Mackenzie Denali Day

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Department Earth, Planetary, and Space Sciences, University of California Los Angeles

EDUCATION

2012-2017 University of Texas at Austin (Austin, TX)
PhD, Geology
Dissertation Advisor – Gary Kocurek
"Pattern formation and preservation in aeolian systems"

2008-2012 California Institute of Technology (Pasadena, CA)
BS, Geology

APPOINTMENTS

2018-pres. Assistant Professor
University of California Los Angeles

2017-2018 Postdoctoral Fellow
University of Washington; NASA Astrobiology Institute

AWARDS

2017 NASA Postdoctoral Program Fellowship
Universities Space Research Association

2017 Best PhD Exit talk
Department of Geological Sciences, Jackson School of Geo.

2016 Laura Thomson Barrow Graduate Fellowship
University of Texas at Austin, Jackson School of Geosciences

2015 Vada and Walter Boyle Graduate Fellowship in Petroleum Geology
University of Texas at Austin, Jackson School of Geosciences

2015, 2013 NASA group achievement award, Mars Science Laboratory Team
NASA Headquarters, Science Mission Directorate

2013 Vargas Endowed Presidential Scholarship
University of Texas at Austin, Office of the President

2013 David Bruton Jr. Graduate Fellowship Award
University of Texas at Austin, Office of the Graduate Dean

2012 National Science Foundation Gradate Research Fellowship
National Science Foundation

2012 Jackson School of Geosciences Conoco Phillips first year Fellowship
University of Texas, Jackson School of Geosciences

2011 Howard Reynolds Prize for excellence in geology
California Institute of Technology

PUBLICATIONS

Day, M., and G. Kocurek (2018), Pattern similarity in planetary dune fields. Geology. In press.

Day, M., and D. Catling (2018), Dune casts preserved by partial burial: the first identification of "ghost dune" pits on Mars. J. Geophys. Res. Planets, 123, 1431–1448. https://doi.org/10.1029/2018JE005613

Kocurek, G., R. Martindale, **M. Day,** T. Goudge, C. Kerans, H. Hassenruck-Gudipati, J. Mason, B. Cardenas, E. Petersen, D. Mohrig, D. Aylward, C. Hughes, and C Nazworth (2018), Antecedent aeolian dune topographic control on carbonate and evaporite facies: Jurassic Todilto Member, Wanakah Formation, Ghost Ranch, New Mexico, USA. Sedimentology. doi:10.1111/sed.12518

Banham, S., S. Gupta, D. Rubin, J. Watkins, D. Sumner, K. Edgett, J. Grotzinger, K. Lewis, L. Edgar, K. Stack-Morgan, R. Barnes, J. Bell, **M. Day,** R. Ewing, M. Lapotre, N. Stein, F. Rivera-Hernandez, and A. Vasavada (2018), Ancient Martian aeolian processes and the palaeomorphology reconstructed from the Stimson formation on the lower slope of Aeolis Mons, Gale crater Mars. Sedimentology. doi: 10.1111/sed.12469

Day, M. and G. Kocurek (2017), Aeolian dune interactions preserved in the ancient rock record. Sedimentary Geology 358: 187-196.

Anderson, W. and **M. Day** (2017), Turbulent flow over craters on Mars: Vorticity dynamics reveal aeolian excavation mechanism. Phys. Rev. E. 96, 043110.

Kocurek, G., and **M. Day** (2017), What is preserved in the aeolian rock record? A Jurassic Entrada sandstone case study at the Utah-Arizona border. Accepted to Sedimentology.

Ewing, R., M. Lapotre, K. Lewis, **M. Day**, N. Stein, D. Rubin, R. Sullivan, S. Banham, M. Lamb, N. Bridges, S. Gupta, and W. Fischer (2017), Sedimentary processes of the Bagnold Dunes: Implications for the eolian rock record of Mars. J. Geophys. Res. doi: 10.1002/2017JE005324.

Day, M., W. Anderson, G. Kocurek, and D. Mohrig (2016), Carving intracrater layered deposits with wind on Mars, Geophys. Res. Lett., 43, doi:10.1002/ 2016GL068011.

Day, M., and G. Kocurek (2016), Observations of an aeolian landscape: From surface to orbit in Gale Crater, Icarus, doi:10.1016/j.icarus.2015.09.042.

Lapotre, M., R. Ewing, M. Lamb, W. Fischer, J. Grotzinger, D. Rubin, K. Lewis, M. Ballard, **M. Day**, et al. (2016). Large wind ripples on Mars: A record of atmospheric evolution. Science, 353, 55-58.

Alibay, F., R. McGranaghan, R. Clegg, P. Craig, **M. Day**, et al. Design of a High-Value, Low-Cost Mission to the Neptunian System, IEEE Aerospace Conference, Big Sky, Montana, March 2014.

CLASSES TAUGHT

Fall 2018	EPSS 103b	Sedimentary Petrology
Spring 2019	EPSS 111	Stratigraphic and Field Geology

INVITED TALKS

Day, M., T. Dorn, and D. Stumbaugh. Aeolian preservation on Mars. Department of Geological Sciences, department colloquium, California State University Fullerton, October, 2018.

Day, M., T. Dorn, and D. Stumbaugh. Aeolian preservation on Mars. Department of Earth, Planetary, and Space Sciences, IPLEX brown bag seminar, University of California Los Angeles, October, 2018.

Day, M., and D. Catling. Dune casts preserved by partial burial: the first identification of "ghost dune" pits on Mars. NASA Astrobiology Institute Virtual Planetary Laboratory Astrobiology Colloquium, University of Washington, April 2018.

Day, M. and G. Kocurek. Dune-field pattern similarity across planetary bodies. American Geophysical Union annual meeting, New Orleans, LA, December 2017.

Day, M. and D. Catling. Dune cross-strata as an explanation for rhythmic layered deposits on Mars. American Geophysical Union annual meeting, New Orleans, LA, December 2017.

Day, M. Sand in Space. Department of Earth and Environmental Sciences, California State University East Bay, March, 2017.

Day, M. Sand in Space: Pattern formation and preservation in aeolian systems. Department of Earth, Planetary, and Space Sciences, University of California Los Angeles, April, 2017.

Day, M., and G. Kocurek. Aeolian bedform dynamics on Earth and Mars. Western Washington University Department of Geology, department seminar, Bellingham, WA, November 2016.

Day, M., G. Kocurek, and J. Grotzinger. Landscape evolution on Mars - A model of aeolian denudation in Gale crater. American Geophysical Union annual meeting, San Francisco, CA, December 2015.

Day, M., W. Anderson, G. Kocurek. Aeolian sediment transport in martian craters. 46th Lunar and Planetary Science Conference, Woodlands, TX, March 2015.

PRESENTATIONS

McCarthy, F., P. Davis, and **M. Day**. Exploring the gravitational anomaly of Mount Sharp in Gale crater, Mars. American Geophysical Union Fall Meeting, Washington DC, December 2018. (poster)

Stumbaugh, D., **M. Day**, and T. Dorn. Investigating an Aeolian Origin to Washboard Terrain on Mars. Abstract 360087. American Geophysical Union Fall Meeting, Washington DC, December 2018. (poster)

Newman, C., **M. Day**, N. Teanby, and M. Richardson. Reproducing the characteristics of Mars dune fields using the MarsWRF model. International Conference on Aeolian research, Bordeaux, France, June 2018.

Day, M., and D. Catling. Dune casts preserved by partial burial: the first identification of "ghost dune" pits on Mars. European Geosciences Union General Assembly, Vienna, Austria, April 2018.

Banham, S., S. Gupta, D. Rubin, J. Watkins, D. Sumner, K. Edgett, J. Grotzinger, K. Lewis, L. Edgar, K. Stack-Morgan, R. Barnes, J. Bell, **M. Day,** R. Ewing, M. Lapotre, N. Stein, F. Rivera-Hernandez, and A. Vasavada. An ancient sand sea

in Gale crater, and its significance for martian climate: Stimson formation. American Geophysical Union Fall Meeting, New Orleans, LA. December 2017.

Ewing, R., M. Lapotre, K. Lewis, **M. Day,** N. Stein, D. Rubin, and N. Bridges. Relating sedimentary processes in the Bagnold Dunes to the development of crater basin aeolian stratification. Geological Society of America annual meeting, Seattle, WA. October 2017.

Day, M. and G. Kocurek. How perfect if perfect in a dune field pattern? Geological Society of America annual meeting, Seattle, WA. October 2017.

Calef, F., **M. Day,** H. Newsom. Crater densities on lower Mount Sharp as a proxy for modern geologic erosion. Geological Society of America annual meeting, Seattle, WA. October, 2017.

Banham, S. G., S. Gupta, D. Rubin, J. Watkins, D. Sumner, J. Grotzinger, K. Lewis, K Edgett, L. Edgar, K. Stack, J. Bell, R. Ewing, **M. Day,** M. Lapotre. Anatomy of an ancient eolian sandstone on Mars: The Stimson formation in Gale crater. 5th Planetary Dunes Conference. St. George, UT. May 2017.

Banham, S. G., S. Gupta, D. Rubin, J. Watkins, D. Sumner, J. Grotzinger, K. Lewis, K Edgett, L. Edgar, K. Stack, J. Bell, **M. Day,** R. Ewing, M. Lapotre. The Stimson formation: Determining the morphology of a dry aeolian dune system and its climate significance in Gale crater, Mars. 48th Lunar and Planetary Science Conference, Woodlands, TX, March, 2017.

Day, M., and G. Kocurek. Preserved dune interactions in sandstones on the Colorado Plateau, USA. Abstract 144747. American Geophysical Union Fall Meeting, San Francisco, CA, December, 2016. (poster)

Anderson, W., **M. Day,** G. Kocurek. Modeling turbulent flows in the atmospheric boundary layer of Mars: application to Gale crater, Mars, landing site of the Curiosity rover. Abstract R35.0001. 69th Annual Meeting of APS Division of Fluid Dynamics, Portland, OR, November 2016.

Lapotre, M., R. Ewing, M. Lamb, W. Fischer, J. Grotzinger, D. Rubin, K. Lewis, M. Ballard, **M. Day,** et al. Origin of the two scales of wind ripples on Mars. Abstract 134355. American Geophysical Union Fall Meeting, San Francisco, CA, December, 2016.

Calef, F., D. Archer, B. Clark, **M. Day**, W. Goetz, J. Lasue, J. Martin-Torres, M. Zorzano, R. Navarro-Gonzalez. Assessing Gale Crater as an exploration zone for the first human mission to Mars. 47th Lunar and Planetary Science Conference, Woodlands, TX, March 2016. (poster)

Anderson, R., C. Dundas, L. Edgar, O. Gasnault, S. LeMouelic, H. Newsom, N. Bridges, R. Weins, J. Frydenvang, A. Vasavada, and **M. Day.** Ongoing and planned long distance remote micro imager observations of targets on Aeolis Mons identified from orbit. 47th Lunar and Planetary Science Conference, Woodlands, TX, March 2016. (poster)

Lapotre, M., R. Ewing, M. Lamb, W. Fischer, K. Lewis, M. Ballard, **M. Day**, D. Rubin, J. Grotzinger. Orbital and in-situ observations in support of the existence of an unknown stable aeolian bedform regime on Mars. 47th Lunar and Planetary Science Conference, Woodlands, TX, March 2016.

Calef, F., B. Clark, **M. Day,** W. Goetz, J. Lasue, J. Martin-Torres, M. Zorzano. Assessing Gale crater as a landing site for the first human mission to Mars. First Landing

Site/Exploration Zone Workshop for Human Mission to the Surface of Mars, Houston, TX, October 2015.

Bridges, N., B. Ehlmann, P. Conrad, R. Ewing, F. Ayoub, **M. Day,** M. de la Torre, M. Fisk, et al. Investigation of the Bagnold Dunes by the *Curiosity* rover: Plans for the first study of an active dune field on another planet. 4th International Planetary Dunes Workshop, Boise, ID, May 2015.

Bridges, N., D. Blaney, **M. Day**, K. Herkenhoff, N. Lanza, S. Le Mouelic, F. Martin-Torres, S. Maurice, C. Newman, et al., Rock abrasion and landscape modification by windblown sand as documented by the MSL *Curiosity* rover. 46th Lunar and Planetary Science Conference, Woodlands, TX, March 2015. (poster)

Jacob, S., S. Rowland, K. Edgett, **M. Day,** F. Calef, M. Palucis, and R. Anderson. Characteristics and Origin of a Cratered Unit near the MSL Bradbury Landing Site (Gale Crater, Mars) Based on Analyses of Surface Data and Orbital Images. American Geophysical Union Fall Meeting, San Francisco, CA, December 2014.

Bridges, N., **M. Day**, F. Martin-Torres, H. Newsom, A. Ullan, et al. Rock abrasion as seen by the MSL Cutiosity rover: insights on physical weathering on Mars. American Geophysical Union Fall Meeting, San Francisco, CA, December 2014.

Day, M., G. Kocurek, N. Bridges, R. Ewing, W. Anderson, C. Newman, the MSL team. Temporal and spatial differences in wind indicators in Gale Crater. Geological Society of America Annual Meeting, Vancouver, BC. Canada. October 2014.

Jacob, S., S. Rowland, K. Edgett, **M. Day,** F. Calef, and M. Palucis. Crater density as an aid to mapping the Cratered Surface unit at Gale Crater, Mars. Geological Society of America Annual Meeting, Vancouver, BC. Canada. October 2014. (poster)

Day, M., G. Kocurek, W. Anderson, A. Hamed, K. Christiansen. Aeolian Erosion of Filled Martian Craters. 45th Lunar and Planetary Science Conference, Woodlands, TX, March, 2014. (poster)

Alibay, F., R. McGranaghan, R. Clegg, P. Craig, **M. Day**, et al. Design of a High-Value, Low-Cost Mission to the Neptunian System, IEEE Aerospace Conference, Big Sky, Montana, March 2014.

Day, M. D., M. Malaska, et al. Neptune and Triton: A Study in Future Exploration. Abstract P51G-1822, American Geophysical Union Fall Meeting, San Francisco, CA, December, 2013. (poster)

Day, M. D, F. J. Calef, P. Buhler, and J. P Grotzinger. Small Crater Analysis of the Mars Science Laboratory Landing Sites, 5th Landing Site Selection Workshop, Pasadena, CA. May 2011.

Day, M. D, F. J. Calef, P. Buhler, and J. P Grotzinger. Small Crater Analysis of the Mars Science Laboratory Landing Site, Abstract P33C-1773, American Geophysical Union Fall Meeting, San Francisco, CA, December, 2011. (poster)

SERVICE

2018	Convener and chair of aeolian session, AGU Fall Meeting
2017	Reviewer for Geophys. Res. Letters and J. Geophys. Res. Planets
2017	Co-convener Aeolian processes session AGU
2017	OSPA Liaison AGU
2016	Executive Secretary for NASA review panel (Fall)

2016	Executive Secretary for NASA review panel (Spring)
2016	Co-Convener, Aeolian processes session EP0004, AGU Fall Meeting
2015-2016	Department Sedimentology Seminar Coordinator
2015-2016	Best PhD exit talk selection committee
2015	Mentor for Undergraduate Honors Thesis program
2012-2015	Mentor with Austin Partners in Education (K-12 students)
2012-2014	Mentor for GeoForce (freshmen undergraduates)
2012	Adjudicator for Gulf Coast Assoc. of Geological Societies convention

PROFESSIONAL MEMBERSHIPS

2011-present	American Geophysical Union
2013-present	Geological Society of America
2017-present	Planetary Society
2017-present	International Society of Aeolian Research
2012-2017	Austin Partners in Education

OUTREACH

Volunteer geologist at City Language Immersion Charter in Los Angeles
Volunteer judge for Austin Energy Regional Science Festival
Volunteer speaker on space and geology in K-5 classrooms
Mars Science Laboratory outreach speaker to high school students
Developed a science outreach program for underperforming schools in Los Angeles

CURRENT GRADUATE STUDENTS

*(*Primary supervisor, ^On committee)*

Taylor Dorn*
Jonathan Sneed*
Krista Sawchuck^

CURRENT UNDERGRADUATE RESEARCH STUDENTS

Dominique Stumbaugh
Fiona McCarthy
Martha Meiji
Ife Dahunsi
Clarissa Valdez-Luna
Robery Ly
Matthew Bogumil
Norris Khoo