

Amanda Ostwald
Postdoctoral Researcher
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Education

- PhD. Geological Sciences
 - University of Nevada, Las Vegas, 2018–2023
 - Dissertation Topic: Magmatic processes leading to compositional diversity in the Mars crust
 - Advised by Dr. Arya Udry
- B.S. Geological Sciences
 - University of Texas at El Paso, 2014–2017
 - *Summa Cum Laude*

Research Interests

Planetary geology with a focus on igneous petrology and martian meteorites.

Research and Professional Experience

- Peter Buck Fellow (Smithsonian National Museum of Natural History, Oct 2023–current)
 - Constrained magma storage timescales for martian meteorites using quantitative analytical data and diffusion modeling.
- Mars 2020 (Perseverance) mission student collaborator (Spring 2022–Summer 2023)
- Research Assistant (UNLV, Fall 2019–Summer 2023)
 - Performed thermodynamic modeling of martian magmatic systems.
 - Project title: “The role of assimilation and fractional crystallization in the evolution of the Mars crust”
 - Analyzed martian meteorite samples using electron microprobe analysis and laser-ablation inductively coupled plasma mass spectrometry.
 - Project title: “The parental melts of the nakhlite and chassignite Mars meteorites”
- Teaching Assistant (UNLV, Fall 2018–Spring 2019)
 - Taught lab portion of online introductory course: GEOL 104.
 - Taught lab portion of Igneous and Metamorphic Petrology: GEOL 327.
- Mars Research Scientist (Jacobs, February 2018–August 2018)
 - Conducted research in alteration products of Mars-like basalts in open and closed hydrologic systems.
 - Analyzed synthesized samples using X-ray diffraction.
- Mars Research Intern (Jacobs/UTEP, Fall 2017)
 - Prepared and analyzed sample standards using X-ray diffraction for full-pattern quantitative analysis library.

- Conducted mineralogical alteration experiments in simulated Mars environments using both column and batch methods.
- Undergraduate Student Researcher for Doctor Diane Doser, “University of Texas at El Paso: Research Experience for Community College Students” (REU, Spring and Summer 2017)
 - Conducted field and laboratory research on El Paso Oligocene intrusive bodies with petrological, structural, and geophysical analysis.
 - Taught field methods, mapping, and structural geology to two-year community college students.
- Research Assistant for Doctor Jose Hurtado (UTEP, Fall 2016–Summer 2017)
 - Constructed 3D models using structure-from-motion photogrammetry and image sets from the Mars Science Laboratory (Curiosity).
- Research Assistant for Doctor Tom Gill (UTEP, Fall 2015–Spring 2016)
 - Prepared and processed sediment samples using laser grain-size analysis.

Peer-reviewed Publications

In Print

1. Beyssac, O., Forni, O., Cousin, A., Udry, A., Kah, L. C., Mandon, L., Clavé, E., Liu, Y., Poulet, F., Quantin Nataf, C., Gasnault, O., Johnson, J., Benzerara, K., Beck, P., Dehouck, E., Mangold, N., Alvarez Llamas, C., Anderson, R., Arana, G., Barnes, R., Bernard, S., Bosak, T., Brown, A.J., Castro, K., Chide, B., Clegg, S., Cloutis, E., Fouchet, T., Gabriel, T., Gupta, S., Lacombe, G., Lasue, J., Le Mouelic, S., Lopez-Reyes, G., Madariaga, J.M., McCubbin, F.M., McLennan, S., Manrique, J.A., Meslin, P.Y., Montmessin, F., Núñez, J., Ollila, A.M., **Ostwald, A.**, Pilleri, P., Pinet, P., Royer, C., Sharma, S.K., Schröder, S., Simon, J.I., Toplis, M.J., Veneranda, M., Willis, P.A., Maurice, S., Wiens, R.C., The SuperCam Team (2023), Petrological traverse of the olivine cumulate Séítah formation at Jezero crater, Mars: A perspective from SuperCam onboard Perseverance. *Journal of Geophysical Research: Planets*, 128: e2022JE007638.
2. Ralston, S. J., Peretyazhko, T. S., Sutter, B., Ming, D. W., Morris, R. V., Garcia, A., **Ostwald, A.** (2022), Phyllosilicate formation on early Mars via open-system acid alteration of basaltic glass. *Earth and Planetary Science Letters*. 10.1016/j.epsl.2022.117987
3. Udry, A., **Ostwald, A. M.**, Sautter, V., Cousin, A., Beyssac, O., Forni, O., Dromart, G., Benzerara, K., Nachon, M., Horgan, B., Mandon, L., Clavé, E., Dehouck, E., Gibbons, E., Alwmark, S., Ravanis, E., Wiens, R. C., Legett, C., Anderson, R., Pilleri, P., Mangold, N., Schmidt, M., Liu, Y., Nuñez, J. I., Castro, K., Madariaga, J. M., Kizovski, T., Beck, P., Bernard, S., Bosak, T., Brown, A., Clegg, S., Cloutis, E., Cohen, B., Connell, S., Crumpler, L., Debaille, V., Flannery, D., Fouchet, T., Gabriel, T. S. J., Gasnault, O., Herd, C. D. K., Johnson, J., Manrique, J. A., Maurice, S., McCubbin, F. M., McLennan, Ollila, A., Pinet, P., Quantin-Nataf, C., Royer, C., Sharma, S., Simon, J. I., Steele, A., Tosca, N., Treiman, A., and the SuperCam team (2022), A Mars 2020 Perseverance SuperCam perspective on the igneous nature of the Mááz formation at Jezero crater and link with Séítah, Mars. *Journal of Geophysical Research: Planets*, 127: e2022JE007440. <https://doi-org.ezproxy.library.unlv.edu/10.1029/2022JE007440>

4. **Ostwald, A.M.**, Udry, A., Payré, V., Gazel, E., Wu, P. (2021), The role of assimilation and fractional crystallization in the evolution of the Mars crust. *Earth and Planetary Science Letters*, 585: 117514. <https://doi.org/10.1016/j.epsl.2022.117514>
5. Wu, P., Gazel, E., Udry, A., Setera, J.B. and **Ostwald, A.M.** (2021), Melt inclusions in chassignite NWA 2737: A link between processes recorded in Martian meteorites and rocks at Gale crater. *Meteoritics and Planetary Science*, 56: 1328-1349. <https://doi.org/10.1111/maps.13700>

In Review

1. **Ostwald, A.**, Udry, A., Gross, J., Day, J. M. D., Griffin, S. (submitted, 2023) Complex zoning in the nakhlite and chassignite martian meteorites reveals multi-stage petrogenesis and undercooling during crystallization. In review.
2. Ramsey S. R., **Ostwald A. M.**, Udry A., O'Neal E., Day J. M. D., Wilbur Z., Barnes J. J., Griffin S. (accepted, 2023), Northwest Africa 13669, a Reequilibrated Nakhilite from a Previously Unsampled Portion of the Nakhilite Igneous Complex. In review.
3. O'Neal, E. W., **Ostwald, A. M.**, Udry, A., Gross, J., Richter, M., Lapen, T. J., Darling, J., Howarth, G. H., Johnsen, R., McQuaig, D. R. (submitted, 2023), Source and parental melts of poikilitic shergottites: Implications for martian magmatism. In review.
4. **Ostwald, A. M.**, Udry, A., Day, J. M. D., Gross, J. (accepted, 2023), Melt inclusion heterogeneities in the nakhlite and chassignite martian meteorite suite and evidence for complicated, multi-generational magmas. In review.

Published Reports

Hurtado, J.M, Young, K.E., **Ostwald, A.M.**, Ward, F.S., Henderson, M.J.B., Morse, Z.R. (2021), Lunar Surface Science Workshop (LSSW) Session VIII: Structuring Real-Time Science Support of Artemis Crewed Operations.
<https://lunarscience.arc.nasa.gov/lssw/downloads/LSSW-8-Report-April-2021.pdf>

Conference Abstracts

- Ostwald, A. M.**, Udry, A., Day, J. M. D., Gross, J., Griffin, S. (2023). *Complexly zoned crystals in the nakhlite and chassignite meteorites and implications for petrogenesis*. Talk presented at the Lunar and Planetary Science Conference, Houston, Texas. Abstract #1123.
- Ramsey, S., **Ostwald, A.**, Udry, A., Day, J. M. D. (2023). *Parental melt composition of the Northwest Africa 13669 nakhlite from pyroxene and olivine-hosted melt inclusions*. Talk presented at the Lunar and Planetary Science Conference, Houston, Texas. Abstract #1030.
- Ralston, S. J., Peretyazhko, T. S., Sutter, B., Ming, D. W., Morris, R. V., Garcia, A. H., **Ostwald, A. M.** (2023) *Phyllosilicate formation on early Mars via open-system acid alteration of basaltic glass*. Talk presented at the Lunar and Planetary Science Conference, Houston, Texas. Abstract #1496.
- Ostwald A. M.**, Udry A., Day J. M. D., Gross J. (2022). *Chemical heterogeneities among melt compositions hosted in melt inclusions in nakhlites and chassignites*. Talk presented at the Meteoritical Society Meeting, Glasgow, Scotland. Abstract #6124.
- Udry A., **Ostwald A. M.**, Sautter V., et al. (2022). *A comparison of the igneous Mááz formation at Jezero crater with martian meteorites*. Talk presented at the Meteoritical Society Meeting, Glasgow, Scotland. Abstract #6089.

- O'Neal E. W., **Ostwald A. M.**, Udry A., Gross J., Righter M., McQuaig D. R., Lapen T. J., Howarth G. H., and Johnsen R. (2022). *The evolution of poikilitic shergottite magmas from mantle to crust*. Talk presented at the Meteoritical Society Meeting, Glasgow, Scotland. Abstract #6178.
- Ramsey S., Udry A., Day J. M. D., and **Ostwald A.** (2022). *Formation and emplacement of the Northwest Africa 13669 nakhlite*. Poster presented at the Meteoritical Society Meeting, Glasgow, Scotland. Abstract #6028.
- Ostwald A. M.**, Udry A., Day J. M. D., and Gross J. (2022) *Complex zoning in the nakhlite and chassignite martian meteorites*. Poster presented at the Meteoritical Society Meeting, Glasgow, Scotland. Abstract #6125.
- Ostwald, A.M.**, Udry, A., Gross, J., Day, J.M.D. (2022). *Chemical Heterogeneities Among Melt Inclusions in Nakhlites and Chassignites*. Poster presented at the Lunar and Planetary Science Conference, Houston, TX. Abstract #1206.
- Ostwald, A.M.**, Udry, A., Gazel, E., Payré, V., Wu, P. (2022). *The Role of Assimilation and Fractional Crystallization in the Formation of the Mars Crust*. Poster presented at the Lunar and Planetary Science Conference, Houston, TX. Abstract #1203.
- Ramsey, S., Udry A., J.M.D. Day, **Ostwald, A.M.** (2022). *Major and Trace Element Bulk Rock and Mineral Chemistry of Northwest Africa 13669, a New Nakhlite*. Poster presented at the Lunar and Planetary Science Conference, Houston, TX. Abstract # 1127.
- O'Neal, E.W., **Ostwald, A.M.**, Udry, A., Gross, J., Righter, M. (2022) *Melt Inclusion, Trace Element, and Isotopic Analyses of a Poikilitic Shergottite Suite: Implications for Martian Magmatism*. Poster presented at the Lunar and Planetary Science Conference, Houston, TX. Abstract #2449.
- Ostwald, A.M.**, Udry, A., Gross, J., Day, J.M.D. (2021). *Nakhlite and Chassignite Parental Melt Compositions Compared*. Talk presented at the Meteoritical Society Meeting, Chicago, IL. Abstract # 6209.
- Ostwald, A.M.**, Henderson, M.J.B., Hurtado, J.M., Young, K.E., Morse, Z.R., Ward, F.S. (2021). *Results and Recommendations from Lunar Surface Science Workshop 8: Structuring Real-Time Support of Artemis Crewed Operations*. Poster presented at the NASA Exploration Science Forum & European Lunar Symposium virtual conference.
- Ostwald, A.M.**, Udry, A., Gazel, E., Payré, V., Wu, P. (2021). *The Role of Assimilation and Fractional Crystallization in Evolved Martian Crustal Compositions*. Oral presentation given at the Lunar and Planetary Science Conference, virtual. Abstract #1132.
- Ostwald, A.M.**, Udry, A., Gross, J., Day, J.M.D. (2021). *Parental Melts of Nakhlites and Chassignites Determined from Analysis of Melt Inclusions*. Poster presented at the Lunar and Planetary Science Conference, virtual. Abstract #1079.
- Udry, A., **Ostwald, A. M.**, Howarth, G. H., Paquet, M., Forman, L. V., Day, J. M. D., and Taylor, A. (2021). *The Plagioclase-bearing Poikilitic Shergottite Northwest Africa 12241, a Not-So Shocked Martian Meteorite*. Oral presentation given at the Lunar and Planetary Science Conference, Houston, TX. Abstract #1033.
- Udry, A., Howarth, G. H., Herd, C. D. K., Day, J. M. D., Lapen, T. J., Filiberto, J., and **Ostwald, A. M.** (2021). *What Have We Learned About the Interior and Surface of Mars from Martian Meteorites*. Poster presented at the Lunar and Planetary Science Conference, Houston, TX. Abstract #1046.
- O'Neal, E. W., Udry, A., Howarth, G. H., Gross, J., and **Ostwald, A.M.** (2021). *Characterization of Poikilitic Shergottite Parental Melts and What They Can Tell Us About Martian Magmatism*. Poster presented at the Lunar and Planetary Science Conference, Houston, TX. #1065.

- Ostwald, A.M.,** Udry, A., Gazel, E., Payré, V., Wu, P. (2020). *Assimilation-fractional crystallization modeling using known martian compositions*. Poster presented at the American Geophysical Union virtual meeting. Abstract P055-0012.
- Ralston, S. J., Sutter, B., Ming, D. W., Garcia, A., **Ostwald, A.,** Peretyazhko, T. (2020). *Clay Mineral Formation on Early Mars via Open-System Acid Alteration of Basaltic Glass*. Poster presented at the American Geophysical Union virtual meeting. Abstract EP017-09.
- O’Neal, E. W., Udry, A., Howarth, G. H., Gross, J., and **Ostwald, A.** (2020). *Constraining Martian Magmatism and Shergottite Formation through Melt Inclusion Analyses of a Poikilitic Shergottite Suite*. Poster presented at the Geological Society of America Conference, virtual.
- Ostwald, A.M.,** Udry, A., Gazel, E., Payré, V. (2020). *Assimilation-fractional crystallization on Mars as a formation process for felsic rocks*. Accepted for oral presentation to Lunar and Planetary Science Conference, Houston, TX (canceled due to coronavirus pandemic).
- Ostwald, A.M.,** Udry, A., Gross, J., Day, J.M.D. (2020). *Chassignite and nakhlite parental melts determined from melt inclusion analysis*. Accepted for poster presentation to Lunar and Planetary Science Conference, Houston, TX (canceled due to coronavirus pandemic).
- O’Neal, E. W., Udry, A., Howarth, G. H., Gross, J., and **Ostwald, A.** (2020). *Source and Parental Melts of a Poikilitic Shergottite Suite: Implications for Martian Magmatism*. Accepted for poster presentation to Lunar and Planetary Science Conference, Houston, TX (canceled due to coronavirus pandemic).
- Ostwald, A.M.,** Udry, A., Gross, J. (2019). *Melt inclusion analyses to constrain parental magma compositions of the nakhlite meteorites*. Talk presented at the Meteoritical Society Meeting, Sapporo, Japan. Abstract #6106.
- Ostwald, A.M.,** Udry, A., Gross, J. (2019). *The parental melt of nakhlites as determined from melt inclusions*. Poster presented at the Lunar and Planetary Science Conference, Houston, TX. Abstract #1431.
- Ostwald, A.M.,** Sutter, B., & Peretyazhko, T.S. (2018). *Open Hydrologic Assessment of Phyllosilicate Formation on Early Mars*. Poster presented at the Lunar and Planetary Science Conference, Houston, TX.
- Ostwald, A.M.,** & Hurtado, J.M. (2017). *3D models from structure-from-motion photogrammetry using Mars Science Laboratory images: methods and implications*. Poster presented at the Lunar and Planetary Science Conference, Houston, TX.
- Ostwald, A.M.,** et al. (2016). *Petrology of the proterozoic Castner marble, Franklin Mountains, West Texas, USA*. Poster presented at the UTEP Geoscience Colloquium, El Paso, TX.

Invited Seminars and Colloquia

- Center for Meteorite Studies, Arizona State University, Virtual talk, July 2020.
- School of Geographical and Earth Sciences, University of Glasgow, Virtual talk, July 2020.

Scientific Session Organization

- Lunar and Planetary Science Meeting “Petrology, Petrogenesis, and Geochemistry of Martian Meteorites, Crust, and Mantle” session moderator, March 7, 2022.
- Meteoritical Society Meeting “Mars” session co-chair, August 17, 2021.
- Lunar Surface Science Workshop, Breakout Discussion facilitator, “Guiding Principles and Exploration Strategies” session chair, February 24-25, 2021.

Technical Expertise

Instruments: Electron Microprobe Analyzer (EMPA), Laser-Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS), X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Petrographic Microscopy, Spectrophotometry.

Modeling and Mathematics: alphaMELTS, Magma Chamber Simulator, MATLAB, HTML, CSS.

Image and Design Software: Photoshop, Illustrator, Indesign, Dreamweaver, Iqpet.

Remote Sensing Software: QGIS, Agisoft Photoscan Professional.

Grants and Awards (Total: \$63,783.89)

- Graduate and Professional Student Association sponsorship. Summer 2023. \$2000.
- Best Graduate Oral Presentation, UNLV Geosymposium. Spring 2023. \$1000.
- Jack and Fay Ross Fellowship. Fall 2022–Spring 2023. \$40,810.00.
- Graduate Academic Achievement Award, UNLV Geosymposium. Spring 2022. \$1500.
- Best Oral Presentation, UNLV Geosymposium. Spring 2022. \$1500.
- McKay Award for best talk at Meteoritical Society Conference 2021 held in Chicago in August, 2021. \$1000.
- General Sciences Scholarship. Fall 2021. \$1500.
- Barnada French Scholarship. University of Nevada, Las Vegas. Fall 2021. \$1250.
- NASA Planetary Sciences Division Travel Grant. Meteoritical Society Conference, Summer 2021. \$1500.
- Geosymposium Research Award: Robinson Mine. Spring 2021. \$1500.
- Runner-up Best Oral Presentation, UNLV Geosymposium. Spring 2021.
- Growth, Inclusivity, Voice, and Excellence (GIVE) Award from UNLV Women's Council for work done with UNLV Chapter of Association for Women Geoscientists. Spring 2021.
- Runner-up Best Oral Presentation, Graduate & Professional Student Association Research Forum. Spring 2021. \$250.
- Graduate & Professional Student Association Research Sponsorship. Fall 2020. \$1123.89.
- Career Development Award from the Lunar and Planetary Institute. Lunar and Planetary Science Conference, Spring 2020. \$1000 award contingent upon attendance to the conference that was canceled due to coronavirus pandemic.
- Graduate & Professional Student Association Research Sponsorship. Fall 2019. \$1250.
- NASA Planetary Sciences Division Travel Grant. Meteoritical Society Conference, Summer 2019. \$1800.
- Geosymposium Research Award: Jacobs. Spring 2019. \$1000.
- Steven E. Dwornik Award: Graduate Student Poster Honorable Mention. Spring 2019.
- Bernada French Scholarship. University of Nevada, Las Vegas. Fall 2018. \$1100.
- Outstanding Graduating Senior in Geology. University of Texas at El Paso. Winter 2017.
- Alpha Phi Omega. *Walter R. Roser Award*. University of Texas at El Paso. Spring 2017. \$1200.
- El Paso Mineralogical Society. *Best Undergraduate Poster, Colloquium 2017*. University of Texas at El Paso. Spring 2017. \$100.
- GEO Surveys, Inc. *W. P. Nash Scholarship*. University of Texas at El Paso. Spring 2014-Fall 2016. \$1400 per semester (total: \$8400).

Workshops and Short Courses

- **Hosted:** Modeling Open System Processes on the Magma Chamber Simulator, online, April 2021.
- Thermodynamic Modeling of Magmatic Processes with alphaMELTS 2: Online, December 2020.
- Melts, Glasses, and Magmas (MGM) Short Course: Online Edition, Ludwig Maximilian University of Munich, July 2020.
- Reservoir characterization and modeling short course, ExxonMobil, University of Arizona, September 2018.

Professional Memberships and Contributions

- Association of Women Geoscientists (member)
 - UNLV Chapter co-founder, president (Fall 2019-Spring 2021)
- Geological Society of America (member)
- Meteoritical Society (member)
- Served on multiple NASA funding review panels (Spring 2023)

Outreach and Science Communication

- Astronomy in the Park at Mt. Charleston with the Las Vegas Astronomical Society (June 2023): gave a 30-minute outdoor talk and answered questions for a general audience of ~200 attendees
- Astronomy in the Park at Lake Mead with the Las Vegas Astronomical Society (February 2023): gave a 15-minute outdoor talk and answered questions for a general audience of ~30 attendees
- Letters to a Pre-Scientist (Spring 2023): participated in a science pen pal program for K–12 students
- Astronomy in the Park at Mt. Charleston with the Las Vegas Astronomical Society (September 2022): gave a 30-minute outdoor talk and answered questions for a general audience of ~500 attendees.
- Astronomy in the Park at Mt. Charleston with the Las Vegas Astronomical Society (July 2022): gave a 30-minute outdoor talk and answered questions for a general audience of ~200 attendees.
- Las Vegas Astronomical Society Meeting (July 2022): gave a one-hour lecture for a general audience of ~30 attendees.
- GEAR UP ASPIRE (Summer 2021): developed and presented 8 hours of lecture material on planetary geology and geologic hazards for 9th grade students.
- Skype a Scientist (Fall 2020-Fall 2022): answered questions for five classes of 5th-6th grade children.
- Las Vegas Regional Science Fair judge (February 2020).
- Association of Women Geoscientists UNLV Chapter volunteer for Burkholder Middle School UNLV visit: taught middle school students about principles of water conservation and how to interpret topographic maps (February 2020).

- Invited speaker for Astronomy on Tap: Las Vegas (October 2019).
- Inclusion Rocks volunteer: taught middle school and high school students about planetary geology, meteorites, fluvial morphology, and topographic map interpretation (Fall 2018-Spring 2019).
- Rock identification for UNLV Department of Geoscience: identified rocks for department visitors (Fall 2018).
- We Are Girls Conference Speaker, Hogg Middle School, Houston (April 2018).
- Celebration of Our Mountains tour coordinator for Bishop's Cap (New Mexico) and Franklin Mountain State Park Tin Mine (Texas) tours (2016).