TYLER M^{c}GREW MENG

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EDUCATION

University of Arizona, *Ph.D. Planetary Sciences* May 2024
Dissertation: "Geophysical measurement and monitoring of planetary rock glacier surface processes"
Committee: John W. Holt (chair), Victor Baker, Shane Byrne, Lynn Carter, Chris Harig

University of Arizona, *M.S. Planetary Sciences (en route)* May 2021
Advisor: John W. Holt

Colorado School of Mines, *B.S. Geophysics* Cum Laude, May 2015
Thesis: "On the origin of the Crestone Crater: Relics of the ice age in a modern high desert"
Advisor: Edwin Nissen

RESEARCH APPOINTMENTS

Washington University in St. Louis July 2024 to Present
Postdoctoral Research Associate & Science PI, Dept. of Earth, Environmental, & Planetary Sciences
Supervisor: Roger Michaelides

University of Arizona August 2018 to May 2024
Graduate Research Assistant/Associate, Lunar & Planetary Laboratory
Advisor: John W. Holt

University of Texas August 2017 to July 2018
Graduate Research Assistant, University of Texas Institute for Geophysics
Advisor: John W. Holt

Colorado School of Mines August 2015 to May 2016
Graduate Research Assistant, Planetary Geophysics Lab
Advisor: Jeffrey Andrews-Hanna

SCIENCE TEAM MEMBERSHIP

NASA Surface Topography & Vegetation Science Team 2024 to Present
Science Team Member

NASA Mars Shallow Radar (SHARAD) Science Team 2017 to 2024
Science Team Member

PUBLICATIONS

Publications In Preparation

3. **Meng, T.M.**, Vivero, S., Siegfried, M., Nguyen, A., Michaelides R.J. "Fusion of InSAR and stereophotogrammetry improves 4D monitoring of rock glacier velocity." *IEEE Transactions on Geoscience & Remote Sensing* (in prep.)

2. **Meng, T.M.**, Valdez, A., Michaelides, R.J. "Geophysical hypothesis tests for the formation mechanisms of the Crestone Crater and other crater-like features in the San Luis Valley, Colorado." *Quaternary Research* (submitted for review January 2026)

1. Follingstad, V., Michaelides, R.J., Siegfried, M.R., **Meng, T.M.**, Bradford, J., Hughson, K., Kubas, A., Mullen, A., Quartini, E., Routt, A., Schmidt, B., Sizemore, H., Swidinsky, A. "Quantifying the Surface Deformation of Pingos on the Alaskan North Slope using Interferometric Synthetic Aperture Radar (InSAR)." *Permafrost and Periglacial Processes* (submitted for review February 2025; revised May 2026)

Peer-Reviewed Journal Publications

7. Sui, Q., Lu, Z., **Meng, T.M.**, Kim, J.W., Higman, B., Dai, C., Budukumah, E.J., McColl, S.T., Howat, I.M., Hults, C., Karanam, V., Liang, K. "Hydrometeorological and Topographic Controls Govern Spatiotemporal Heterogeneity in Rock Glacier Kinematics: Insights from Satellite Interferometry in Southeastern Alaska." *Journal of Geophysical Research: Earth Surface*, 2026. doi: 10.1029/2025JF008895.

6. Aguilar, R.J., Holt, J.W., Christoffersen, M.S., **Meng, T.M.**, Nerozzi, S. "Revealing the internal structure of Mars-analog glaciers from drone-based radar sounding." *Journal of Geophysical Research: Planets*, 2026. doi: 10.1029/2025JE009208.

5. **Meng, T.M.**, Potter, N., Aguilar, R.J., Petersen, E.I., Nerozzi, S., Daniel, M.F., Holt, J.W., Putzig, N.E., Russell, A.T., Michaelides, R.J., Heldmann, J.L. "The Sun is setting for the historic Sunlight Glacier, Absaroka Mountains, Wyoming, USA." *Annals of Glaciology*, 2026. doi: 10.1017/aog.2026.10041.

4. **Meng, T.M.**, Tober, B.S., Aguilar, R.J., Daniel, M.F., Jacobo-Bojórquez, R.A., Nerozzi, S., Holt, J.W. "Effects of rock glacier dynamics on surface morphology and deformation." *Journal of Geophysical Research: Earth Surface*, 2025. doi: 10.1029/2024JF008106.

3. **Meng, T.M.**, Aguilar, R.J., Christoffersen, M.S., Petersen, E.I., Larsen, C.F., Levy, J.S., Holt, J.W. "Photogrammetric monitoring of rock glacier motion using high-resolution cross-platform datasets: formation age estimation and modern thinning rates." *Remote Sensing*, 2023. doi: 10.3390/rs15194779.

2. Kuehn, T., Holt, J.W., Johnson, R., **Meng, T.M.** "Active seismic refraction, reflection and surface-wave surveys in thick debris-covered glacial environments." *Journal of Geophysical Research: Earth Surface*, 2023. doi: 10.1029/2023JF007304.

1. **Meng, T.M.**, Petersen, E.I., Holt, J.W. "Rock glacier composition and structure from radio wave speed analysis with dipping reflector correction." *Journal of Glaciology*, 2022. doi: 10.1017/jog.2022.90.

Open-Access Datasets

3. **Meng, T.M.**, Data and Code for "Effects of rock glacier dynamics on surface morphology and deformation". University of Arizona Research Data Repository. Dataset. 2024. doi: 10.25422/azu.data.27021397.v1

2. **Meng, T.M.**, Data and Code for "Photogrammetric monitoring of rock glacier motion using high-resolution cross-platform datasets: formation age estimation and modern thinning rates". University of Arizona Research Data Repository. Dataset. 2023. doi: 10.25422/azu.data.23272220.v1

1. **Meng, T.M.**, Petersen, E.I., and Holt, J.W., Data and Code for "Rock glacier composition and structure from radio wave speed analysis with dipping reflector correction". University of Arizona Research Data Repository. Dataset. 2022. doi: 10.25422/azu.data.19495178.v1

CONFERENCE ABSTRACTS

12. **Meng, T.M.**, Michaelides, R.J., Vivero, S., Nguyen, A., Siegfried, M., Routt, A., Ross, E., Hills, B.H., McKaig, L., Marquardt, M., Vogt, B. "Refined spatiotemporal characterization of rock glacier velocity and alpine permafrost dynamics using tiered in situ, airborne, and orbital measurements." American Geophysical Union Annual Meeting, December 2025. Conference Talk.

11. **Meng, T.M.**, Potter Jr., N., Aguilar, R.J., Petersen, E.I., Nerozzi, S., Daniel, M.F., Holt, J.W., Putzig, N.E., Russell, A.T., Michaelides, R.J., Heldmann, J. "130 years of glacier change and multidisciplinary monitoring of buried ice in the Sunlight Peak region, Absaroka Mountains, Wyoming." American Geophysical Union Annual Meeting, December 2025. Poster.

10. **Meng, T.M.**, Tober, B.S., Aguilar, R., Michaelides, R.J. and Holt, J.W. "Multisensor monitoring of rock glacier morphology and debris deformation sheds light on effects of dynamic surface processes." American Geophysical Union Annual Meeting, December 2024. Poster.

9. **Meng, T.M.**, Tober, B.S., Nerozzi, S., Aguilar, R., and Holt, J.W. "Multidisciplinary geophysical evidence for modifications to rock glacier morphology and debris distribution through dynamic processes." Symposium on the Application of Geophysics to Engineering and Environmental Problems, March 2024. Conference Talk.

8. **Meng, T.M.**, Petersen, E.I., Holt, J.W. "Estimating rock glacier thickness and ice abundance with GPR wave speed measurements." 19th International Conference on Ground Penetrating Radar, June 2022. Poster.

7. **Meng, T.M.**, Petersen, E.I., Holt, J.W. "A novel technique for wavespeed determination in ground-penetrating radar applied to the problem of constraining ice content and subsurface geometry in rock glaciers." American Geophysical Union Fall Meeting, December 2021. Conference Talk.

6. **Meng, T.M.**, Petersen, E.I., Holt, J.W. "Insolation-driven variability in debris-covered glaciers on Mars and Earth." Lunar and Planetary Science Conference, March 2020. Conference Talk (abstract accepted but conference canceled due to COVID19).

5. **Meng, T.M.**, Petersen, E.I., Tober, B.S., Christoffersen, M.S., and Holt, J.W. "Lack of meltwater may prevent radar sounding measurements of supraglacial debris thickness in the martian midlatitudes." Seventh Mars Polar Science Conference, January 2020. Conference Talk.

4. **Meng, T.M.** "Hypothesis testing for the origin of crater-like features near Great Sand Dunes, Colorado." Geological Society of America Annual Meeting, September 2019. Poster.

3. **Meng, T.M.**, Petersen, E.I., Holt, J.W., and Larsen, C.F. "Debris thickness variability and internal structure of an Alaskan debris-covered glacier from sled-borne ground-penetrating radar." International Glaciological Society: Five Decades of Radioglaciology, July 2019. Conference Talk.

2. **Meng, T.M.**, Petersen, E.I., Holt, J.W., Levy, J.S., and Larsen, C.F. "Local variability in debris-covered glacier evolution on Earth and Mars." Lunar and Planetary Science Conference, March 2019. Poster.

1. **Meng, T.M.**, Petersen, E.I., Holt, J.W., Stuurman, C.S., and Levy, J.S. "Searching for climate signals in the internal structure of terrestrial and martian debris-covered glaciers." Mars Workshop of Amazonian and Present Day Climate, June 2018. Conference Talk.

SEMINARS & INVITED PRESENTATIONS

4. **Meng, T.M.**, "Terrestrial Analogs & Periglacial Landscapes: Comparative Surface Processes Throughout the Solar System." Department of Geography and Environmental Studies, University of Colorado Colorado Springs. August 2025. **Invited Presentation**.

3. **Meng, T.M.**, "Rock glaciers and the road forward: geophysical measurment and monitoring of mountain permafrost." Department of Earth, Atmospheric, and Planetary Sciences, Purdue University. April 2025. **Invited Presentation**.

2. **Meng, T.M.** "Effects of rock glacier dynamics on surface morphology." Seminar for Rock Glacier Inventories and Kinematics, September 2024.

1. **Meng, T.M.** "Kinematic and dynamic processes impacting rock glacier surface morphology." International Glaciological Society: Global Seminar Series, February 2024.

AWARDED GRANTS

NASA 2025
Mars Data Analysis Program, "Unveiling the thickness and structure of the debris cover on midlatitude martian glaciers" S. Nerozzi (PI), J.W. Holt (CoI), E.R. Jawin (CoI), **T.M. Meng** (CoI) ($616,832 total; $90,000 awarded to WUSTL)

NASA 2025*
Decadal Survey Incubation, "Characterization of Topographic and Topographic-Change Uncertainty, Vertical Accuracy, and Measurement Error of Multi-Sensor Observing Systems for Periglacial Landscapes" R.J. Michaelides (PI), **T.M. Meng** (Science-PI), M.R. Siegfried (CoI) ($599,997 total, $498,491 awarded to WUSTL)
*Selected in April 2025, program manager reported status modified to 'Selectable' in May 2025 due to NASA funding uncertainty.

AWARDS & HONORS

Galileo Circle Scholar University of Arizona, 2021
Department of Geosciences Off-Campus Research Seed Grant University of Texas, 2018
John Moore Endowed Scholar Colorado School of Mines, 2011-2015

TEACHING & LECTURING EXPERIENCE

Guest Lecturer, EEPS 4074/5074: Remote Sensing, *Washington University in St. Louis* 2025
Guest Lecturer, EEPS 171A: The Solar System, *Washington University in St. Louis* 2024
Guest Lecturer, PTYS 549: Planetary Radar Remote Sensing, *University of Arizona* 2023
Guest Instructor, PTYS 565: Planetary Analog Field Research, *University of Arizona* 2022
Teaching Assistant, PTYS170B2: The Universe & Humanity, *University of Arizona* 2021, 2024

FIELD EXPERIENCE

Science Lead, Ouray, CO August 2025
Geophysical surveys on Gilpin & Imogene Rock Glaciers, 1 week duration
Deputy Field Lead & Institutional Science Lead, Cody, WY August 2023
Geophysical surveys on Galena Creek & Sulphur Creek Rock Glaciers, 2 week duration
Participant, Heber City, UT March 2023
CUAHSI & NASA-sponsored snow measurement field school, 1 week duration
Science Lead, Cody, WY August 2022
Geophysical surveys on Galena Creek Rock Glacier, 1 week duration
Science Lead, McCarthy, AK July 2022
Geophysical surveys on Sourdough Rock Glacier, 1 week duration
Science Lead, Crestone, CO June 2022
Ground-penetrating radar data acquisition at the Crestone Crater, 1 week duration
Science Lead, McCarthy, AK August 2021
Geophysical surveys on Sourdough Rock Glacier, 1 week duration
Science Lead, Cody, WY August 2020

Geophysical surveys on Galena Creek & Sulphur Creek Rock Glaciers, 1 week duration
Field Assistant, Flagstaff, AZ & Grants, NM July 2020
Geophysical surveys & manual measurements of lava tubes, 1 week duration
Field Assistant, Ouray, CO & Cody, WY August 2019
Geophysical surveys on Gilpin, Galena Creek, & Sulphur Creek Rock Glaciers, 2 week duration
Field Assistant, McCarthy, AK March 2019
Geophysical surveys on Sourdough Rock Glacier, 2 week duration
Field Assistant, McCarthy, AK March 2018
Geophysical surveys on Sourdough Rock Glacier, 1 week duration
Field Technician & Crew Chief, Green Geophysics, Inc., Northwest & Northeast US 2016 & 2017
Regional magnetotelluric station installations for EarthScope project, 3 month duration
Team Member, Crestone, CO January 2015
Gravimetry & GNSS data acquisition at the Crestone Crater, 1 week duration

RELEVANT TECHNICAL SKILLS

General Science
Science Communication & Ethics
Calculus & Differential Equations
Mechanics & Electromagnetics
Programming in MATLAB & Python
Digital Signal Analysis
Probability & Statistics
Project Management & Proposal Writing

Earth & Space Science
Structural Geology & Stratigraphy
Applications of Satellite Remote Sensing
Earth Systems Modeling & Inversion
Planetary Geophysics & Cosmochemistry
GIS & GPS Applications in Earth Science
Seismology & Geodynamics
Planetary Surface Processes

CERTIFICATIONS & SERVICE

Executive Committee Member Rock Glacier Inventories & Kinematics, 2026–2028
Geosciences Congressional Visit Geological Society of America, 2025
Licensed Part 107 UAV Pilot FAA, 2025
Wilderness First Aid Desert Mountain Medicine, 2023
Executive Secretary for Dual Anonymous Peer Review Panel NASA, 2022
Avalanche Safety Level I Kachina Peaks Avalanche Center, 2019
Peer Review: *The Cryosphere, Geophysical Research Letters, Icarus, Journal of Geophysical Research: Earth Surface, Permafrost & Periglacial Processes*
Professional Society Membership: American Geophysical Union, Geological Society of America, Institute of Electrical and Electronics Engineers, International Glaciological Society, International Permafrost Association, United States Permafrost Association, Permafrost Young Researchers Network