

Benjamin T. Cardenas

Assistant Professor
Penn State
Department of Geosciences
College of Earth and Mineral Sciences
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University Park, PA 16802

Principal Investigator - [The Planetary Sedimentology Laboratory](#)
Founder – [Society for Sedimentary Geology \(SEPM\) Planetary Research Group](#)
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PROFESSIONAL APPOINTMENTS

Penn State, since July 2022
Department of Geosciences, College of Earth and Mineral Sciences
Assistant Professor

Caltech, September 2019 – June 2022
Division of Geological and Planetary Sciences
Postdoctoral Scholar Fellowship Trainee in Geology
National Science Foundation Earth Sciences Postdoctoral Fellow
Mars Science Laboratory Science Team Collaborator
Advisors: Mike Lamb and John Grotzinger

EDUCATION

PhD, Geological Sciences, 2019
The University of Texas at Austin, Jackson School of Geosciences
Advisor: David Mohrig
Dissertation: The accumulation and preservation of fluvial and aeolian strata

MS, Geological Sciences, 2014
The University of Texas at Austin, Jackson School of Geosciences
Advisors: David Mohrig and Gary Kocurek

BS, Geological Sciences with Mathematics minor, 2012
The University of Texas at San Antonio
Undergraduate Research Advisors: Hongjie Xie and Judy Haschenburger

AWARDS AND FELLOWSHIPS

2. Association of Women Geoscientists Penn State Chili Cook-off – 3rd place, 2023
1. National Science Foundation Earth Sciences Postdoctoral Fellow, 2021-2022

MISSION EXPERIENCE

1. Mars Science Laboratory Science Team Collaborator, 2020-2022

FUNDING

At Penn State

2022

1. PI Cardenas, NASA Solar System Workings program, Can martian fluvial ridges be used to measure structural tilt? Funding period 2022 – 2025.

Prior to appointment at Penn State

11. National Science Foundation Earth Sciences Postdoctoral Fellowship: A channel-belt scale source of autogenic topography controlling fluvial sedimentation and preservation: Investigation using 3D seismic volumes, May 2021 – June 2022
10. University of Texas at Austin Graduate School Summer Fellowship, Summer 2019
9. University of Texas at Austin Graduate Student Scholarship, January 2019
8. University of Texas at Austin Undergraduate Research Fellowship for field work at White Sands National Monument, New Mexico. Awarded to undergraduate mentee Feifei Zhao, Spring 2018
7. NASA/Mars Exploration Program Travel Grant to the Fourth landing site workshop for the Mars 2020 rover mission, October 2018
6. NASA/Mars Exploration Program Travel Grant to the Fifth Planetary Dunes Workshop, May 2017
5. Jackson School of Geosciences Seed Grant, January 2016
4. Jackson School of Geosciences Planetary Science Theme Scholarship, January 2015
3. Jackson School of Geosciences Off-Campus Research Grant, May 2013
2. Jackson School of Geosciences Entry Fellowship, 2012-2013
1. Best Talk Award, Minority Opportunities for Research in Engineering and Science Colloquium, University of Texas at San Antonio, May 2012

PUBLICATIONS

Planetary Sedimentology Lab members in bold

In Review/In Revision

1. **Cardenas, B.T.**, Beer, A., Donahoe, P., Kanine, O., and Lamb, M.P. Crater wall degradation and chute formation from dry erosional rockfall.

Published

2023

19. **Cardenas, B.T.**, **Stacey, K.**, and **Baran, Z.**, Relationships between fluvial dune cross-set thickness, planview width, and trough geometry. Accepted for publication in Geology.
18. **Cardenas, B.T.**, and **Stacey, K.** Landforms associated with the aspect-controlled exhumation of crater-filling alluvial stratigraphy on Mars. Geophysical Research Letters, v. 50, e2023GL103618, <https://doi.org/10.1029/2023GL103618>.
17. Wu, C., Kim, W., Herring, R., **Cardenas, B.T.**, Dong, T., Ma, H., Moodie, A., Tsai, F., Li, A., and Nitttrouer, J. Pace of meandering and avulsion set river sinuosity near coast on Earth and Mars. A Nature Geoscience, v. 16, p. 747-753, <https://doi.org/10.1038/s41561-023-01231-1>.

16. **Cardenas, B.T.**, Lamb, M.P., Jobe, Z.R., Mohrig, D., and Swartz, J.M., 2023, Morphodynamic preservation of fluvial channel belts. *The Sedimentary Record*, v. 21, <https://doi.org/10.2110/001c.66285>.

2022

15. **Cardenas, B.T.**, Grotzinger, J.P., Lamb, M.P., Lewis, K., Fedo, C., Dietrich, W., Bryk, A., Stein, N., Turner, M., and Caravaca, G., 2022, Barform deposits of the Carolyn Shoemaker formation, Gale crater, Mars. *Journal of Sedimentary Research*, v. 92, p. 1071-1092, <https://doi.org/10.2110/jsr.2022.032>.
14. **Cardenas, B.T.**, Lamb, M.P., and Grotzinger, J.P., 2022, Martian landscapes of fluvial ridges carved from sedimentary basin fill. *Nature Geoscience*, v. 15, p. 871-877, <https://doi.org/10.1038/s41561-022-01058-2>.
13. **Cardenas, B.T.** and Lamb, M.P., 2022, Paleogeographic reconstructions of an ocean margin on Mars based on deltaic sedimentology at Aeolis Dorsa. *Journal of Geophysical Research – Planets*, v. 127, e2022JE007390, <https://doi.org/10.1029/2022JE007390>.
12. Swartz, J., **Cardenas, B.T.**, Mohrig, D., and Passalacqua, P., 2022, Tributary channel networks formed by depositional processes. *Nature Geoscience*, v. 15, p. 216-221, <https://doi.org/10.1038/s41561-022-00900-x>.

2021

11. Hayden, A.T., Lamb, M.P., Myrow, P., Mohrig, D., Williams, R.M.E., Cuevas Martinez, J.L., **Cardenas, B.T.**, Findlay, C.P., Ewing, R.C., and McElroy, B.J., 2021, The Oligocene-Miocene Guadalupe-Matarranya fan, Spain, as an analog for long-lived, ridge-bearing megafans on Mars. *Journal of Geophysical Research – Planets*, v. 126, e2021JE006993, <https://doi.org/10.1029/2021JE006993>.
10. Zhao, F., Kim, W., and **Cardenas, B.T.**, 2021, Controls of aeolian dune height on cross-strata architecture: White Sands, New Mexico, USA. *Journal of Sedimentary Research*, v. 91, p. 1-12, <https://doi.org/10.2110/jsr.2020.138>.

2020

9. Mason, J., **Cardenas, B.T.**, Day, M.D., Daniller-Varghese, M., Brothers, S.C., Kocurek, G., and Mohrig, D., 2020, Pattern evolution and interactions in subaqueous dune fields: North Loup River, Nebraska, U.S.A. *Journal of Sedimentary Research*, v. 90, p. 1734-1746, <https://doi.org/10.2110/jsr.2020.066>.
8. **Cardenas, B.T.**, Mohrig, D., Goudge, T.A., Hughes, C.M., Levy, J.S., Swanson, T., Mason, J., and Zhao, F., 2020, The anatomy of exhumed river-channel belts: Bedform- and belt-scale kinematics of the Ruby Ranch Member, Cretaceous Cedar Mountain Formation, Utah, USA. *Sedimentology*, v. 67, p. 3655-3682, <https://doi.org/10.1111/sed.12765>.

2019

7. **Cardenas, B.T.**, Swanson, T., Goudge, T.A., Wagner, R.W., and Mohrig, D., 2019, The effect of remote sensing resolution limits on aeolian sandstone measurements and the reconstruction of ancient dune fields on Mars: Numerical experiment using the Page Sandstone, Earth. *Journal of Geophysical Research – Planets*, v. 124, p. 3244-3256, <https://doi.org/10.1029/2019JE006191>.

6. Swanson, T., Mohrig, D., Kocurek, G., **Cardenas, B.T.**, Wolinsky, M.A., 2019, Preservation of autogenic processes and allogenic forcings within set-scale aeolian architecture I: numerical experiments. *Journal of Sedimentary Research*, v. 89, p. 728-740, <https://doi.org/10.2110/jsr.2019.42>.
5. **Cardenas, B.T.**, Kocurek, G., Mohrig, D., Swanson, T., Hughes, C.M., and Brothers, S.C., 2019, Preservation of autogenic processes and allogenic forcings in set-scale aeolian architecture II: the scour-fill dominated Jurassic Page Sandstone, Arizona, USA. *Journal of Sedimentary Research*, v. 89, p. 741-760, <https://doi.org/10.2110/jsr.2019.41>.
4. Kocurek, G., Martindale, R.C., Day, M.D., Goudge, T.A., Kerans, C., Hassenruck-Gudipati, H.J., Mason, J., **Cardenas, B.T.**, Petersen, E.I., Mohrig, D., Aylward, D.S., Hughes, C.M., and Nazworth, C.M., 2019, Antecedent aeolian dune topographic control on carbonate and evaporate facies: Jurassic Todilto Member, Wanakah Formation, Ghost Ranch, New Mexico, USA. *Sedimentology*, v. 66, p. 808-837, <https://doi.org/10.1111/sed.12518>.
3. Hughes, C.M., **Cardenas, B.T.**, Goudge, T.A., and Mohrig, D., 2019, Deltaic Deposits Indicative of a Paleo-Coastline at Aeolis Dorsa, Mars. *Icarus*, v. 317, p. 442-453, <https://doi.org/10.1016/j.icarus.2018.08.009>.

2018

2. Goudge, T.A., Mohrig, D., **Cardenas, B.T.**, Hughes, C.M., and Fassett, C.I., 2018, Stratigraphy and Paleohydrology of Delta Channel Deposits, Jezero Crater, Mars. *Icarus*, v. 301, p. 58-75, <https://doi.org/10.1016/j.icarus.2017.09.034>.
1. **Cardenas, B.T.**, Mohrig, D., and Goudge, T.A., 2018, Fluvial stratigraphy of valley fills at Aeolis Dorsa, Mars: Evidence for base-level fluctuations controlled by a downstream water body. *GSA Bulletin*, v. 130, p. 484-498, <https://doi.org/10.1130/B31567.1>.

Other Publications

2. **Cardenas, B.T.**, 2019, The Accumulation and Preservation of Fluvial and Aeolian Strata. PhD Dissertation, University of Texas at Austin.
1. **Cardenas, B.T.**, 2014, Evidence for coastline-controlled changes in base level from fluvial stratigraphy at Aeolis Dorsa, Mars. MS Thesis, University of Texas at Austin.

Data Repositories

9. **Cardenas, B.T.**, Stacey, K., and Baran, Z.J., 2023, Data for "Relationships between cross-set widths, thicknesses, and trough geometry". [Data set]. ScholarSphere. <https://doi.org/10.26207/47fx-fk43>
8. **Cardenas, B.T.**, 2023, Model and data for "Crater-wall degradation and bedrock-chute formation from dry rockfall erosion." [Data set]. ScholarSphere. <https://doi.org/10.26207/rdex-en91>
7. **Cardenas, B.T.**, 2023, Data for "Formation of topographic benches and noses from the exhumation of crater-filling alluvial strata on Mars." [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.7757469>
6. **Cardenas, B.T.**, 2022, Data and processing scripts from "Morphodynamic Preservation of Fluvial Channel Belts". [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.730024>
5. **Cardenas, B.T.**, Dickson, J.L., Hayden, A.T., and Lamb, M.P., 2022, Context Camera digital elevation models for Aeolis Dorsa, Mars [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.7120440>
4. **Cardenas, B.T.**, 2022, Paleogeographic evolution of an ocean margin on Mars - data (1.0) [Data set]. CaltechDATA. <https://doi.org/10.22002/D1.20176>

3. **Cardenas, B.T.**, 2022, Martian landscapes carved from ancient sedimentary basin fill - Data and Model (1.0) [Data set]. CaltechDATA. <https://doi.org/10.22002/D1.20023>
2. **Cardenas, B.T.**, 2022, Barform deposits of the Carolyn Shoemaker formation, Gale Crater, Mars - data (1.0) [Data set]. CaltechDATA. <https://doi.org/10.22002/D1.20044>
1. **Cardenas, B.T.**, 2019, Aeolian cross-set thicknesses from the Page Sandstone: Original, blended data, and synthetic comparisons (1.0) [Data set]. CaltechDATA. <https://doi.org/10.22002/D1.1304>

MENTORSHIP

PhD

2. Vincent Soldano, Spring 2024-
1. Kaitlyn Stacey, Fall 2022- Summer 2023 (no degree).

Undergraduate

3. Sophia Wood, Fall 2023-
2. Ava Nehlsen, Spring 2023-
1. Zachary Baran, Fall 2022-

Committee Member

2. Jasmine Walker (advisor Liz Hajek), 2023-
1. Noshin Sharmili (advisor Liz Hajek), 2023-

Prior to appointment at Penn State

Caltech (as a postdoctoral fellow)

1. Patrick Donahoe, Undergraduate Class of 2024.

University of Texas at Austin (as a PhD student)

2. Feifei Zhao, BS 2020.
1. Cory Hughes, BS 2018.

TEACHING

Fall 2023 (Teaching Release for parental support)

GEOSC 496-003 – Independent Study

GEOSC 600-006 – Thesis Research

New Course Development – Planetary Geology and Mars Sedimentology

Spring 2023

EAR100 – Environment Earth

GEOSC 496-003 – Independent Study

GEOSC 600-006 – Thesis Research

Fall 2022

GEOSC 496-003 – Independent Study

GEOSC 600-006 – Thesis Research

SERVICE**To Penn State**

3. Penn State Department of Geosciences Qualifying Exam Rover, 2023
 4. Aristle Monteiro, advisor Tushar Mittal
 3. Eddie Spagnuolo, advisor Peter Wilf
 2. Adam Stone, advisor Brad Foley
 1. Caleb Norville, advisor Sarah Ivory
2. Penn State Department of Geosciences Admissions Committee, 2023
1. Penn State Department of Geosciences DEI Committee, 2022-

To the Discipline***Societies***

3. SEPM (Society for Sedimentary Geology) Twenhoefel Award Committee, 2023-
2. Organizer of SEPM (Society for Sedimentary Geology) Planetary Research Group, 2020-
1. Founder of SEPM (Society for Sedimentary Geology) Planetary Research Group, 2020

Conference Involvement

9. Co-convener of SEPM's International Sedimentary Geology Conference – Planetary Sedimentary Geology session, Flagstaff, AZ, April 2024
8. Co-convener and OSPA Liaison of AGU's Planetary Surface Processes session, OSPA judge, Chicago, IL, December 2022.
7. Co-organizer of Second Annual Meeting of SEPM's Planetary Research Group, GSA Meeting, Denver, CO, October 2022
6. Co-organizer of First Annual Meeting of SEPM's Planetary Research Group, 2021
5. Founder of Planetary Science Research Group, SEPM Society for Sedimentary Geology, 2020 - current
4. Participant in online workshop *Hard Conversations: Intro to Racism and its Undoing*, September-October 2020
3. Official Twitter microblogger for the 50th Lunar and Planetary Science Conference, March 2019
2. Organizer of the UT Austin Soft Rock Seminar, 2016–2017
1. Graduate Student Representative for the Planetary Science Research Theme at the JSG, 2015-2017

Manuscript Reviews**2023**

Journal of Geophysical Research: Planets (1)

2022

Geophysical Research Letters (2)

Journal of Geophysical Research – Planets (2)

Prior to Appointment at Penn State

Earth and Planetary Science Letters

Earth Surface Processes and Landforms

Geology

Geophysical Research Letters

Geosphere

Icarus

Journal of Geophysical Research: Earth Surface

Journal of Geophysical Research: Planets

Nature Communications

Science Advances

The Sedimentary Record

Sedimentology

Proposal Reviews**2023**

National Science Foundation, Proposal Review

National Aeronautics and Space Administration, Panel

National Aeronautics and Space Administration, Proposal Reviews

National Aeronautics and Space Administration, Planetary Data Systems Imaging Node, review of the datasets produced by PDART project *Mastcam Stereo Analysis and Mosaics (MSAM)*

2022

National Aeronautics and Space Administration, Panel

National Aeronautics and Space Administration, Proposal Reviews

2021

National Aeronautics and Space Administration, Panel

INVITED TALKS**2023**

18. American Geophysical Union Annual Meeting, San Francisco, CA, December 2023.

17. Astronomy on Tap, State College Chapter, January 2023.

2022

16. Interview with GeoEngage, collaborative outreach program between University of Texas at San Antonio and Northwest Vista College, San Antonio, TX, November 2022.
15. University of Arkansas, Department of Geosciences Colloquium, November 2022.

Prior to appointment at Penn State

14. Texas A&M, Geology and Geophysics Seminar, November 2021.
13. University of Texas at San Antonio, Geology Seminar, October 2021.
12. University of Washington, June 2021.
11. Georgia Southern University, April 2021.
10. The Pennsylvania State University, Department of Geosciences Colloquium Series, March 2021.
9. University of Illinois at Chicago, Earth and Environmental Science Seminar, March 2021.
8. University of California, Berkeley, EPS Department Colloquium, February 2021.
7. Caltech, guest lecture in Geomorphology, November 2020.
6. University of Washington, October 2020.
5. Caltech, Geoclub Seminar, June 2020.
4. Stanford University, guest lecture, June 2020.
3. University of Washington, cancelled due to covid-19 concerns, April 2020.
2. Brown University, Planetary Lunch Bunch, Providence, Rhode Island, January 2020.
1. Rice University, Sedimentology Seminar, Houston, Texas, September 2017.

PRESS

8. "Traces of an ancient ocean discovered on Mars" by Adrienne Berard, Penn State News, October 27, 2022, <https://www.psu.edu/news/research/story/traces-ancient-ocean-discovered-mars/>, picked up by at least 95 news outlets. <https://wiley.altmetric.com/details/137415385/wikipedia>
7. Comment on a published manuscript, "Estimating Land Loss in River Deltas", by Mohammed El-Said in Eos, August 2022. <https://eos.org/articles/estimating-land-loss-in-river-deltas>
6. Comment on a published manuscript, "Satellite Images Reveal a New View of Ancient Earth's Rivers" by Joel Goldberg in Eos, July 2022. <https://eos.org/articles/satellite-images-reveal-a-new-view-of-ancient-earths-rivers>
5. Science Salutation, for Setting up the Preservation of Fluvial Channel Belts, Salutation by Kyle Straub. Shaw Sedimentology and Stratigraphy Laboratory at the University of Arkansas, December 5, 2020. <https://sandandmud.org/2020/12/05/ss4-cardenas-et-al-setting-up-the-preservation-of-fluvial-channel-belts>
4. Live television interview, 'Water on Mars', Fox 7 Austin KTBC, July 25, 2018.
3. Interview discussing analogs in planetary science, We Martians Podcast, Episode 39, www.wemartians.com
2. "Mars research finds evidence of vast bodies of water" by Sabrina Tran in the Daily Texan, Oct. 2017.
1. "Study of Martian sedimentary layers reveals more about the planet's past" by Matt Williams in Universe Today, Sep. 2017.

PROFESSIONAL ORGANIZATION MEMBERSHIP

3. Geological Society of America, 2012 - current
2. American Geophysical Union, 2012 - current
1. SEPM Society for Sedimentary Geology, 2013 – current

CONFERENCE ABSTRACTS

Planetary Sedimentology Lab members in bold

2023

34. **Stacey, K.** and **Cardenas, B.T.**, 2023, Planform architecture of fluvial cross strata within the Cedar Mountain Formation, Utah with applications to Mars. 54th Lunar and Planetary Science Conference, 13-17 March 2023, held at the Woodlands, TX, LPI Contribution No. 2806, id.1361.
33. **Baran, Z.J.** and **Cardenas, B.T.**, 2023, Numerical simulations of Lake Bonneville shoreline erosion at Mars-like rates and durations. 54th Lunar and Planetary Science Conference, 13-17 March 2023, held at the Woodlands, TX, LPI Contribution No. 2806, id.2697.
32. **Cardenas, B.T.** and Lamb, M.P., 2023, Sedimentology of an ancient ocean margin at Aeolis Dorsa, Mars. 54th Lunar and Planetary Science Conference, 13-17 March 2023, held at the Woodlands, TX, LPI Contribution No. 2806, id.2172.

2022

31. **Cardenas, B.T.**, Grotzinger, J.P., Lamb, M.P., Lewis, K. Fedo, C., Dietrich, W., Bryk, A., Stein, N., Turner, M., and Caravaca, G., 2022, Preserved barform deposits in the Carolyn Shoemaker formation, Gale crater, Mars. Abstract ID 1062763, presented at American Geophysical Union Fall Meeting, Chicago, IL, Dec.
30. **Cardenas, B.T.**, Lamb, M.P., and Grotzinger, J.P., 2022, Erosional windows into ancient sedimentary basins on Mars. Abstract ID 378687, presented at Geological Society of America Connects 2022 in Denver, CO, Oct.

2021

29. Wu, C., Kim, W., Moodie, A.J., **Cardenas, B.T.**, Herring, R., Dong, T.Y., Ma, H., and Tsai, F. T.-C., Li, A., and Nitttrouer, J.A., 2021, Pace of meandering and avulsion set river sinuosity near coast on Earth on Mars: EP31A-07, presented at American Geophysical Union Fall Meeting, New Orleans, LA, 13-17 Dec.

2020

28. **Cardenas, B.T.**, Lamb, M.P., Woodward, W.W., Dickson, J.L., and Hayden, A.T., 2020, Reconstructing paleo-topography from river deposits on Mars: SEPM Society for Sedimentary Geology International Sedimentary Geosciences Conference, Flagstaff, AZ, USA, canceled due to COVID-19 concerns.

2019

27. **Cardenas, B.T.**, Kocurek, G., Mohrig, D., Swanson, T., Hughes, C.M., and Brothers, S.C., 2019, Autogenic processes and environmental forcings recorded in aeolian stratigraphy I: the Jurassic Page Sandstone, Arizona, USA: AAPG ACE 2019, San Antonio, TX, USA.

26. Swanson, T., Mohrig, D., Kocurek, G., **Cardenas, B.T.**, 2019, Autogenic Processes and Environmental Forcings Recorded in aeolian stratigraphy II: numerical experiments: AAPG ACE 2019, San Antonio, TX, USA.
25. **Cardenas, B.T.**, Swartz, J.M., and Mohrig, D., 2019, The length of fluvial sinuous ridges on Mars: 50th Lunar and Planetary Science Conference, 18-22 March, 2019, held at The Woodlands, Texas, LPI Contribution No. 2132, id.1677.

2018

24. *Zhao, X., **Cardenas, B.T.**, and Kim, W., 2018, Grainflow thickness: surface process to subsurface record: EP51C-1832, presented at 2018 AGU Fall Meeting, Washington, D.C., 10-14 Dec.
23. Liu, X.C., Mohrig D.C., Buttles, J.L., Kim, W., Slyvester, Z., Hudec, M.R., Fernandez, N., and **Cardenas, B.T.**, 2018, Unraveling the geometric signals in mini-basin development that are connected to turbidity-current sedimentation versus gravity sliding: An experimental approach: EP51A-03, presented at 2018 AGU Fall Meeting, Washington, D.C., 10-14 Dec.
22. **Cardenas, B.T.**, Mohrig, D.C., Goudge, T.A., Hughes, C.M., Levy, J., Swanson, T., and Mason, J., 2018, Anatomy of exhumed river channel-belts: EP52A-01, presented at 2018 AGU Fall Meeting, Washington, D.C., 10-14 Dec.
21. Hayden, A., Lamb, M.P., Mohrig, D.C., McElroy, B.J., Williams, R.M.E., Myrow, P., Ewing, R., **Cardenas, B.T.**, and Findlay, C.P., 2018, Sinuous ridges are exhumed fluvial channel belts formed over millions of years: implications for inverted channels on Mars: EP13B-03, presented at 2018 AGU Fall Meeting, Washington, D.C., 10-14 Dec.
20. **Cardenas, B.T.**, Goudge, T.A., Hughes, C.M., Mohrig, D., Mason, J., Swanson, T., and Levy, J.S., 2018, Testing the Preservation of River Channel Properties in Earth Analogs to Martian Fluvial Sinuous Ridges: 49th Lunar and Planetary Science Conference, 19-23 March, 2018, held at The Woodlands, Texas, LPI Contribution No. 2083, id.1541.
19. **Cardenas, B.T.**, Kocurek, G., Mohrig, D., Hughes, C.M., Swanson, T., Brothers, S.C., and Goudge, T.A., 2018, Ancient Environmental Forcings Recorded in Aeolian Stratigraphy: An Earth Analog to Aeolian Strata on Mars: 49th Lunar and Planetary Science Conference, 19-23 March, 2018, held at The Woodlands, Texas, LPI Contribution No. 2083, id.2971.

2017

18. **Cardenas, B.T.**, Kocurek, G., Mohrig, D., and Swanson, T., 2017, Coupling aeolian stratigraphic architecture to paleo-boundary conditions: the scour-fill dominated Jurassic Page Sandstone: EP33A-1918, presented at 2017 AGU Fall Meeting, New Orleans, LA, 11-15 Dec.
17. Hayden, A., Lamb, M.P., Mohrig, D., Williams, R.M.E., Myrow, P., Ewing, R.C., **Cardenas, B.T.**, Findlay, C.P., Reconstructing paleo-discharge from geometries of fluvial sinuous ridges on Earth and Mars: EP33A-1917, presented at 2017 AGU Fall Meeting, New Orleans, LA, 11-15 Dec.
16. **Cardenas, B.T.**, Kocurek, G., and Mohrig, D., The Jurassic Page Sandstone: coupling aeolian stratigraphic architecture to water table and sea level fluctuations: Fifth International Planetary Dunes Workshop, Proceedings of the conference held 16-19 May, 2017 in St. George, Utah. LPI Contribution No. 1961, 2017, id.3050.
15. Goudge, T.A., Mohrig, D., **Cardenas, B.T.**, Hughes, C.M., and Fassett, C.I., 2017, Stratigraphy and evolution of delta channel deposits, Jezero crater, Mars: Lunar and Planetary Science XLVIII, #1195.

14. **Cardenas, B.T.**, Mohrig, D., and Goudge, T.A., 2017, Fluvial stratigraphy at Aeolis Dorsa, Mars, records base level changes and backwater sedimentation controlled by a fluctuating downstream body of water: Lunar and Planetary Science XLVIII, #1938.
13. **Cardenas, B.T.**, Goudge, T.A., Hughes, C.M., Mohrig, D., and Levy, J.S., 2017, Stratigraphic architecture of compound channel-filling deposits in the Cedar Mountain and Morrison Formations, Utah: stratigraphic analogs to martian sinuous ridges: Lunar and Planetary Science XLVIII, #1946.
12. **Cardenas, B.T.**, Goudge, T.A., Hughes, C.M., Levy, J.S., and Mohrig, D., Justifying martian fluvial sinuous ridge measurements using Earth analog stratigraphy: Fourth International Conference on Early Mars: Geologic, Hydrologic, and Climatic Evolution and the Implications for Life, Proceedings of the conference held 2-6 October, 2017 in Flagstaff, Arizona. LPI Contribution No. 2014, 2017, id.3060

2016

11. Goudge, T.A., Mohrig, D., **Cardenas, B.**, Hughes, C., Levy, J., and Fassett, C.I., 2016, Stratigraphy and paleohydrology of delta channel deposits, Jezero Crater, Mars: Geological Society of America Abstracts with Programs. Vol. 48, No. 7, doi: 10.1130/abs/2016AM-279574.
10. Petersen, E., Holt, J., Levy, J.S., Stuurman, C., Nerozzi, S., **Cardenas, B.T.**, Pharr, J., Aylward, D., Schmidt, L., Hoey, W., Prem, P., Rambo, J., Lim, Y., and Maharaj, K., A possible climate signal in the surface morphology and internal structure of Galena Creek Rock Glacier, Wyoming: EGU General Assembly 2016, held 17-22 April, 2016 in Vienna Austria, id. EPSC2016-10541.
9. **Cardenas, B.T.**, Bryk, A.B., Goudge, T.A., Hughes, C.M., and Mohrig, D., Determining paleoflow direction of martian channel belts using preserved channel-bend asymmetry: case study at Aeolis Dorsa, Mars: 47th Lunar and Planetary Science Conference, held March 21-25, 2016 at The Woodlands, Texas. LPI Contribution No. 1903, p.2367.
8. Goudge, T.A., Mohrig, D., **Cardenas, B.T.**, Hughes, C.M., Levy, J.S., and Fassett, C.I., Sedimentology of the Jezero crater western fan deposit: 2. Secular changes in the style of channelization: 47th Lunar and Planetary Science Conference, held March 21-25, 2016 at The Woodlands, Texas. LPI Contribution No. 1903, p.1656.
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