

Shelby Ahrendt

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Harris Hydraulics Laboratory
University of Washington
Seattle, WA 98195

EDUCATION

- 2018 - Present** **Ph.D. Candidate, Civil Engineering,** *University of Washington*
Thesis Topic: Hydrogeomorphic hazards; the influences of sediment on river flooding
GPA: 3.88/4.00
- 2017 - 2018** **M.S. Student, Civil Engineering,** *University of Illinois at Urbana Champaign*
GPA: 3.94/4.00 (completed 18 credits towards M.S. degree)
- 2013 - 2017** **B.A. Physics, Studio Art,** *St. Olaf College,* Northfield, Minnesota; GPA: 3.66/4.00
- 2015** **Study Abroad Experience,** Copenhagen, Denmark; Architecture Foundations Program
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EXPERIENCE

- Sep 2018 – Present** **Graduate Research Assistant:** *University of Washington,* Seattle, WA
- Conduct river basin data-studies to test for shifting river geomorphology; implement hydrogeomorphic models to study sediment-driven effects on flood risk
- Dec 2017 - Aug 2018** **Groundwater Modeler :** *Illinois State Water Survey, University of Illinois at Urbana-Champaign,* Urbana, IL
- Utilized FloPy to set-up, run, and calibrate numerical groundwater MODFLOW models; setup model frameworks to accommodate real-time field data
- June 2016 - Aug 2016** **Undergraduate Research Assistant:** *St. Olaf Physics Department,* Northfield, MN
- Wrote MATLAB scripts to extract ice sheet elevation information from CryoSat-2 radar altimetry data; processed and interpolated elevation data points to create digital elevation model of Hercules Dome, Antarctica; calibrated map accuracy with ground-based radar measurements
- May - Aug 2014, 2017** **Conservation Corps Crew: Leader (*17), Member (*14)** *Rocky Mountain Conservancy* Estes Park, CO
- 2017: Independently lead crew of 6 on backcountry projects including bridge design and trail restoration.
 - 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

TEACHING

- April 2021 - June 2021** **Hydraulics of Sediment Transport Teaching Assistant & HEC-RAS Sediment-Transport Modeling Lab Instructor:** *University of Washington, Seattle, WA*
- Taught virtual, weekly hour-long labs on sediment-transport modeling in HEC-RAS; developed HEC-RAS project guidelines & augmented lab material; graded course homework
- April 2021 - June 2021** **Environmental Flows Teaching Assistant:** *University of Washington, Seattle, WA*
- Developed and taught virtual, weekly hour-long workshops; attended synchronous virtual class sessions and facilitated in-class group work
- Jan 2020 - April 2020** **Fluid Dynamics Teaching Assistant:** *University of Washington, Seattle, WA*
- Taught weekly hour-long workshops; ran lab-sessions and office hours; proctored tests; delivered class lecture on dimensional analysis
- May 2018 - Aug 2018** **Python Workshop Instructor:** *Illinois State Water Survey, Urbana, IL*
- Lead and co-led bi-weekly 2 hour workshops to teach Python and Flopy for groundwater modeling using python; developed Jupyter Notebook tutorials
- Feb 2014 - May 2014** **Astronomy Teaching Assistant:** *St. Olaf Physics Department, 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

PAPERS

- **Ahrendt, S.**, Horner-Devine, A. R., Collins, B., Morgan, J., Kumar, N., Istanbuluoglu, E., (In prep.) "Morphological change to rivers has variable influence on flood risk over annual to decadal scales depending on geomorphic driver of adjustments" (Paper to be submitted to Water Resources Research, Spring 2021)
- 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>)
- Abrams, D., **Ahrendt, S.**, (In prep.) "Applying a head-specified MODFLOW model of unconfined aquifer conditions to assess the impact of seasonally variable recharge and pumping" Paper to be submitted to Groundwater in Summer 2021

PRESENTATIONS

- **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 (Virtual) at the American Geophysical Union Fall Meeting (Dec, 2020)

- **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 (Virtual) at the Community Surface Dynamics Modeling System: Summer Science Series (July, 2020)
- **Ahrendt, S.,** (Presenter) A. Horner-Devine, N. Kumar, J. Morgan, B. Collins, E. Istanbuluoglu, C. Bandaragoda, 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).
- **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)
- **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)
- **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).
- 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 (Jun, 2018)
- **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).

HONORS AND AWARDS

- Fulbright Research Fellowship, The Netherlands, 2021
- NSF Graduate Research Fellowship, Honorable Mention, 2019
- Valle Scholarship, Civil and Environmental Engineering, University of Washington, 2018
- Gerald R. and Audrey G. Olson Fellowship in Civil and Environmental Engineering, University of Illinois at Urbana-Champaign, 2017
- Presidential Scholarship, St. Olaf College 2013-2017
- Deans List, St. Olaf College, 2017
- Sigma Pi Sigma Physics Honor Society, Induction: St. Olaf College, 2016
- Academic All-American, US Collegiate Ski Nationals, 2014 & 2015
- 1st Place: Team, Nordic Skiing, US Collegiate Ski Nationals, Bend, Oregon, 2015
- 7th Place: Individual, Nordic Skiing, US Collegiate Ski Nationals, Bend, Oregon, 2015
- 8th Place: Individual, Nordic Skiing, US Collegiate Ski Nationals, Lake Placid, New York, 2014

SERVICE

Oct 2020 - Present

Program on Climate Change Graduate Steering Committee Member:

The University of Washington, Seattle, WA

- Participant of committees dedicated to founding an undergraduate research cohort at the University of Washington and raising funding for the Action-Oriented Community Research (ACORN) program

July 2020 - Sept 2020

Summer Institute Session Organizer: Program on Climate Change

The University of Washington, Seattle, WA

- Invited speakers and co-facilitated the Hydrology session of the PCC Summer Insitute themed: “Climate Extremes and Climate and Environmental Equity”

PROFESSIONAL AFFILIATIONS

Sigma Pi Sigma Physics Honor Society

Geological Society of America

American Geophysical Union

Rocky Mountain Conservancy

PROGRAMMING SKILLS AND CERTIFICATIONS

Programming Proficiency & Experience:

Advanced: Python (7 yrs), Mathematica (5 yrs)

Intermediate: MATLAB (3 yrs)

Basic: Microsoft Excel: Visual-Basic (1 yr), GNU Octave (1 yr)

GIS Software: QGIS (2 yrs), ArcGIS (1 yr)

Numerical Models: MODFLOW (2 yrs), Delft3D (1yr)

Graphics Programs: Adobe Illustrator, Indesign & Photoshop (5 yrs), Blender 3D-Modeling (1 yr),

FinalCutPro Video (2 yrs)

Certifications: Wilderness First Responder (exp. 2021), Class-A Chainsaw Sawyer (exp. 2018),

Lead-Belay Climbing (exp. 2017)