Alexander Michael Morgan

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EDUCATION

2017	**Doctor of Philosophy (Ph.D.)** Dept. of Environmental Sciences, University of Virginia *Sedimentology, hydrology, and climatic environment of alluvial fans on Earth and Mars*, Advisor: Professor Alan D. Howard
2010	**Bachelor of Science (B.S.)** Dept. of Earth and Planetary Sciences, University of California at Santa Cruz

APPOINTMENTS

2021 – Present	**Research Scientist** Planetary Science Institute
2020 – Present	**Research Associate** Center for Earth and Planetary Studies, National Air and Space Museum, Smithsonian Institution
2017 – 2020	**Post-Doctoral Research Geologist** Center for Earth and Planetary Studies, National Air and Space Museum, Smithsonian Institution
2015 – 2017	**Research Fellow** Center for Earth and Planetary Studies, National Air and Space Museum, Smithsonian Institution
2011 – 2015	**Research and Teaching Assistant** Department of Environmental Sciences, University of Virginia
2010 – 2011	**Research Associate** SETI Institute & NASA Ames Research Center

AWARDS AND HONORS

2016	University of Virginia (UVA) Dept. of Env. Sciences Chair's Award
2015	UVA Raven Honor Society; UVA Dept. of Env. Sciences Moore Research Award; Geologic Society of America Graduate Student Research Grant; National Center for Airborne Laser Mapping (NCALM) Seed Grant Recipient
2014	UVA Dept. of Env. Sciences Exploratory Research Award
2014 – 2015	Graduate School of Arts and Sciences Representative to the UVA Honor Committee

AWARDED RESEARCH GRANTS

2024 – 2027	**NASA PDART Program** *Creating a Mars valley database using CTX data* **A.M. Morgan (PI)**, T.A. Goudge (Co-I, UT Austin), S.A. Wilson (Co-I, Smithsonian), A. Rudolph (Co-I, Smithsonian).
2024 – 2027	**NASA Mars Data Analysis Program** *Investigating controls on martian alluvial fan formation* **A.M. Morgan (PI)**, M.C. Palucis (Co-I, Dartmouth), K. Lutz (Grad student, Dartmouth).
2024 – 2027	**NASA Mars Data Analysis Program** *Composition of Martian Fans, Basin Deposits, and Watersheds Using VNIR Spectroscopy* J.T. Haber (PI, Smithsonian), **A.M. Morgan (Co-I)**, R.P. Irwin III (Co-I, Smithsonian), B.H.N. Horgan (Collaborator, Perdue), S.A. Wilson (Collaborator, Smithsonian).
2021 – 2024 (in NCE)	**NASA Solar Systems Workings Program** *Reconstructing basaltic sediment transport on Mars using terrestrial analogues* **A.M. Morgan (PI)**, M.C. Palucis (Co-I, Dartmouth), R.A. Craddock (Co-I, Smithsonian), E.R. Rogers (Grad student, Dartmouth).
2021 – 2024 (in NCE)	**NASA Mars Data Analysis Program** *Timing and spatial variability of post-Noachian fluvial erosion on Mars* R.P. Irwin III (PI, Smithsonian), **A.M. Morgan (Co-I)**.
2021 – 2023 (in NCE)	**NASA Mars Data Analysis Program** *Do delta deposits around the martian crustal dichotomy record an ancient northern ocean?* M.C. Palucis (PI, Dartmouth), **A.M. Morgan (Co-I)**, F. Rivera-Hernandez (Co-I, Georgia Tech).
2020 – 2022 (in NCE 2)	**NASA Solar Systems Workings Program** *Linking alluvial fan morphology and sedimentology with formation processes via Martian analog studies in the Atacama Desert, Chile* **A.M. Morgan (PI)**, M.C. Palucis (Co-I, Dartmouth), R.M.E Williams (Co-I, PSI), R.A. Craddock (Co-I, Smithsonian).
2019 – 2020	**Smithsonian Institution Scholarly Studies Program** *Reconstructing basaltic sediment transport on Mars using a Hawaiian Analogue* **A.M. Morgan (PI)**, R.A. Craddock (Co-I, Smithsonian).
2016 – 2019	**NASA Mars Data Analysis Program**

High-Resolution Mapping and Geomorphological Studies of Martian Valley Networks
R.A. Craddock (PI, Smithsonian) **A. M. Morgan (Post-doc; wrote and executed proposal)**.

2015 – 2016 **Smithsonian Institution Earth and Space Sciences Predoctoral Fellowship**
Investigating alluvial fan formation processes and the implications for Mars' climate
A.M. Morgan (PI), R.A. Craddock (Co-I, Smithsonian).

PUBLICATIONS

Google Scholar | **ResearchGate** | **ORCiD**

*Indicates student mentees †Indicates equal author contribution

Journal publications

[18] A.G. Galofre, A.D. Howard, **A.M. Morgan**, S.A. Wilson, J.M. Moore (2024). Glacial sculpting of a martian cratered landscape on the northeastern flank of the Hellas basin. *Icarus* 420. **DOI:10.1016/j.icarus.2024.116211**

[17] K.A. Pearson, E.Z Noe Dobrea, D. Zhao, A. Altinok, **A.M. Morgan** (2024). Mapping Brain Terrain Regions on Mars Using Deep Learning. *The Planetary Science Journal* 5(7). **DOI:10.3847/PSJ/ad5673**

[16] T.A. Goudge, **A.M. Morgan**, G. Stucky de Quay, C.I. Fassett (2024). Spatial patterns of valley network erosion on early Mars. *Icarus* 421. **DOI:10.1016/j.icarus.2024.116224**

[15] **A.M. Morgan** (2024). New maximum constraints on the era of martian valley network formation. *Earth and Planetary Science Letters* 626. **DOI:10.1016/j.epsl.2023.118509**

[14] M.C. Palucis, **A.M. Morgan**, J.V. Strauss, F. Rivera-Hernandez, J.A. Marshall, E. Menio, R. Miller (2023). Rates and processes controlling periglacial alluvial fan formation: Implications for martian fans. *GSA Bulletin.* 135(3-4) **DOI:10.1130/B36459.1**

[13] **A.M. Morgan**, S.A Wilson, A.D Howard (2022). Geospatial data from a global survey of martian fan-shaped sedimentary landforms. *Data in Brief* 44. **DOI:10.1016/j.dib.2022.108494**

[12] **A.M. Morgan**, S.A Wilson, A.D Howard (2022). The global distribution and morphologic characteristics of fan-shaped sedimentary landforms on Mars. *Icarus* 385. **DOI:10.1016/j.icarus.2022.115137**

[11] E.S. Kite, M.A. Mischna, B. Fan, **A.M. Morgan**, S.A. Wilson, M.I. Richardson (2022). Changing spatial distribution of water flow charts major change in Mars's greenhouse effect. *Science Advances* 8(21). **DOI: 10.1126/sciadv.abo5894**

[10] S.J. Holo, S.J., E.S. Kite, S.A. Wilson, **A.M. Morgan** (2021). The timing of alluvial fan formation on Mars. *Planetary Science Journal* 2(5). **DOI:10.3847/PSJ/ac25ed**

[9] T.A. Goudge†, **A.M. Morgan**†, G.S. de Quay, C.I. Fassett (2021). The importance of lake breach floods for valley incision on early Mars. *Nature* 597. **DOI:10.1038/s41586-021-038601**

[8] A.D. Howard, Wilson, **A.M. Morgan**, J.M. Moore, O.L. White (2021). Light-toned deposit in the northeastern Hellas basin formed by terrain-conforming airfall sedimentation. *Icarus* 360. **DOI:10.1016/j.icarus.2021.114356**

[7] S.A. Wilson, **A.M. Morgan**, A.D. Howard, J.A. Grant (2021). The global distribution of craters with alluvial fans and deltas on Mars. *Geophysical Research Letters* 48(4). **DOI:10.1029/2020GL091653**

[6] M.P. Pfeiffer, **A.M. Morgan**, A. Heimsath, T. Jordan, A. D. Howard, R. Amundson (2021). A century scale rainfall in the absolute Atacama Desert: landscape response and implications for past and future rainfall magnitudes. *Quaternary Science Reviews* 254. **DOI:10.1016/j.quascirev.2021.106797**

[5] **A.M. Morgan**, R.A. Craddock (2019). Assessing the accuracy of paleodischarge estimates for rivers on Mars. *Geophysical Research Letters* 46(21). **DOI:10.1029/2019GL084921**

[4] **A.M. Morgan**, R.A. Craddock (2017). Depositional processes of alluvial fans along the Hilina Pali fault scarp, Island of Hawaii. *Geomorphology* 296. **DOI:10.1016/j.geomorph.2017.08.028**

[3] J.M. Moore, A.D. Howard, **A.M. Morgan** (2014). The Landscape of Titan as Witness to its Climate Evolution. *Journal of Geophysical Research-Planets* 119. **DOI:10.1002/2014JE004608**

[2] **A.M. Morgan**, A.D. Howard, D.E.J. Hobley, J.M. Moore, W.E. Dietrich, R.M.E. Williams, D.M. Burr, J.A. Grant, S.A. Wilson, Y. Matsubara (2014). Sedimentology and climatic environment of alluvial fans in the martian Saheki crater and a comparison with terrestrial fans in the Atacama Desert. *Icarus* 229. **DOI:10.1016/j.icarus.2013.11.007**

[1] D. Durda, N. Movshovitz, D. Richardson, E. Asphaug, **A. Morgan**, A.R. Rawlings, C. Vest (2009). Experimental determination of the coefficient of restitution for meter scale granite spheres. *Icarus* 211. **DOI:10.1016/j.icarus.2010.09.003**

Books and book chapters

Under contract:

J. Radebaugh† and **A.M. Morgan**† (*book under contract*). *Erosion, Deposition, and Weathering Across Solar System.* Elsevier.

D. Domingue† and **A.M. Morgan**† (*chapter under contract*). Weathering processes across the Solar System. In: J. Radebaugh and **A.M. Morgan** (eds.) *Erosion, Deposition, and Weathering Across Solar System*. Elsevier.

Published:

[1] M.C. Palucis[†] and **A.M. Morgan**[†] (2020). Extraterrestrial Fluvial Environments. In: J.F. Shroder (Ed.) *Treatise on Geomorphology, 2nd Edition.* Wiley. **DOI: 10.1016/B978-0-12-818234-5.00006-7**

MENTORING EXPERIENCE

Graduate students

2021 – present	Emma Rogers (Dartmouth College): PhD Co-advisor
2024 – present	Kathrine Lutz (Dartmouth College): PhD Co-advisor
2021 – 2024	Noemi Ortega-Dominguez: M.S. mentor (now at Malin Space Science Systems)

Undergraduate interns

2017	Charlie Detelich (NC State) (now Ph.D. student at Cornell)
2018	Nhut Nguyen (Santa Monica College) (now at UC Berkeley)
2019	Sophia Sanders (University of Georgia) (now at SC DHEC)
2020	Nicole Law (Mercyhurst University) (now at Argo AI)

TEACHING EXPERIENCE

EVSC 2800: Fundamentals of Geology (Four semesters; TA)
EVSC 2801: Fundamentals of Geology Laboratory (Four semesters; Instructor of Record)
EVSC 4890: Planetary Geology/Astronomy (Three semesters; TA)
EVSC 4891: Planetary Geology/Astronomy Laboratory (Three semesters; Instructor of Record)

SERVICE AND OUTREACH

2021 – Present Editor, **Planetary Exploration Newsletter** (PEN)

Peer review

Earth and Planetary Science Letters, Earth Surface Dynamics, *Geomorphology, Geophysical Research Letters, Earth and Planetary Science Letters, Geosciences, Icarus, Journal of Geophysical Research: Planets,* and *Nature Communications*, *Remote Sensing*

Grant review

NASA

Group Chief	Future Investigators in NASA Earth and Space Science and Technology (FINESST)
Executive Secretary	Lunar Data Analysis Program (LDAP)
Panelist	Cassini Data Analysis Program (CDAP)
	New Frontiers Data Analysis Program (NFDAP)
	Planetary Data Archiving, Restoration, and Tools (PDART)
	Solar System Workings (SSW)

NSF

External reviewer	Geomorphology & Land-use Dynamics (GLD)

Meeting organization

2024	Program Committee, Geological Society of America Connects (Annual Meeting)
2018 – 2021	Program Committee, Lunar and Planetary Science Conference
2016 – 2023	Session Chair, AGU Fall Meeting – Planetary Sediment Transport
2016 – present	Session Chair, various sessions at LPSC
2017 – 2022	AGU OSPA & LPSC Dwornik Award judge

Scientific society leadership

2024 – Present	Executive board member, Geological Society of America Planetary Geology Division
2023 – Present	Member-at-Large (Quaternary Geology & Geomorphology), Geological Society of America Grants Committee
2015 – 2017	Graduate Student Representative to AGU Planetary Science Section

Outreach

2021 – 2024	Participating Scientist, Scientist in Every Florida School
2021 – 2024	Participating Scientist and Activity Leader, University of Florida Natural Resources Diversity Initiative Afterschool Science Clubs
2015 – 2020	Various public outreach activities at the National Air and Space Museum

INVITED TALKS

May 4, 2023: Department of Earth Science, Dartmouth College, Hanover, NH

June 28, 2022: Florida Space Institute, University of Central Florida, Orlando, FL

January 14, 2021: Department of Geological Sciences, University of Florida, Gainesville, FL

March 11, 2020: Geological Society of Washington, Cosmos Club, Washington, DC

November 13, 2019: Solar System Exploration Division, NASA Goddard Space Flight Center, MD

October 30, 2019: Department of Mineral Sciences, National Museum of Natural History, Smithsonian Institution, Washington, DC

July 19, 2019: Apollo 50 Festival, National Mall, Washington, DC

October 18, 2018: Department of Earth and Environmental Sciences, Macquarie University, Sydney, Australia

CONFERENCE PRESENTATIONS

Only first authored or student-authored presentations are listed.

*Indicates student mentee

A.M. Morgan, E.Z. Noe Dobrea, K.A. Pearson, A. Altinok (2024). Crater Retention Timescales of Martian Brain Coral Terrain Records Past Climatic Change, presented at the 55th Lunar and Planetary Science Conference, The Woodlands, TX, March 11-14.

E.R. Rogers*, M.C. Palucis, A.M. Morgan, R.A. Craddock, E. Benyshek, D.F. Richards (2023). Reconstructing Basaltic Sediment Transport on Mars Using Terrestrial Analogs, presented at the 54th Lunar and Planetary Science Conference, The Woodlands, TX, March 13-17.

E.R. Rogers*, G.L. Ferrari, J.H. Janovyak, R.A. Craddock, A.M. Morgan, M.C. Palucis (2023). Reconstructing Basaltic Sediment Transport Using Clast Morphometry, presented at the AGU Fall Meeting, San Francisco, CA, December 11-15.

A.M. Morgan (2023). Maximum Bounds on the Era of Martian Valley Network Formation, presented at the Geological Society of America Connects Annual Meeting, Pittsburgh, October 15-18.

A.M. Morgan, K.A. Pearson, E.Z. Noe Dobrea, A. Altinok (2023). Crater Retention Timescales of Martian Brain Terrain, presented at the Geological Society of America Connects Annual Meeting, Pittsburgh, October 15-18.

A.M. Morgan (2022). Evidence for Prolonged and Episodic Fluvial Activity Recorded in Martian Valley Network Morphology, presented at the 53rd Lunar and Planetary Science Conference, The Woodlands, TX, March 7-11.

A.M. Morgan, S.A. Wilson, A.D. Howard (2022). Geographic Distribution and Morphological Characteristics of Fan-Shaped Sedimentary Landforms on Mars, presented at the 53rd Lunar and Planetary Science Conference, The Woodlands, TX, March 7-11.

A.M. Morgan (2021). Investigation of some valley networks and their associated drainage basins in western Terra Sabaea, presented at the AGU Fall Meeting, New Orleans, LA, December 13-17.

A.M. Morgan, M.C. Palucis, R.M.E. Williams, D.E.J. Hobley, J.M. Moore, R.A. Craddock (2021). Mars-Analogue Alluvial Fans in the Chilean Atacama Desert, presented at the Workshop on Terrestrial Analogs for Planetary Exploration, Online, June 16–18.

A.M. Morgan, S.C. Sanders*, R.A. Craddock (2020). Runoff Production on Early Mars, presented at the 51st Lunar and Planetary Science ConferenceCanceled due to COVID-19.

N. Law*, A.M. Morgan (2020). Multiple Episodes of Fluvial Activity in the Gale Crater Region, Mars., presented at the AGU Fall Meeting, Online, December 1-17.

A.M. Morgan, R.A. Craddock (2019). How Accurate are Paleodischarge Estimates for Martian Rivers?, presented at the 50th Lunar and Planetary Science Conference, The Woodlands, TX, March 18-22.

A.M. Morgan, S.A. Wilson (2019). Utilizing a global database to explore morphologic trends of martian alluvial fans, presented at the 50th Lunar and Planetary Science Conference, The Woodlands, TX, March 18-22.

A.M. Morgan, S.A. Wilson, N. Nguyen* (2019). Late Amazonian alluvial fan formation in southern Acidalia Planitia, Mars, presented at the AGU Fall Meeting, San Francisco, CA, December 9-13.

A.M. Morgan, S.A. Wilson, A.D. Howard, R.A. Craddock, J.A. Grant (2018). Global distribution of alluvial fans and deltas on Mars, presented at the 49th Lunar and Planetary Science Conference, The Woodlands, TX, March 19-23.

A.M. Morgan, R.A. Craddock (2018). Morphometric analyses of every martian valley: do morphological differences reveal a heterogeneity of conditions during the time of valley network formation?, presented at the AGU Fall Meeting, Washington, DC, December 10-14.

A.M. Morgan, S.A. Wilson, A.D. Howard (2018). Global Distribution of Alluvial Fans and Deltas on Mars, presented at the The Geological Society of America 130th Annual Meeting, Indianapolis, IN, November 4-7.

A.M. Morgan, R.A. Craddock (2018). Utilizing Morphometric Analyses of Every Martian Valley to Assess the Heterogeneity of Conditions During the Time of Valley Network Formation (Invited), presented at the The Geological Society of America 130th Annual Meeting, Indianapolis, IN, November 4-7.

A.M. Morgan, R.A. Craddock (2017). Mars-analog Alluvial Fans Along the Hilina Pali, Hawaii, presented at the 113th Annual Meeting of the GSA Cordilleran Section, Honolulu, HI, May 23-25.

A.M. Morgan, A.D. Howard, J.M. Moore, R.A. Craddock (2017). Landform evolution modeling of fine-grained alluvial fan sedimentation on mars utilizing an Atacama Desert Analog, presented at the 48th Lunar and Planetary Science Conference, The Woodlands, TX, March 20-24.

A.M. Morgan, A.D. Howard, J.M. Moore (2017). Landform evolution modeling of fine-grained sedimentation on alluvial fans on Mars and Earth, presented at the AGU Fall Meeting, New Orleans, LA, December 11-15.

A.M. Morgan, R.A. Craddock (2016). Mars analogue alluvial fans along the Hilina Pali fault system, Island of Hawaíi, presented at the AGU Fall Meeting, San Francisco, CA, December 12-16.

A.M. Morgan, A.D. Howard, J.M. Moore (2015). Constraints on Environmental Conditions on Mars during Periods of Alluvial Fan Formation: Results from Landform Evolution Modeling, presented at the AGU Fall Meeting, San Francisco, CA, December 14-18.

A.M. Morgan and A.D. Howard (2014). Simulating Fine-grained Alluvial Fan Sedimentation, presented at the CSDMS 2.0: Moving Forward, Boulder, CO, March 23-25.

A.M. Morgan, A.D. Howard, D.E.J. Hobley, Y. Matsubara, J.M. Moore, R. Parsons, R.M.E. Williams, D. Burr, A. Hayes, W. Dietrich (2013). Alluvial Fans of Northern Chile as an Analog to Mars, presented at the 44th Lunar and Planetary Science Conference, The Woodlands, TX, March 18-22.

A.M. Morgan, A.D. Howard, J.M. Moore, R.A. Beyer (2013). Simulating Fine grained Alluvial Fan Sedimentation on Mars, presented at the AGU Fall Meeting, San Francisco, CA, December 9-13.

A.M. Morgan, R.A. Beyer, A.D. Howard, J.M. Moore (2012). The alluvial fans of Saheki crater, presented at the 43rd Lunar and Planetary Science Conference, The Woodlands, TX, March 19-23.

A.M. Morgan, A.D. Howard, J.M. Moore, R.A. Beyer (2012). Episode(s) of intense alluvial deposition during an era of drought on Mars: Evidence from fans at Saheki (and Gale?), presented at the AGU Fall Meeting, San Francisco, CA, December 3-7.

A.M. Morgan, R.A. Beyer, A.D. Howard, J.M. Moore (2011). Simulating the Formation of Large Alluvial Fans on Mars, presented at the 42nd Lunar and Planetary Science Conference, The Woodlands, TX, March 7-11.

Last updated 9/12/2024