

Shelby Ahrendt, Ph.D.

CONTACT INFORMATION	U.S. Geological Survey Landslide Hazards Program 1711 Illinois St Golden, CO 80401	sahrendt@usgs.gov +1 (218) 370-9628 ORCID: 0000-0002-3678-5087 Google Scholar
EDUCATION	University of Washington , Seattle, WA <i>June 2023</i> : Ph.D., Civil and Environmental Engineering Thesis Title: <i>Feedbacks between river morphodynamics and overbank flooding.</i> St. Olaf College , Northfield, MN <i>May 2017</i> : B.A., Physics & Studio Art	
RESEARCH EXPERIENCE	Mendenhall Research Civil Engineer , Golden, CO U.S. Geological Survey, Landslide Hazards Program	Aug. 2023 - Present
	Graduate Research Assistant , Seattle, WA University of Washington Department of Civil & Environmental Engineering	June 2022 – June 2023 Sept 2018 – Sept 2021
	Fulbright Research Fellow , Delft, The Netherlands Technical University of Delft, Dept. of Civil & Environmental Engineering	Sept. 2021 – June 2022
	Groundwater Modeler , Urbana, IL Illinois State Water Survey, Univ. of Illinois at Urbana-Champaign	Dec 2017 – Aug 2018
	Undergraduate Research Assistant , Northfield, MN St. Olaf College, Physics Department	June 2016 – Aug 2016
PEER-REVIEWED PUBLICATIONS	<ol style="list-style-type: none">5. Ahrendt, S. M., Mirus, B. B., LaHusen, S. R., Perkins, J., (2025) Dynamic feedbacks between river meandering and landsliding in northwestern Washington glacial terraces, https://doi.org/10.1029/2024JF0082494. Ahrendt, S. M., Blom, A., Van Denderen, R. P., Schielen, R. M. J., Horner-Devine, A. R., (2024) Geometric floodplain controls on riverbed elevation change within and between flood events , <i>River Flow 2022 (1st ed.)</i> CRC Press. https://doi.org/10.1201/9781003323037-433. Wuming, N., Morgan, J., Horner-Devine, A. R., Kumar, N., Ahrendt, S. (2022) Impacts of Sea-Level Rise on Morphodynamics and Riverine Flooding in an Idealized Estuary. <i>Water Resources Research</i>, https://doi.org/10.1029/2022WR0325442. Ahrendt, S., Horner-Devine, A. R., Collins, B., Morgan, J., Istanbuloglu, E., (2022) Channel Conveyance variability can influence flood risk as much as streamflow variability in western Washington State, <i>Water Resources Research</i>. https://doi.org/10.1029/2021WR0318901. Morgan, J. A., Kumar, N., Horner-Devine, A. R., Ahrendt, S., Istanbuloglu, E., Bandargoda, C., (2020), Simulating large-scale and long-term fluvial morphodynamics: The efficacy of using a morphological acceleration factor. <i>Geomorphology</i>, 356, p. 107088 https://doi.org/10.1016/j.geomorph.2020.107088	

THESES

Ahrendt, S. (2023) [“Feedbacks between river morphodynamics and overbank flooding”](#). PhD Thesis. Seattle, WA, USA: University of Washington, Seattle

CONFERENCE PRESENTATIONS

22. **Ahrendt, S.** (Invited Presenter), Mirus, B., Perkins, J., LaHusen, S., Hoch, O., Carlson-Dunlap, L.R. “River-landslide coupling in western Washington State: implications for landslide hazards and landscape evolution” Oral presentation to be given at the American Geophysical Union Fall Conference; Dec 2025: New Orleans, LA
21. **Ahrendt, S.** (Invited Presenter), Mirus, B., LaHusen, S., Perkins, J. “Dynamic feedbacks between river meandering and landsliding in northwestern Washington glacial outwash terraces” Oral presentation at the American Geophysical Union Fall Conference; Dec 2024: Washington D.C.
20. **Ahrendt, S.** (Invited Presenter), Blom, A., Van Denderen, P., Schielen, R., Horner-Devine, A.R., Tucker, G., Hutton, E., Campforts, B. “Channel-floodplain flow exchange explains main-channel bed elevation change within and between flood events” Oral presentation at the Community Surface Dynamics Spring Conference; May 2024: Montclair, NJ
19. **Ahrendt, S.** (Presenter), Horner-Devine, A., Morgan, J., Ni, W., Istanbuluoglu, E., “Feedbacks between river morphodynamics and overbank flooding during an atmospheric river event in the Nooksack River, Washington State, US” Oral presentation at the American Geophysical Union Fall Conference; Dec 2023: San Francisco, CA
18. **Ahrendt, S.** (Presenter), Horner-Devine, A., Morgan, J., Ni, W., Istanbuluoglu, E., “River morphodynamics and flooding on the Nooksack River, Washington State: an investigation of drivers and feedbacks” Poster presentation at the Community Surface Dynamics Modeling System Annual Meeting; May 2023: Boulder, CO
17. **Ahrendt, S.** (Presenter), Blom, A., VanDenderen, R. P., Schielen, R. M. J., Horner-Devine, A. R., “Can streamwise variation in floodplain geometry and peak flow rate explain river bed elevation change during and between peak flows?” Poster presentation at the American Geophysical Union Fall Meeting; Dec 2022: Chicago, IL
16. **Ahrendt, S.** (Presenter), Blom, A., VanDenderen, R. P., Schielen, R. M. J., Horner-Devine, A. R., “Geometric floodplain controls on river bed elevation change within and between flood events” Oral Presentation at RiverFlow 2022; Nov 2022: Online
15. **Ahrendt, S.** (Presenter), Blom, A., VanDenderen, R. P., Schielen, R. M. J., Horner-Devine, A. R., [The influence of floodplain geometry on riverbed elevation change within and between floods](#) Poster Presentation at the Netherlands Centre for River Studies, NCR-Days Conference; April 2022: Delft, The Netherlands
14. Schwat, E. (Presenter), Knuth, F., Istanbuluoglu, E., Horner-Devine, A., Shean, D., Keck, J., **Ahrendt, S.**, & Morgan, J. (2021, December). Historical Aerial Images and Structure from Motion Software Allow Repeat Measurement of Sediment Yields in Proglacial Environments, Poster presentation at the American Geophysical Union Fall Meeting: Dec 2021
13. **Ahrendt, S.** (Presenter), Horner-Devine, A., Collins, B., Morgan, J. A., Istanbuluoglu, E., Kumar, N., River morphodynamics and flood risk in Western Washington State, US Poster presented at the River, Coastal, Estuarine Morphodynamics Conference; Nov 2021: Online

12. **Ahrendt, S.** (Presenter), Horner-Devine, A., Kumar, N., Morgan, J. A., Collins, B., Istanbulluoglu, E. “[Understanding Morphologic Flood Risk Relevant to River Management in Western Washington State](#)” Oral Presentation at the American Geophysical Union Fall Meeting; Dec 2020: Online
11. Morgan, J. A. (Presenter), Kumar, N., Horner-Devine, A., **Ahrendt, S.**, Ni, W., Istanbulluoglu, E., The effect of upstream sediment supply on flood risk, Poster presentation at the American Geophysical Union Fall Meeting; Dec 2020: Online
10. Ni, W. (Presenter), Horner-Devine, A., Kumar, N., Morgan, J. A., **Ahrendt, S.**, Sun, Z. Impacts of Sea-Level Rise on Morphodynamics and Flooding in an Idealized Estuary, Poster presentation at the American Geophysical Union Fall Meeting; Dec 2020; Online
9. **Ahrendt, S.** (Presenter), Horner-Devine, Kumar, N., A., Morgan, J. A., Collins, B., Istanbulluoglu, E. [River Morphology and Flood Risk in the Pacific Northwest](#) Oral Presentation at the Community Surface Dynamics Modeling System: Summer Science Series; July 2020: Online
8. **Ahrendt, S.**, (Presenter) A. Horner-Devine, N. Kumar, J. Morgan, B. Collins, E. Istanbulluoglu, C. Bandargoda, A. Pfeiffer, [How is channel capacity connected to flood risk in high sediment supply mountain basins?](#) Oral presentation at the American Geophysical Union Fall Conference: Dec 2019; San Francisco, CA
7. Morgan, J. A. (Presenter), Kumar, N., Horner-Devine, A., Ni, W., **Ahrendt, S.**, Istanbulluoglu, E. Simulating flood risk in a lowland river with high sediment supply. Poster presentation at the American Geophysical Union Fall Conference; Dec 2019: San Francisco, CA
6. **Ahrendt, S.** (Presenter), Morgan, J. A., Horner-Devine, A., Kumar, N., Keck, J., Duan, Z., Istanbulluoglu, E., Bandaragoda, C., Collins, B., Pfeiffer, A. [A mountain-to-coast hydrogeomorphic modeling framework for flood risk prediction](#) Poster Presentation at the Community Surface Dynamics Modeling System Meeting; May 2019: Boulder, CO
5. **Ahrendt, S.** (Presenter), Istanbulluoglu, E., Horner-Devine, A., Mauger, G., Bandaragoda, C., Collins, B., Lundquist, J., Montgomery, D., Kumar, N., Shean, D., Pfeiffer, A., Morgan, J. A., Duan Z., Riedel, J., Kennard P., Anderson, S., Jaeger, K., Whorton E. Integrated Modeling of HydroGeomorphic Hazards (MoHGeoH): Floods, landslides and sediment Poster Presentation at the National Science Foundation PREEVENTS PI Meeting; Sept 2018: Washington D.C.
4. **Ahrendt, S.** (Presenter), Abrams, D. A Head-Specified Model; Concept Proof and Application in the Mahomet Aquifer, Presentation at the Mahomet Aquifer Consortium Meeting; July, 2018; Urbana, IL
3. Abrams, D. (Presenter), **Ahrendt, S.**, Hadley, D. [Moving toward a real-time model of groundwater/surface water interactions in two heavily irrigated systems](#) Presentation at the International Congress on Environmental Modelling and Software; June 2018: Ft. Collins, CO
2. Abrams, D. (Presenter), **Ahrendt, S.** [ANIMATING THE POTENTIOMETRIC SURFACE OF A HEAVILY IRRIGATED AQUIFER](#), Presentation at the GSA Annual Meeting; Jan 2018: Indianapolis, IN
1. **Ahrendt, S.** (Presenter), Jacobel, Christianson, Steig, Porter (2016). [A New Digital Elevation Model for Hercules Dome, Antarctica from CryoSat-2 Altimetry – Toward Site Selection for the Next Antarctic Deep Ice Core](#) Poster presentation

at the American Geophysical Union Fall Conference; Dec 2016: San Francisco, CA

GRANTS &
ACADEMIC
AWARDS

- ***Mendenhall Postdoctoral Fellowship*** (2023-present)
U.S. Geological Survey, Landslide Hazards Program
Supports full salary and research program including field instrumentation, monitoring equipment, and computational resources
- ***Ronald & Mary Nece Fellowship in Water Engineering*** (2023)
Civil & Environmental Engineering Dept., University of Washington, Seattle
- ***Open Earthscape Summer Fellowship*** (2022)
Community Surface Dynamics Modeling System, Univ. of Colorado, Boulder
- ***Fulbright Research Fellowship*** (2021)
The Netherlands Fulbright Commission
- ***Ann Bostrom Research Award*** (\$2,500) (2021)
University of Washington
- ***NSF Graduate Research Fellowship***, Honorable Mention (2019)
- ***Valle Scholarship*** (2018)
Civil & Environmental Engineering Dept, University of Washington, Seattle
- ***Presidential Scholarship*** (2013-2017)
St. Olaf College
- ***Sigma Pi Sigma Physics Honor Society*** (2016)
Induction: St. Olaf College Physics Dept.
- ***Academic All-American*** (2014 & 2015)
US Collegiate Ski Nationals

TEACHING &
MENTORING

- Research Mentor for Graduate Student Intern** 2024 - 2026
U.S. Geological Survey, Golden, CO
- Research Advisor for Two Undergraduate Students** June - Sept 2021
University of Washington, Seattle, WA
- Earth Surface Processes Institute (ESPIIn) Program Mentor** June 2021
Community Surface Dynamics Modeling Systems Lab, Boulder, CO
- Teaching Assistant: Hydraulics of Sediment Transport** April - June 2021
University of Washington, Seattle, WA
- Teaching Assistant: Hydrology & Environmental Fluid Mechanics** April - June 2021
University of Washington, Seattle, WA
- Teaching Assistant: Intro to Fluid Mechanics**
Jan - March 2020
University of Washington, Seattle, WA
- Python Workshop Instructor: ENIGMMA Program** Jan - April 2019
Illinois State Water Survey, Urbana, IL
- Teaching Assistant: Introductory Astronomy** Feb 2014 - May 2014
St. Olaf College Physics Dept., Northfield, MN

LECTURES &
SEMINARS

- **USGS Landslide Hazards Seminar** July 2024
Feedbacks between river meandering and landsliding in northwestern Washington glacial outwash terraces [link to recording]

- St. Olaf College, Physics Dept. Colloquium June 2022
Landscape Evolution Modeling: Growing and Eroding Mountains using Physics & Python [link to recording]
- University of British Columbia, Oct 2022
“River morphodynamics and flood risk in western Washington State, US”
Western Coastal Collaboratorium (WCC) Seminar Series
- University of Washington, Field Measurements Course April 2022
“Stream gaging and flooding in Washington State and beyond” April 2024
- Risk and Resilience DAT\Arathon June 2022
Techniques for communicating code using graphics
- CSDMS Summer Science Series III (virtual): July 2020
River morphology and flood risk in the Pacific Northwest, US [recording]

PROFESSIONAL
ACTIVITIES &
OUTREACH

Organizer

Landslide Hazards Program Seminar

Reviewer

Water Resources Research

Journal of Geophysical Research - Earth Surface

Geophysical Research Letters

Earth Surface Processes & Landforms

Landslides

Frontiers in Freshwater Science: Rivers & Floodplains

Conference Organization

- AGU Fall Meeting Session Co-Chair 2024
“Geomorphic Response to Extreme Events”
San Francisco, CA
- CSDMS 2023 Annual Meeting Scientific Program Committee Member: 2022
“Patterns and Processes Across Scales”
Boulder, CO
- AGU Fall Meeting Session Co-Chair & OSPA Liaison: 2022
“Modeling Earth Surface Processes Using Community Surface-Dynamics Software”
Chicago, IL
- NCR Days 2022: “Anthropogenic Rivers” LOC Member 2022
Technical University of Delft, The Netherlands
- River, Coastal, and Estuarine Morphodynamics (RCEM) 2021 2021
System Response to Anthropogenic Influence and Climate Change
Session Co-Chair (Online)
- Program On Climate Change Summer Institute 2020
Climate Extremes and Climate and Environmental Equity
Hydrology Session Co-Chair (Online)

Representative

Graduate Student Steering Committee: Program on Climate Change 2020 – 2022

Volunteer

University of Washington Fulbright Program: application feedback volunteer 2022
University of Washington Engineering Discovery Days 2019

Member

American Geophysical Union 2017 – Present
Geological Society of America 2017 – Present
Sigma Pi Sigma Physics Honor Society 2016 – Present
Rocky Mountain Conservancy 2015 – 2018

SKILLS & CERTIFICATIONS

COMPUTER SKILLS

Operating Systems:

- Linux, Windows, Mac

Programming Languages:

- Python (primary), Mathematica/Wolfram, R, MATLAB, Shell scripting, Microsoft Visual Basic

Software Tools:

- Git, HTML, CSS, Read the Docs

GIS Software:

- QGIS, ArcGIS, GRASS GIS

Numerical Models:

- Landlab, MODFLOW, DClaw, HEC-RAS

Graphics Programs:

- Adobe Illustrator, InDesign & Photoshop, Blender 3D-Modeling, Final-Cut Pro, Adobe Premier Pro

Typesetting:

- $\text{\LaTeX}$, $\text{\BibTeX}$

FIELD SKILLS

- Total station & RTK topographic surveying
- Groundwater monitoring well installation
- Field mapping of kinematic landslide features
- Meteorological site installation and maintenance
- Stream gaging including stage and discharge wading measurements
- Wolman pebble counts of river bed material and substrate
- Backcountry navigation
- Canoe and kayak travel

CERTIFICATIONS

- Wilderness First Aid (**2024-present**: Bondi Outdoor Leadership)
- Glacial Travel & Crevasse Rescue (**2019**: University of Washington, UWild)
- Wilderness First Responder (**2014-2021**: Wilderness Medical Associates)
- Class-A Chainsaw Sawyer (**2015-2018**: United States Forest Service)
- Lead Belay Climbing (**2011-2017**: Vertical Endeavors)