

Cory M. Hughes

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RESEARCH INTERESTS

Comparative Planetology
 Earth Analogues for Planetary Science
 Sedimentary Geology
 Remote Sensing

EDUCATION

PhD, Geology **Expected: 2025**

University of Arkansas

Dissertation: *Evidence of Backwater Morphodynamics in the Rock Record on Earth and Mars*

MS, Geology **2020**

Western Washington University

Thesis: *Bio-preservation Potential of Sediment in Eberswalde Crater, Mars*

BS, Geological Sciences **2017**

The University of Texas at Austin, Jackson School of Geosciences

Undergraduate Research: *Deltaic Deposits Indicative of a Paleo-coastline at Aeolis Dorsa, Mars*

HONORS AND AWARDS

Vernon Peppard Scholarship	2024
Doy L. Zachry Endowed Scholarship	2024
University of Arkansas, Doctoral Academy Fellowship	2020 – 2024
Association for Women Geoscientists – Summer Scholarship	2021
Haley & Aldrich DEI Essay Contest Winner	2021
Ross Travel Grant	2018 – 2019
SETI Institute LPSC Travel Grant	2016

REFEREED JOURNAL PUBLICATIONS -- [h-index = 7; i10-index = 7; citations = 360]

Mahon, R. C., **Hughes, C. M.**, Ma, H., & Shaw, J. B. (2024). Analysis of Ancient Channel-Mouth Bifurcation Angles on Earth and Mars. *The Sedimentary Record* (in press).

Hughes, C. M., Rice, M. S., Barnhart, C. J., Swanson, T. E., Pfeiffer, A. M., & Goudge, T. A. (2023). Sources of Clay-Rich Sediment in Eberswalde Crater, Mars With Implications for Biopreservation Potential. *Journal of Geophysical Research: Planets*, 128(4), e2022JE007545. [[Link](#)]

Zaki A. S., Edgett K. S., Pajola M., Kite E., Davis J. M., Mangold N., Madof A. S., Lucchetti A., Grindrod P., **Hughes C. M.**, Sangwan K. Prolonged Record of Hydroclimatic Changes at Antoniadi Crater, Mars. *Journal of Geophysical Research: Planets*. (2023) Jul;128(7):e2022JE007606. [[Link](#)]

Zaki, A., Davis, J., Edgett, E., Giegengack, R., Roige, M., Conway, S., Schuster, M., Gupta, S., Salese, F., Sangwan, K., Fairen, A., **Hughes, C. M.**, Pain, C., & Castellort, S. (2022). Fluvial depositional systems of the African humid period: An analog for an early, wet Mars in the eastern Sahara. *Journal of Geophysical Research: Planets*, 127(5), e2021JE007087. [[Link](#)]

Rice, M.S., Seeger, C., Bell, J., Calef, F., St. Clair, M., Eng, A., Fraeman, A.A., **Hughes, C. M.**, Horgan, B., Jacob, S. and Johnson, J. (2022). Spectral diversity of rocks and soils in Mastcam observations along the Curiosity rover's traverse in Gale crater, Mars. *Journal of Geophysical Research: Planets*, 127(8), e2021JE007134.

Stack, K. M., Williams, N. R., Calef, F., Sun, V. Z., Williford, K. H., Farley, K. A., Eide, S., Flannery, D., **Hughes, C. M.**, ... & Yingst, R. A. (2020). Photogeologic map of the perseverance rover field site in Jezero crater constructed by the Mars 2020 Science Team. *Space Science Reviews*, 216(8), 1-47. [[Link](#)]

Cardenas, B. T., Mohrig, D., Goudge, T. A., **Hughes, C. M.**, Levy, J. S., Swanson, T., ... & Zhao, F. (2020). The anatomy of exhumed river-channel belts: Bedform to belt-scale river kinematics of the Ruby Ranch Member, Cretaceous Cedar Mountain Formation, Utah, USA. *Sedimentology*. [[Link](#)]

Cardenas, B. T., Kocurek, G., Mohrig, D., Swanson, T., **Hughes, C. M.**, & Brothers, S. C. (2019). Preservation of Autogenic Processes and Allogenic Forcings in Set-Scale Aeolian Architecture II: The Scour-and-Fill Dominated Jurassic Page Sandstone, Arizona, USA. *Journal of Sedimentary Research*, 89(8), 741-760. [[Link](#)]

Hughes, C. M., Cardenas, B. T., Goudge, T. A., & Mohrig, D. (2019). Deltaic deposits indicative of a paleo-coastline at Aeolis Dorsa, Mars. *Icarus*, 317, 442-453. [[Link](#)]

Kocurek, G., Martindale, R. C., Day, M., Goudge, T. A., Kerans, C., Hassenruck-Gudipati, H. J., ... **Hughes, C. M.** & Nazworth, C. M. (2019). Antecedent aeolian dune topographic control on carbonate and evaporite facies: Middle Jurassic Todilto Member, Wanakah Formation, Ghost Ranch, New Mexico, USA. *Sedimentology*, 66(3), 808-837. [[Link](#)]

Goudge, T. A., Mohrig, D., Cardenas, B. T., **Hughes, C. M.**, & Fassett, C. I. (2018). Stratigraphy and paleohydrology of delta channel deposits, Jezero crater, Mars. *Icarus*, 301, 58-75. [[Link](#)]

PUBLICATIONS IN-PREP, SUBMITTED, OR IN REVISION

Hughes, C. M., Shaw, J.B., Fernandes, A.M., Swanson, T.E. (2024). Channel Belt Narrowing and Backwater Morphodynamics as Planetary Phenomena: Tools for Interpreting Fluvial Systems. *Geophysical Research Letters* (submitted).

Hughes, C. M., Shaw, J.B., Cardenas, B.T., MacGilvery, M., Jackson, S. (2024). The Wedington Sandstone: A Terrestrial Analog for Topographically Inverted River Delta Deposits on Mars. (in preparation).

OTHER PUBLICATIONS

Hughes, C. M. (2020). Bio-preservation potential of sediment in Eberswalde crater, Mars. [[Link](#)]

CONFERENCE ABSTRACTS

Hughes, C. M., Shaw, J. B., & Cardenas, B. T. (2024). Sedimentology of a Topographically Inverted River Delta in Northwest Arkansas: An Important Analog for Jezero Crater and Other Martian Deposits. *LPI Contributions*, 3007, 3452.

Hughes, C. M., & Shaw, J. B. (2022). Interpreting coastal channel dynamics at Aeolis Dorsa, Mars with implications for hydrodynamic reconstructions. In *AGU Fall Meeting 2022*. AGU.

Hughes, C.M. & Shaw, J.B. (2022). Coastal channel dynamics at Aeolis Dorsa, Mars. *Proceedings of the Fluvial and Tidal Workshop, Padua, Italy*.

Hughes, C. M., & Shaw, J. B. (2021). River Delta Trunk Channel Deposit Preserved in Inverted Relief, Wedington, Arkansas. *LPI Contributions*, 2595, 8078.

Hughes, C. M., & Shaw, J. B. (2020). Preliminary Analysis of a Terrestrial Analog for Topographically Inverted Martian River Delta Deposits. In *AGU Fall Meeting 2021*. AGU.

Zaki, A., Edgett, K. S., Gupta, S., Pajola, M., Davis, J., **Hughes, C. M.**, ... & Castelltort, S. (2020). Reconstructing the fluvial history of Antoniadi crater: evidence for Noachian and Amazonian stream networks on Mars. In *AGU Fall Meeting 2020*. AGU.

Hughes, C. M., & Rice, M. S. (2019). Hyperspectral Analysis of the Source-to-Sink System at Eberswalde crater, Mars. *AGUFM, 2019*, P51F-3425.

Seeger, C., Rice, M. S., Starr, M., **Hughes, C. M.,** & Frizzell, K. (2019). Mastcam Spectral Diversity Within Glen Torridon, Gale crater, Mars. *AGUFM, 2019*, P31A-3426.

Seeger, C. H., Rice, M. S., Starr, M., & **Hughes, C. M.** (2019). Mastcam Spectral Characterization of Stratigraphic Units Along Curiosity's Traverse in Gale crater, Mars. *LPI*, (2132), 2235.

Rice, M. S., Starr, M. S., **Hughes, C. M.,** Seeger, C. H., Fraeman, A. A., Johnson, J. R., ... & Wellington, D. F. (2019). Science Results from a Comprehensive Mastcam Spectral Database for Curiosity's Traverse. *LPI*, (2132), 3030.

Starr, M. S., Rice, M. S., **Hughes, C. M.,** Seeger, C. H., Bell, J. F., & Wellington, D. F. (2019). Methodology for the Creation and Analysis of a Comprehensive Mastcam Multispectral Database of Curiosity's Traverse. *LPI*, (2132), 3087.

Hughes, C. M., & Rice, M. (2019). Spectral Characteristics of Deposit Stratigraphy at Eberswalde crater, Mars. *EPSC, 2019*, EPSC-DPS2019.

Cardenas, B. T., Mohrig, D. C., Goudge, T. A., **Hughes, C. M.,** Levy, J., Swanson, T., & Mason, J. (2018). Anatomy of exhumed river channel-belts. *AGUFM, 2018*, EP52A-01.

Cardenas, B. T., Kocurek, G., Mohrig, D., Swanson, T., **Hughes, C. M.,** Brothers, S., & Goudge, T. (2018). Ancient environmental forcings recorded in aeolian stratigraphy: an Earth analog to aeolian strata on Mars. *LPI*, (2083), 2971.

Goudge, T. A., Mohrig, D., Cardenas, B. T., **Hughes, C. M.,** & Fassett, C. I. (2017). Stratigraphy and evolution of delta channel deposits, Jezero crater, Mars.

Goudge, T. A., Mohrig, D., Cardenas, B. T., **Hughes, C. M.,** & Fassett, C. I. (2017). Stratigraphy and evolution of delta channel deposits, Jezero crater, Mars.

Peng, Y., Steel, R., Rossi, V. M., Clayton, C., & **Hughes, C. M.,** Mixed Energy Process Interactions Read From a Tide-Dominated Shoreline: The Paleo-Orinoco Delta, Trinidad. In *AAPG Annual Convention and Exhibition*.

Hughes, C. M., Cardenas, B. T., Goudge, T. A., & Mohrig, D. (2016). Deltaic deposits indicative of a paleo-coastline at Aeolis Dorsa, Mars. In *Proceedings of the 47th Lunar and Planetary Science Conference: Houston, Texas, Lunar and Planetary Institute, abstract* (Vol. 2139).

Goudge, T. A., Mohrig, D., Cardenas, B. T., **Hughes, C. M.,** Levy, J. S., & Fassett, C. I. (2016). Sedimentology of the Jezero crater Western Fan Deposit: 2. Secular Changes in the Style of Channelization. *LPI*, (1903), 1656.

Cardenas, B. T., Bryk, B. A., Goudge, T. A., **Hughes, C. M.,** & Mohrig, D. (2016). Determining Paleoflow Direction of Martian Channel Belts Using Preserved Channel-Bend Asymmetry: Case Study at Aeolis Dorsa, Mars. *LPI*, (1903), 2367.

MISSION INVOLVEMENT

NASA – Mars Perseverance Rover

Student Participant

2018 – 2020

Inlet-Valley Co-Lead for geologic mapping of the Jezero crater landing site, landing site workshop contributor

NASA – Mars Science Laboratory Curiosity Rover

Student Participant

2018 – 2019

Quality assurance on Mastcam Multispectral Database; Mastcam multispectral observation processing and analysis

INVITED TALKS AND OUTREACH

Fort Smith Geologic Society	2024
GeoHog Conference	2020 – 2024
Bellingham Space Exploration Society	2019
WWU Geology Department Brown-bag	2018
Blinn Community College Planetary Science Outreach	2018
Bellville I.S.D., Science and Tech. Booster Club	2018 – 2019
UT Undergraduate Geologic Society	2017
UT Soft-Rock Talk	2016
Planetary Organization for Space Science and Exploration	2016

TEACHING EXPERIENCE

University of Arkansas, Department of Geosciences

Graduate Teaching Assistant	2022 – 2024
Stratigraphy and Sedimentation (GEOS 203) – one semester	
Physical Geology Lab (GEOS 1111L) – three semesters	

Western Washington University, Department of Geology

Graduate Teaching Assistant	2018 – 2020
Introduction to Geology (GEOL 101) – three quarters	
Physical Geology (GEOL 211 & 211A) – five quarters	

FIELD EXPERIENCE

Pea Ridge, Lincoln, Elkins, Arkansas	2024
Demmings, New Mexico	2023
Bob Kidd Lake, Arkansas	2022
Lake Wedington, Arkansas	2021
Vantage, Washington; Caspe, Northern Spain	2019
Deming, Washington; Yakima, Washington	2018
Ghost Ranch, New Mexico; Gulf Coast, Texas	2017
Page, Arizona; Green River, Utah; Gulf Coast, Texas; Liberty, Texas	2016
Trinidad	2015
Jackson School of Geosciences Field School; Questa, New Mexico	2014

LEADERSHIP AND SERVICE

University of Arkansas

Association of Women Geoscientists - Member	2020-2024
Graduate Student Diversity, Equity, and Inclusiveness Group Founder	
Geoscience Mentorship Program Co-Founder	

Western Washington University

Graduate Student Advisory Council	2018 – 2019
Committee Chair on Graduate Student Finances	
Committee Member on Diversity, Equity and Inclusiveness	

PROFESSIONAL DEVELOPMENT

University of Arkansas

Fluvial and Tidal Processes Workshop – Padua, Italy	2022
Sexual Orientation and Gender Identity Seminar	2021

Western Washington University

LGBTQ+ 101 Seminar	2019
Student Centered Teaching Practices Seminar	2018 – 2019

TECHNICAL SKILLS AND EXPERTISE

ENVI, ESRI ArcGIS, and Adobe Suite, Agisoft, Python, R, IDL, MATLAB, and Latex, Bash/Shell, photogrammetry, hyperspectral analysis, ground-truthing remotely sensed data, machine learning, field surveying, field geology