

# Marion A. McKenzie

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## RESEARCH INTERESTS

I am a glacial geomorphologist with expertise in sedimentology, stratigraphy, geochronology, glaciology, and quantitative geomorphology. My research interests focus on elucidating subglacial dynamics and connecting paleo and modern glaciology research and landscape evolution.

## POSITIONS

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- NSF Earth Sciences Postdoctoral Fellow** September 2023-Present  
Colorado School of Mines, Golden, CO  
*Pairing on-and-offshore observation of paleo-ice streams to constrain and elucidate dynamics of the Cordilleran Ice Sheet (PISCES)*, Mentored by Dr. Ryan Venturelli, in collaboration with Drs. Lauren Miller and Tamara Pico.
- Postdoctoral Researcher** June-August 2023  
University of Virginia, Charlottesville, VA  
Environmental Institute Grant: *Legacy blue carbon – long-term storage in seagrass meadows and potential to mitigate climate change*, Advised by Drs. Peter Berg and Lauren Miller
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## EDUCATION

- Ph.D. in Environmental Sciences** May 2023  
University of Virginia, Charlottesville, VA  
Dissertation: *Ice-sheet sensitivity to Earth's surface: an assessment of landscape records*, Advised by Dr. Lauren Miller
- B.S. in Environmental Studies, Mathematics Minor** May 2019  
Gettysburg College, Gettysburg, PA  
Summa Cum Laude, Honors Thesis: *Using streamlined landforms to reconstruct and compare paleo-ice flow paths in Bárðardalur, north Iceland and northwestern Pennsylvania*, Advised by Dr. Sarah Principato
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## PEER-REVIEWED PUBLICATIONS

- McKenzie, M.A.**, Simkins, L.M., Slawson, J.S., MacKie, E.J., Wang, S. (2023). [Differential impact of isolated topographic bumps on glacial ice flow and subglacial processes](#). *The Cryosphere*.
- McKenzie, M.A.**, Simkins, L.M., Principato, S., Munevar-Garcia, S. (2022). [Subglacial bedform sensitivity to bed characteristics across the deglaciated Northern Hemisphere](#). *Earth Surface Processes and Landforms*.
- McKenzie, M.A.**, Simkins, L.M., Lepp, A.P. (*submitted*). Outcrop perspective on spatial and temporal effects of topography on the marine-terminating Puget Lobe of the Cordilleran Ice Sheet. *Climate of the Past*.
- Berg, P., Hebert, R.M.\*, **McKenzie, M.**, Groff, L., Wiman, C., Fiss, M., McGlathery, K.J., Muñoz, S., Stubbins, A. (*in prep*). Legacy Blue Carbon below modern seagrass beds. *LNO Research Letters*.
- Prakash, M.\*, Miller, L., Limaye, A., **McKenzie, M.**, Smith, J. (*in prep*) Morphometric comparison of terrestrial eskers and martian sinuous ridges reveal paths of persistent meltwater drainage.

\*students advised by M. McKenzie

\**in prep* and *submitted* manuscripts available upon request

RESEARCH  
FUNDING

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<i>Total awarded to M. McKenzie</i>	<b>\$193,965</b>
<b>NSF Earth Science Directorate Postdoctoral Fellowship</b>	\$180,000
<i>Project: Pairing on-and-offshore observation of paleo-ice streams to constrain and elucidate dynamics of the Cordilleran Ice Sheet (PISCES), Mentored by Dr. Ryan Venturelli, in collaboration with Drs. Lauren Miller and Tamara Pico.</i>	
<b>Moore Graduate Student Award, 2022</b>	\$5,000
<i>Department of Environmental Sciences, University of Virginia Project: Leveraging deglaciaded landscapes to inform ice flow behavior of the Greenland Ice Sheet</i>	
<b>Graduate Student Internship, 2022</b>	\$1,540*
<i>National Ocean Science Accelerator Mass Spectrometry Laboratory Project: Getting the timing right: Pairing optically stimulated luminescence and radiocarbon dating techniques to provide marine reservoir corrections for the Puget Lowland, WA</i>	
*analytical cost covered by program	
<b>Double Hoo Research Grant, 2021</b>	\$6,000
<i>University of Virginia, co-written with undergraduate student Medha Prakash Project: Glacial or marine? Utilizing a novel research approach to characterize stratigraphic units in the Puget Lowland, Washington state.</i>	
<b>Exploratory Research Grant, 2020</b>	\$1,425
<i>Department of Environmental Sciences, University of Virginia</i>	

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MENTORING

<b>Co-mentor for Coastal NSF REU</b>	2022
<i>University of Virginia Coastal Research Center, Cape Charles, VA Renee Hebert, University of Virginia Project: "Assessing legacy Blue Carbon in a restored seagrass meadow" conducted with Drs. Peter Berg and Karen McGlathery</i>	
<b>Undergraduate Research Mentor</b>	2019- 2023
<i>University of Virginia, Charlottesville, VA Marion Donald, Maya Weiss</i>	
<i>Project: Characterizing a subglacial lake through sedimentology in the Puget Lowland, Washington state</i>	2023
<i>Medha Prakash</i>	2021-2023
<i>Project: Morphometric comparison of terrestrial eskers and martian sinuous ridges</i>	
<i>Jacob Slawson, now: PhD student, Colorado School of Mines</i>	2020-2021
<i>Project: Just a bump in the road? Assessing the influence of topographic relief on Cordilleran Ice Sheet flow from deglaciaded landscapes</i>	
<b>Alumnae College Mentor</b>	2022
<i>Linden Hall School for Girls, Lititz, PA</i>	

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RESEARCH  
EXPERIENCE

<b>PaleoCAMP Student</b>	2022
<i>PaleoCAMP Organization, Mammoth, CA</i>	
<b>NSF funded Research Experience for Undergraduates Student</b>	2018

Geophysical Institute at the University of Alaska, Fairbanks, AK  
Project: *The impact of permafrost forecasting accuracy on Predicting the influence of Arctic vegetation type and Disturbance events on permafrost degradation*

**Cross-Disciplinary Science Institute Research Assistant** 2017  
Environmental Studies Department at Gettysburg College, Gettysburg, PA  
Project: *Using streamlined landforms to reconstruct and compare paleo-ice flow paths in Bárðardalur, north Iceland and northwestern Pennsylvania*

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TEACHING  
EXPERIENCE

**University of Virginia**  
*Environmental Sciences Teaching Assistant* 2020-2023  
Fundamentals of Geology Lecture and Lab (3 semesters)  
Applied Statistics for Environmental Science (1 semester)  
Polar Environments Teaching Assistant (1 semester)  
*Cavalier Athletics Support Team Content Tutor* 2021-2022  
Environmental Science Content Tutor (2 semesters)  
*School of Education Summer Enrichment Program Instructor* 2020-2021  
Middle School Course "The Cool Cryosphere!" (2 summers)

**Gettysburg College**  
*Environmental Studies Peer Learning Associate* 2017-2018  
Earth System Science (2 semesters)  
*Mathematics Department Tutor* 2017-2018  
Calculus I, II, and III (3 semesters)

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AWARDS AND  
HONORS

**University of Virginia**  
Graduate Student Mentorship Award 2023  
Graduate Student Association Award 2021  
Henry W.A. Hanson Scholarship Award 2019

**Gettysburg College**  
Gertrude Lawrence Ledford Scholarship Award 2019  
David Wills Academic Scholar 2015-2019  
Deans List Scholar 2015-2019  
Gettysburg Senior Scholarship Award 2018  
Dean Frank B. Williams Memorial Prize 2018

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PROFESSIONAL  
SERVICE

**Referee Service**  
Journals: *Journal of Earth System Science* review, *Polar Science* co-review

**Community Engagement**  
CryoCommunity co-development of "Graduate Student Resources" Article 2023

**Conference Service**  
Co-convening AGU Sessions: 2023  
*C010: Archives and Observations from Sub-ice Environments*,  
co-convened with Drs. Ryan Venturelli, Matthew Siegfried, and Jon Hawkings.  
*EP024: Landscape Evolutions Beneath and Beyond the Ice*,  
co-convened with Shanti Penprase and Drs. Andrew Wickert and Dougal Hansen.

[West Antarctic Ice Sheet Workshop](#) co-development of  
community college lesson plan 2022  
Northeast Geological Society of America student volunteer 2022

### Certificates

Fundamentals of Learning for Science Mentors Course 2020  
University of Virginia PhD+ Professional Seminar 2020

**Graduate Student Association Co-President** 2022-2023  
Department of Environmental Sciences, University of Virginia, Charlottesville, VA

**Diversity, Equity, and Inclusion Committee Representative** 2020-2022  
Department of Environmental Sciences, University of Virginia, Charlottesville, VA

**ESIP Community Data Cluster Fellow** 2020-2021  
Earth Science Information Partners Federation, Remote

### INVITED TALKS

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- [3] Differential impacts of subglacial bed conditions on paleo-ice flow and subglacial processes.  
*Pal(a)eoPERCS Seminar Series, Virtual* 8 Nov. 2022
- [2] Ice-sheet sensitivity to Earth's surface: an assessment of Cordilleran Ice Sheet behavior across the Puget Sound  
*Friday Harbor Labs Seminar Series, San Juan Island, WA* 30 Nov. 2022
- [1] Building Bridges in Community Engagement Panel  
*ESIP 2022 Winter Meeting, Virtual* 19 Jan. 2022
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### SELECT CONFERENCE ABSTRACTS

- [10] **McKenzie, M.**, Miller, L., Berg, P., Hebert, R., Guo, Z., Wiggins, T., Kuzminski, S., Wiman, C., Muñoz, S. Sedimentary Records of Blue Carbon and Environmental Change in Coastal Virginia: An Assessment of Seagrass Meadow Sediment Deposition and Carbon Cycling Variations. American Geophysical Union 2023, San Francisco, CA, USA. Submitted to Session PP040: Sedimentary records of Holocene climate and environmental change.
- [9] **McKenzie, M.**, Miller, L., Lepp, A., DeWitt, R. Outcrop Perspectives on Spatial and Temporal Effects of Topography on the Marine-terminating Puget Lobe of the Cordilleran Ice Sheet. American Geophysical Union 2023, San Francisco, CA, USA. Submitted to Session C010: Archives and Observations from Sub-ice Environments.
- [8] **McKenzie, M.**, Simkins, L.M. Outcrop Perspectives on Spatially Variable Retreat of the Marine-terminating southern Cordilleran Ice Sheet. American Geophysical Union 2022, Chicago, IL, USA. Session: PP014 - Ice-sheet variability and behavior through the lens of geologic data and numerical modeling.
- [7] **McKenzie, M.A.**, Slawson, J., Simkins, L.M., Wang, S., MacKie, M. 2022. Influence of bed highs on ice flow as determined by bedform morphology. Northeast GSA Annual Meeting Abstract, Lancaster, PA, USA.
- [6] Berg, P., Hebert, R., **McKenzie, M.**, Groff, L., Wiman, C., Fiss, M., McGlathery, K., Munoz, S., Stubbins, A. Legacy Blue Carbon below Modern Seagrass Beds. Association for the Sciences of Limnology and Oceanography 2023, Palma de Mallorca, Spain.
- [5] Dellert, C.D., Reynolds, L., **McKenzie, M.**, Simkins, L.M., Kennedy, W. Carbon Content of Coastal Lake sediments from Whidbey Island, Washington State. American Geophysical Union 2022, Chicago, IL, USA. Session: PP015 - Limnology, Paleolimnology, and Limnogeology - Lakes as Archives of Climate and Environment Variability and Geohazards.

- [4] Prakash, M., Simkins, L. **M.**, **McKenzie**, M., Smith, J.W., Limaye, A.B. Morphometrics of Terrestrial Eskers and Martian Sinuous Ridges Reveal Persistent Pathways of Subglacial Meltwater Drainage. American Geophysical Union 2022, Chicago, IL, USA. Session EP024 - Surface Processes on Rocky and Icy Bodies across the Solar System.
- [3] **McKenzie**, **M.A.**, Simkins, L.M., Principato, S. 2021. Streamlined bedform sensitivity to bed characteristics from deglaciated landscapes. West Antarctic Ice Sheet Workshop Talk Abstract, Sterling, VA.
- [2] **McKenzie**, **M.A.**, Romanovsky, V. E., Kholodov, A. L. 2019. The impact of permafrost forecasting accuracy on predicting the influence of Arctic vegetation type and disturbance events on permafrost degradation. Arctic Workshop Annual Meeting Abstract, Stockholm, Sweden.
- [1] **McKenzie**, **M.A.**, Principato, S.M., Benediktsson, I.O. 2017. Geomorphic evidence for a paleo-ice stream near Bárðardalur, north Iceland. GSA Annual Meeting Abstract, Seattle, WA, USA.