Sophie Bodek

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Education

Stanford University — Stanford, CA
Ph.D. Candidate in Civil & Environmental Engineering — *entered* September 2022
- Dissertation Topic: Stress history effects in sediment beds
- Advisor: Nicholas T. Ouellette

University of Delaware — Newark, DE
M.S., Geology — August 2020
- Thesis: *Is the White Clay Creek a Threshold Channel? Evaluating Bed Mobility of a Gravel-Bed River in Pennsylvania, U.S.A.*
- Advisor: James E. Pizzuto

University of Pennsylvania — Philadelphia, PA
B.A., Earth Sciences, Summa Cum Laude — May 2018
Concentration: Geology; Minor: Mathematics
- Senior Thesis: *How Pebbles Round and Rocks Fragment: On Particle Shape Evolution According to Transport Mechanism*
- Thesis Advisor: Douglas J. Jerolmack

Professional Appointments

Ramboll U.S. Consulting, Inc. — Princeton, NJ
Consultant, *Environment & Health Group* — January 2021 – May 2022

Penn State Brandywine — Media, PA
Adjunct Instructor, *Earth Sciences* — August 2020 – May 2022

Publications

2. **Bodek, S.** and Jerolmack, D.J. (2021) "Breaking down chipping and fragmentation in sediment transport: the control of material strength." *Earth Surface Dynamics, 9*, 1531–1543. doi.org/10.5194/esurf-9-1531-2021

1. **Bodek, S.**, Pizzuto, J.E., McCarthy, K.E., Affinito, R.A. (2021) "Achieving Equilibrium as a Semi-Alluvial Channel: Anthropogenic, Bedrock, and Colluvial Controls on the White Clay Creek, PA, USA." *Journal of Geophysical Research: Earth Surface, 126*, e2020JF005920. doi.org/10.1029/2020JF005920

Honors, Awards, & Fellowships

2022–*present*	**Gabilan Fellow,** Stanford Graduate Fellowship
2023–2024	**Mentoring Institute for Sediment Transport Researchers (MIST),** AGU Fall Meeting 2023 travel funding
2018	**Henry Darwin Rogers Award,** Penn Department of Earth and Environmental Sciences for excellence in the study of Earth Sciences by a graduating senior
2018 (*inducted*)	***Phi Beta Kappa*,** Delta Chapter of Pennsylvania
2018	**DCHWS Scholarship,** Society of American Military Engineers (SAME) Philadelphia Post
2017	**Hayden Scholars Fellowship,** Penn Department of Earth and Environmental Sciences funding for summer research
2016	**Penn Undergraduate Research Mentoring (PURM) Program,** Penn Center for Undergraduate Research & Fellowships funding for summer research
2014–2018	**Dean's List,** University of Pennsylvania

Research Experience

Graduate Research Fellow — September 2022 – *present*
Bob & Norma Street Environmental Fluid Mechanics Lab (EFML), *Stanford University*
- Designed and conducted laboratory flume experiments to investigate the effect of directional flows on the threshold of sediment motion.
- Utilized particle tracking velocimetry (PTV) techniques to identify sediment movement and calculate grain motion statistics.

Graduate Research & Teaching Assistant August 2018 – August 2020
Pizzuto Lab, *University of Delaware Department of Earth Sciences*

- Monitored fluvial environments in Pennsylvania and Delaware by deploying and surveying Radio Frequency Identification (RFID) tags, geomorphic mapping, and channel surveys.
- Developed a numerical model to predict changes in bed elevation and grain size distribution due to variations in sediment input.
- Studied floodplain and wetland stratigraphy at exposed banks and through soil samples. Characterized floodplain deposits at the Powder River, Montana; and described legacy sediment deposits at the White Clay Creek, Pennsylvania.

Undergraduate Researcher February 2016 – May 2018
Soft Earth Dynamics Lab, *University of Pennsylvania*

- Conducted experiments on attrition mechanisms in materials of differing strength by simulating transport using a rotating drum rock tumbler.
- Investigated the effect of moisture on threshold wind speeds and mechanical shear rates of sand through laboratory experiments and field work at White Sands National Park, New Mexico.

Teaching Experience

Stanford University
Teaching Assistant
- CEE 262E: *Rivers, Streams & Canals* – Spring 2024

Grader
- CEE 262B: *Transport & Mixing in Surface Water Flows* – Winter 2024

Penn State Brandywine, *Adjunct Instructor*
- EARTH 111: *Water: Science and Society* – Spring 2022
- GEOG 3N: *Future of Food* – Fall 2021
- EARTH 100: *Environment Earth* – Fall 2020, Spring 2021

University of Delaware, *Teaching Assistant*
- GEOL 203: *Surficial Processes* – Spring 2020
- GEOL 107: *Geology of Dynamic Earth* – Fall 2018, Spring 2019

University of Pennsylvania, *Teaching Assistant*
- GEOL 130: *Oceanography* – Spring 2018
- GEOL 100: *Introduction to Geology* – Fall 2017

Research Mentoring

Evelyn Pung, *Stanford University Undeclared Major, '27*: Undergraduate Researcher through the SESUR Program, Summer 2024

Leanna Stackhouse, *University of Delaware Geological Sciences Major, '21 (current PhD student at the University of British Columbia)*: Geological Sciences Research Intern, Summer 2019

Invited Talks

April 2022 "Lessons from the White Clay Creek: Anthropogenic, Bedrock, and Colluvial Controls on Mid-Atlantic River Systems." Department of Earth and Environment *Lite Lunch*, Franklin & Marshall College, Lancaster, PA.

Conference Abstracts

7. **Bodek, S.** and Ouellette, N. T. (2023) "How does flow history impact the threshold of motion? Strengthening and weakening in directionally varied flows." *American Geophysical Union (AGU) Fall Meeting*, San Francisco, CA, 11-15 December, Poster.
6. **Bodek, S.**, Pizzuto, J.E., McCarthy, K.M., Affinito, R. (2020) "Getting Beyond the Bankfull Shield's Parameter: A Continuum of Threshold Channel Types Illustrated by the White Clay Creek, PA, a Bedrock-Alluvial River with Cohesive Banks." *American Geophysical Union (AGU) Fall Meeting*, Online, 1-17 December, Talk.

5. Pizzuto, J.E., Aalto, R., **Bodek, S.**, Karwan, D.L., Marquard, J., O'Neal, M., Sturchio, N.C. (2020) "Quaternary–Present Sediment Transport and Geomorphology of the White Clay Creek: Insights from Geomorphic Mapping and Radionuclides." *Geological Society of American (GSA) Northeastern Section Meeting*, Cancelled due to Covid-19. doi.org/10.1130/abs/2020SE-345266
4. **Bodek, S.** and Pizzuto, J.E. (2019) "Is the White Clay Creek a Threshold Channel? Evaluating Bed Mobility at a Gravel-Bed River in Pennsylvania, U.S.A." *American Geophysical Union (AGU) Fall Meeting*, San Francisco, CA, 9-13 December, Poster. doi.org/10.1002/essoar.10502277.1
3. Pizzuto, J.E. and **Bodek, S.** (2019) "The Hydraulic Geometry of the Christina River Basin – Revisiting Classic Contributions By Leopold and Wolman." *American Geophysical Union (AGU) Fall Meeting*, San Francisco, CA, 9-13 December, Talk.
2. **Bodek, S.** and Jerolmack, D.J. (2018) "How pebbles round and rocks fragment: particle shape evolution according to transport mechanism." *American Geophysical Union (AGU) Fall Meeting*, Washington, D.C., 10-14 December, Poster.
1. Qian, F., Lee, D.B., **Bodek, S.**, Roberts, S., Topping, T.T., Robele, Y., Koditschek, D.E., Jerolmack, D.J. (2017) "Determination of erosion thresholds and aeolian dune stabilization mechanisms via robotic shear strength measurements *American Geophysical Union (AGU) Fall Meeting*, New Orleans, LA, 11-15 December, Poster.

Departmental Service

Graduate Leadership Committee, Stanford Department of Civil & Environmental Engineering	2023 – *present*
Seminar Coordinator, Stanford EFML Seminar Series	2023 – 2024
Student-Faculty Liaison, University of Delaware Department of Earth Sciences	2018 – 2020
Undergraduate Advisory Board, Penn Department of Earth and Environmental Science	2017 – 2018
Vice President & Co-Founder, Penn Geology Society	2016 – 2018

Professional Service

Reviewer, Earth Surface Dynamics (since 2023)

Outreach & Community Engagement

2024	**Volunteer,** Stanford GeoKids
2023	**Organizer,** Stanford EFML alumni career panel
2021	**Panelist,** Penn Department of Earth and Environmental Sciences alumni career panel
2017–18	**Organizer,** Penn Geology Society scientific illustration workshops
2017	**Organizer,** *Chalk the Walk!* Penn Geology Society public art and education exhibit
2016–18	**Presenter,** Student Sustainability Association at Penn *GreenFest*
2016–17	**Organizer,** Penn Geology Society field trips to Palisades Park, NJ; Wissahickon Park, PA; NJ beaches

Professional Organizations

American Geophysical Union (AGU)
American Physical Society (APS)
American Society of Civil Engineers (ASCE)

Skills & Proficiencies

Programming	Python, MATLAB, R, Java, Fortran, LaTeX
Software	Adobe Creative Suite (Photoshop, Illustrator, InDesign), ImageJ/Fiji
Fieldwork	Surveying stream cross-sections and profiles (total station, automatic level, RTK GPS); soil coring, profiles, and characterization; conducting pebble counts
Laboratory	Sediment transport flume experiments, sediment grain size analysis, particle tracking velocimetry (PTV), acoustic Doppler velocimetry (ADV; Nortek Vectrino)
Teaching	Stanford Course CEE 200A: *Teaching of Civil and Environmental Engineering* (Spring 2024); Stanford Course ENGR 312: *Science and Engineering Course Design* (Winter 2024); Stanford CEE Department Seminar on Teaching for TAs (Fall 2023); University of Delaware CTAL TA Training (Fall 2018); Penn CETLI Structured, Active, In-class Learning (SAIL) TA Workshop (Spring 2018); Penn CETLI TA Training (Fall 2017)
DEI	Bystander intervention training workshop organized by the ADVANCEGeo Partnership at the University of Delaware (2020)