada in 2018. While in Canada, I had several unique opportunities with the Institute for Earth and Space Exploration to teach planetary science oriented field courses and to work with both NASA and the Canadian Space Agency (CSA) on a series of high-fidelity analogue rover missions. These missions tested everything from rover instrumentation to mission control room structure using terrestrial field sites that are analogous to both the Martian and Lunar surfaces. Today, I get to continue this same sort of research, working with the RISE2 team to prepare for the near-future return of humans to the lunar surface.

Favorite part of being a CRESST Scientist:

My favorite part of being a CRESST scientist is the opportunity to connect my research with several diverse groups across Goddard including the other CRESST 2 scientists, the Goddard Instrument Field Team (GIFT), and the Goddard Virtual Reality / Augmented Reality (AR/VR) research group. These are amazing opportunities I have thanks to being a part of the CRESST 2 / Goddard network.

Highlight of research as a CRESST Scientist:

So far, opportunities for field work have been limited by the pandemic. Fortunately, this has provided me with an opportunity to develop an augmented Reality (AR) application for data visualization in the field. When finished, this app could be used by scientists in the field to project collected data or other information directly onto the rock outcrop in front of them! For more details on how this works, check out my recent virtual AGU poster at: agu2020fallmeeting-agu.ipostersessions.com/Default.aspx?s=1F-A0-42-63-36-A4-60-26-C3-8E-B4-58-65-B4-B4-74

Publications:

Morse, Z. R., Osinski, G. R., Tornabene, L. L., Bourassa, M., Zanetti, M., Hill, P.J.A., Pilles, E., Cross, M., King, D., Tolometti, G., (Accepted / In Process) "Detailed morphologic mapping and traverse planning for a rover-based lunar sample return mission to Schrödinger Basin." Planetary Science Journal.

Morse, Z. R., Osinski, G. R., Tornabene, L. L., Neish, C. D. (Accepted / In Process) "Morphologic mapping and interpretation of ejecta deposits from Tsiolkovskiy Crater." Meteoritics and Planetary Science.

Morse, Z. R., E. Harrington, P. J. Hill, et al. 2019. "The use of GIS, mapping, and immersive technologies in the CanMars Mars Sample Return analogue mission; advantages for science interpretation and operational decision-making." Planetary and Space Science, 168: 15-26 [10.1016/j.pss.2019.01.001]

Morse, Z. R., G. R. Osinski, and L. L. Tornabene. 2018. "New morphological mapping and interpretation of ejecta deposits from Orientale Basin on the Moon." Icarus, 299: 253-271

Selected Talks, Presentations, and Posters:

Developing an Augmented Reality Application for Enhanced Geologic Outcrop Analysis (3-minute e-Lightning Talk). 12/15/2020. A 3-minute e-Lightening talk given in the Planetary Analogs session at the 2020 American Geophysical Union (AGU) meeting.

CanMoon Analogue Mission Tactical Science Team: Scientific Instrumentation and Decision Making During a High Fidelity Realtime Lunar Analogue Mission [#1253]
2020 Lunar and Planetary Science Conference (LPSC) - Abstract #1253

CanMoon Analogue Mission Pre-Mission Remote Sensing and Traverse Planning [#1254]
2020 Lunar and Planetary Science Conference (LPSC) - Abstract #1254

2019 CanMoon Tactical Science Team: Real-Time Instrument Use and Coordination During a Lunar Sample Return Analogue Mission
2019 Lunar Exploration and Analysis Group (LEAG) Annual Meeting - Abstract / Poster #5047

Mapping and Analysis of Tsiolkovsky Crater Ejecta [#2196]
2018 Lunar and Planetary Science Conference (LPSC) - Abstract / Poster # 2196

Mapping and Analysis of Ejecta Deposits from Orientale Basin on the Moon
2017 NASA Solar System Exploration Research Virtual Institute (SSERVI) Exploration Science Forum 2017
Abstract / Poster

New Morphologic Map and Analysis of Orientale Basin Ejecta
2017 Lunar and Planetary Science Conference (LPSC) Abstract / Talk # 2299

List of awards won:

2018 - Fallona Family Interdisciplinary Research Showcase Presentation Award - Third Place

2017 - NASA SSERVI Exploration Science Forum Student Poster Award - Second Place

2017 - Centre for Planetary Science and Exploration Outstanding Outreach Volunteer Award

2015 - Canadian Space Agency Official Recognition for Contributions to the 2015 CanMars Mars Sample Return Analogue Rover Mission

To Contact Zachary to learn more about his work or collaboration, he can be reached at:
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