

Shelby M. Ahrendt

CONTACT INFORMATION	Harris Hydraulics Lab Seattle, WA 98195	shelbyahrendt.com sahrendt@uw.edu
EDUCATION	University of Washington , Seattle, WA Ph.D., Civil and Environmental Engineering, Expected: Spring 2023 <ul style="list-style-type: none">Thesis Topic: <i>Hydrogeomorphic hazards; the influences of sediment on river flooding</i>Advisor: Dr. Alex Horner-Devine St. Olaf College , Northfield, MN B.A., Physics & Studio Art, Sept. 2013 – May 2017 <ul style="list-style-type: none">Advisors: Dr. Brian Borovsky & Dr. Amy Kolan	
STUDY ABROAD	Delft University of Technology , Delft, The Netherlands Sept. 2021 – June 2022, dissertation research abroad <ul style="list-style-type: none">Topic: Effects of floods on river bed elevation change in the Waal River, the NetherlandsAdvisor: Dr. Astrid Blom Danish Institute for Study Abroad , Copenhagen, Denmark Sept. 2015 - Dec. 2015, Undergraduate semester abroad <ul style="list-style-type: none">Architecture Foundations StudioArctic Glaciology	
EXPERIENCE	Fulbright Research Fellow , <i>Delft, The Netherlands</i> Sep. 2021 – Present Visiting research fellow at TU Delft, conducting dissertation research on flood hazard shifts as a result of sediment-transport and changes in river geometry <ul style="list-style-type: none">Technical University of Delft, Dept. of Civil & Environmental EngineeringSection: Rivers, Ports & Waterways Graduate Research Assistant , <i>Seattle, WA</i> Sep. 2018 – Present Conduct river basin data-studies to test for shifting river geomorphology; implement hydrogeomorphic models to study sediment-driven effects on flood risk <ul style="list-style-type: none">University of Washington, Dept. of Civil & Environmental EngineeringLab Group: Environmental Fluid Mechanics Groundwater Modeler , <i>Urbana, IL</i> Dec 2017 – Aug 2018 Utilized FloPy to initialize, run, and calibrate groundwater MODFLOW models; developed model frameworks to accommodate real-time field data; created IPython notebook teaching materials for FloPy <ul style="list-style-type: none">Illinois State Water Survey, Univ. of Illinois at Urbana-ChampaignSection: Groundwater Modeling Undergraduate Research Assistant , <i>Northfield, MN</i> June 2016 – Aug 2016 Wrote MATLAB scripts to extract ice sheet elevation information from CrySat-2 radar altimetry data; created digital elevation model of Hercules Dome, Antarctica <ul style="list-style-type: none">St. Olaf College, Physics Dept.Lab: St. Olaf Center for Geophysical Studies of Ice & ClimateAdvisor: Dr. Robert Jacobel	

Conservation Corps Crew:

Leader (2017), Member (2014) *Estes Park, CO*

May – Aug 2014, 2017

2017: Independently lead crew of six on backcountry projects including bridge design, trail construction & maintenance

2014: Collaborated with the US Forest Service to construct and maintain trails, fell hazard trees, conduct backcountry patrol and repair washout areas; completed Grade-A chainsaw sawyer training

- Rocky Mountain Conservancy Conservation Corps

PEER-REVIEWED
PUBLICATIONS

2. **Ahrendt, S.**, Horner-Devine, A. R., Collins, B., Morgan, J., Istanbuluoglu, E., (2022) Channel Conveyance variability can influence flood risk as much as streamflow variability in western Washington State, *Water Resources Research*. <https://doi.org/10.1029/2021WR031890>
1. Morgan, J. A., Kumar, N., Horner-Devine, A. R., **Ahrendt, S.**, Istanbuluoglu, E., Bandargoda, C., (2020), Simulating large-scale and long-term fluvial morphodynamics: The efficacy of using a morphological acceleration factor. *Geomorphology*, 356, p. 107088 <https://doi.org/10.1016/j.geomorph.2020.107088>

CONFERENCE
PRESENTATIONS

14. **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
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., Istanbuluoglu, 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., Istanbuluoglu, 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., 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., Istanbuluoglu, 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. Istanbuluoglu, 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.**, Istanbuluoglu, 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., Istanbuluoglu, 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), Istanbuluoglu, 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

TEACHING &
MENTORING

Research Advisor for Two Undergraduate Students June 2021 - Sept. 2022
University of Washington, Seattle, WA

- Contributed to NSF application for REU funding for undergraduate students to work on river & landslide modeling; advertised and interviewed position; operated as primary advisor for two students involving weekly check-ins, project development, and developing materials for learning Python coding and modeling

Earth Surface Processes Institute (ESPIIn) Program Mentor June 2021
Community Surface Dynamics Modeling Systems Lab, Boulder, CO

- Mentored project teams in week long program on earth surface processes modeling; helped with Python coding bugs, provided programming advice and project guidance

Teaching Assistant: Hydraulics of Sediment Transport April 2021 - June 2021
University of Washington, Seattle, WA

- Lab instructor for weekly, hour-long labs on sediment-transport modeling in HEC-RAS; developed HEC-RAS project guidelines and augmented lab material; graded course homework and exams

Teaching Assistant: Hydrology & Environmental Fluid Mechanics April - June 2021
University of Washington, Seattle, WA

- Developed and taught weekly, hour-long workshops; attended synchronous virtual class sessions and facilitated in-class group work

Teaching Assistant: Intro to Fluid Mechanics Jan - March 2020
University of Washington, Seattle, WA

- Taught biweekly, hour-long workshops; ran lab sessions and office hours; proctored & graded tests; delivered class lecture on dimensional analysis

Python Workshop Instructor: ENIGMMA Program Jan 2020 - April 2020
Illinois State Water Survey, Urbana, IL

- Lead and co-led bi-weekly, two-hour workshops on using Python and FloPy for groundwater modeling; developed Jupyter Notebook Tutorials

Teaching Assistant: Introductory Astronomy Feb 2014 - May 2014
St. Olaf College Physics Dept., Northfield, MN

- Attended class lectures and facilitated in-class discussions; graded student work; set up and configured Celestron telescope equipment and instructed biweekly star-watching sessions

HONORS AND AWARDS

- ***Open Earthscape Summer Fellowship*** 2022
 Community Surface Dynamics Modeling System
 The University of Colorado, Boulder
- ***Fulbright Research Fellowship*** 2021 – 2022
 The Netherlands Fulbright Commission &
 Netherlands-America Foundation (NAF)
- ***Ann Bostrom Research Award*** 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
- ***All-American Athlete*** 2014 & 2015
 US Collegiate Ski Nationals, Nordic Skiing
 - 2014: 1st Place (Team); 7th Place (Individual) *Bend, OR*
 - 2015: 8th Place (Individual) *Lake Placid, NY*

PROFESSIONAL ACTIVITIES & OUTREACH

Reviewer
 Water Resources Research

Writing

- Student Reflections on Earth Day 2021 2021
"Managing Water Extremes"
 The Netherlands-America Foundation Newsletter
- Valle Fellowship Quarter 1 Blog 2018
"A Peak A Week: Quarter 1"
 Notes on Starting a Graduate Research Project

Conference Organization

- NCR Days 2022: "Anthropogenic Rivers" LOC Member 2022
 Technical University of Delft, The Netherlands
- River, Coastal, and Estuarine Morphodynamics (RCEM) 2021 2021
 Session Co-Chair:
System Response to Anthropogenic Influence and Climate Change (Online)
- Program On Climate Change Summer Institute 2020
Climate Extremes and Climate and Environmental Equity (Online)
 Hydrology Session Co-Organizer

Invited Lectures

- University of Washington, Field Measurements Course May 2022
"Stream gaging and flooding in Washington State and beyond"
- St. Olaf College, Physics Dept. Colloquium June 2022
Landscape Evolution Modeling: Growing and Eroding Mountains using Physics & Python

Representative

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

Member

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

SKILLS AND
 CERTIFICATIONS

Programming:

Advanced: Python (8 yrs), Mathematica (5 yrs)

Intermediate: MATLAB (4 yrs)

Basic: HTML (2 yrs), JavaScript (1 yr), Microsoft Excel: Visual-Basic (1 yr),
 GNU Octave (1 yr)

GIS Software: QGIS (4 yrs), ArcGIS (3 yrs)

Numerical Models:

HEC-RAS (2 yrs), MODFLOW (2 yrs), Delft3D (1 yr)

Graphics Programs:

Adobe Illustrator, InDesign & Photoshop (6 yrs), Blender 3D-Modeling (1 yr)

Certifications:

Wilderness First Responder (2014-2021)

Class-A Chainsaw Sawyer (2015-2018)

Lead Belay Climbing (2011-2017)