Shanti Bhattacharya Penprase *(she/her)*

Department of Earth Sciences, Dartmouth College
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EDUCATION

PhD, Earth & Environmental Sciences, University of Minnesota – Twin Cities, Minneapolis, MN **2024**
Sediment, Water, Change: Post-glacial to post-agricultural evolution of river systems in the Upper Mississippi River Valley
Advisor: Dr. Andrew Wickert

BA, Geology, Carleton College, Northfield, MN **2016**
Senior Thesis: *Acid Mine Drainage Simulated Leaching Behavior of Goethite and Cobalt Substituted Goethite*
Advisors: Dr. Bryn Kimball & Dr. Bereket Haileab

PROFESSIONAL EXPERIENCE

Guarini Dean's Postdoctoral Fellow, Department of Earth Sciences, Dartmouth College, Hanover, NH 2024 – Present

Research & Teaching Assistant, Earth & Environmental Sciences (ESCI), University of Minnesota –Twin Cities, Minneapolis, MN 2018 – 2024

Watershed Monitoring Assistant, Mississippi Watershed Management Organization, Minneapolis, MN *2017 – 2018*

Minnesota GreenCorps Member, Minnesota Pollution Control Agency, Saint Paul, MN *2016 – 2017*

Mellon Mays & Keck Research Fellowships, Carleton College, Northfield, MN *2015 – 2016*

PUBLICATIONS **Denotes Undergraduate Coauthor*

… **Penprase, S.,** Palucis, M., Getraer, A., *Jones, I., Strauss, J., Nordin, B., *Stewart, M., Cool Fans: climate-driven morphology and sediment transport processes of Arctic fans, Aklavik and Canyon Ranges, NWT, Canada. *JGR Earth Surface.* ***(In Prep)***

… **Penprase, S.,** Wickert, A., Larson, P. A natural experiment for base level change in alluvial river systems: post-glacial evolution of the Whitewater River, southeastern Minnesota. *Earth Surface Dynamics.* ***(In Prep)***

… McKenzie, M., King, T., Rothman-Haji, S., Nordgren, A., Blair, E., Schiavo, J., **Penprase, S.,** Venturelli, R., Miller, L., Evidence of changes in central Cordilleran ice stream sediment contribution and interactions with nearshore Pacific Ocean circulation throughout the Pleistocene. ***(In Prep)***

[7] **Penprase, S.,** *Wilwerding, A., McKenzie, M., Wickert, A., Larson, P., Rittenour, R., Meltwater, mud, and the Mississippi: Upper Mississippi River Valley slackwater sediments reveal shifting deglacial meltwater sources associated with the Marquette Readvance of the Laurentide Ice Sheet. *Climate of the Past.* ***(Submitted)***

[6] Romero, M., Van Wyk de Vries, M., Fedotova, A., Ito, E., Shapley, M., Magnani, M.B., Wickert, A.D, Jones, A.G, Marcott, S., Strelin, J., Brignone, G., **Penprase**, **S.B.,** and Caffee, M.W., Holocene History of Glaciar Upsala, Southern Patagonia., *The Cryosphere.* ***(In Review)***

[5] **Penprase, S.,** Wickert, A., Larson, P., Wood. J., Larsen, I., Rittenour, T.**,** Plow vs. Ice Age: Erosion rate variability from glacial–interglacial climate change is an order of magnitude lower than agricultural erosion in the upper Mississippi River Valley. *Geology.* v. 53, p. 535–539, doi:10.1130/G52585.1. **(2025)**

[4] Prescott, J., Zoet, L., Hansen, D., Elmo, J., **Penprase, S.**, Controls on Glacial Kettle Morphology. *Earth Surface Processes and Landforms.* p. 1–10, doi: 10.1002/esp.6030 **(2024)**

[3] Wickert, A., Barnhart, K., Armstrong, W., Romero, M., Schulz, B., Ng, C., Sandell, C., La Frenierre, J., **Penprase, S.**, Van Wyk de Vries, M., MacGregor, K. Open-source automated ablation stakes to constrain temperature-index melt models. *Annals of Glaciology.* v. 64, p. 425–438, doi:10.1017/aog.2024.21, **(2024)**

[2] Romero, M., **Penprase, S**. B., Van Wyk de Vries, M. S., Wickert, A. D., Jones, A. G., Marcott, S. A., Strelin, J. A., Martini, M. A., Rittenour, T. M., Brignone, G., Shapley, M. D., Ito, E., MacGregor, K. R., and Caffee, M. W.: Late Quaternary glacial maxima in southern Patagonia: insights from the Lago Argentino glacier lobe, *Climate of the Past,* 20, 1861–1883, doi.org/10.5194/cp-20-1861-2024, **(2024)**

[1] Van Wyk De Vries, M., Romero, M., **Penprase, S.**, Ng, G.-H.C., and Wickert, A.D., 2023, Increasing rate of 21st century volume loss of the Patagonian Icefields measured from proglacial river discharge: *Journal of Glaciology*, p. 1–16. doi:10.1017/jog.2023.9. **(2023)**

MEDIA

Science Magazine, ***"Modern farming has carved away earth faster than during the ice age"*** *Spring 2025*
Howell, E.**,** doi: 10.1126/science.zycg3qb

Carleton College, ***"Research by Shanti Penprase '16 featured in Science news story"*** *Spring 2025*
https://www.carleton.edu/news/stories/research-shanti-penprase-science-story/

British Society for Geomorphology, "*Quarterly Newsletter Research Feature: Shanti Penprase*" *Spring 2025*
https://www.geomorphology.org.uk/2025/06/25/newsletter-june-2025/

AGU Earth & Planetary Surface Processes Section, ***"Early Career Spotlight: Shanti Penprase"*** *Spring 2022*
https://connect.agu.org/epsp/spotlight/feb-2022/

AWARDS

- **Alvin Anderson Award,** *Saint Anthony Falls Laboratory, University of Minnesota* *2023*
  For excellence in research related to water resources and sediment transport
- **H.E. Wright Footsteps Award,** *Earth & Environmental Sciences, University of Minnesota* *2023*
  For outstanding students conducting research in Quaternary studies or related fields
- **Outstanding Teaching Assistant Award,** *Earth & Environmental Sciences, University of Minnesota* *2023*
- **V. Rama Murthy & Janice Noruk Fellowship for Women,** *Earth & Environmental Sciences, University of Minnesota* *2023*
- **Outstanding Student Presentation Award (OSPA),** *American Geophysical Union (AGU)* *2022*
- **Best Oral Presentation Award**, *Research Symposium, Earth & Environmental Sciences, University of Minnesota* *2022*
- **AGeS2 Geochronology Award,** *National Science Foundation Funded Grant Program* *2021*
  $10,000 to support independently developed geochronology and geochemistry research
- **Certificate of Completion,** *Preparing Future Faculty Program, University of Minnesota* *2021*
  Program designed to teach pedagogy and build teaching skills for graduate students and post-docs
- **Thank a Teacher Award,** *University of Minnesota* *2019*
  Student-nominated for exceptional teaching
- **Honorable Mention,** *Graduate Research Fellowship Program, National Science Foundation* *2019*
- **Keck Geology Consortium Fellowship,** *Keck Geology Consortium* *2016*
- **Mellon Mays Undergraduate Fellowship,** *Mellon Mays Foundation* *2015*
  Undergraduate summer funding and post-grad support for students of color in doctorate programs

TEACHING

- **Earth and Planetary Surface Processes,** *Dartmouth College,* ***(Instructor of Record)*** *Spring 2026*
  Lab course with emphasis on GIS applications of remotely sensed datasets using ArcGIS and QGIS
- **Paleoclimate and Glacial Processes, "The Stretch" Field Course,** *Dartmouth College,* **(*Co-Instructor with Prof. Meredith Kelly)*** *Fall 2025*
  Three-week course section on paleoclimatic evolution of the Eastern Sierra Mountains, CA with extensive in-class assignments focused on working with and applying proxy climate data

GUEST TEACHING

- **Geomorphology,** *Denison University* *April 2024*
  In-class activity on shallow subsurface hydrology and the impacts of urbanization and land use change on stormwater discharge
- **Isotope Geochemistry**, *University of Minnesota* *November 2023*
  Lecture on applications of geochronology deglaciation and the impacts of glacial melting on river systems
- **Surface & Groundwater Hydrology,** *Macalester College* *February 2024, February 2022, & March 2021*
  Two course sessions and a lab focused on water quality and state-level environmental legislation in Minnesota, incorporating an in-class activity, lecture and facilitated class discussion
- **Geomorphology,** *University of Minnesota* *October 2020*
  Four lectures and original assignments on glacial processes, deglaciation, and paraglacial environments
- **Advanced Geomorphology,** *Macalester College* *March 2020*
  Geomorphology and geochronology lecture, activity, and facilitated class discussion

TEACHING ASSISTANTSHIPS

- **Geomorphology,** *University of Minnesota* ***Fall 2022*** *(In-Person) &* ***Fall 2020*** *(Online)*
- **Hydrogeology Field Camp,** *University of Minnesota* ***Summer 2022*** *(In-Person) &* ***Summer 2021*** *(Online)*
- **Earth Surface Processes,** *University of Minnesota* ***Spring 2021*** *(Online)*
- **Earth & Its Environments,** *University of Minnesota* ***Summer 2019, Fall 2019 & Fall 2018****(In-Person)*
- **Introduction to Geology,** *Carleton College* ***Fall 2015*** *(In-Person)*

UNDERGRADUATE MENTORING **Student from group(s) historically underrepresented in geosciences*

Lang Burgess – *Dartmouth College,* **Directed Undergraduate Research Project** *2025 – Present*
Laboratory experiments and structure from motion photogrammetry to study kettle lake formation processes

Laura Wilson – *Dartmouth College,* **Directed Undergraduate Research Project** *Spring 2025*
Laboratory experiments and structure from motion photogrammetry to study kettle lake formation processes

***Abigail Wilwerding –** *University of Minnesota,* **Directed Undergraduate Research Project** *2022 – 2024*
Student poster presentation at a Regional Geological Society of America meeting and undergraduate co-authorship on peer-reviewed publication, X-Ray Fluorescence analysis and sediment core descriptions

***Anna Gonzalez –** *University of Minnesota,* **Directed Undergraduate Research Project** *2022 – 2023*
Statistical analysis of river bed grain size distribution in the Whitewater River catchment

***Hana Uyeda –** *Carleton College,* **Senior Thesis Advisor** *2021 – 2022*
Case studies on environmental impacts of Line 3 Pipeline in Minnesota and Michigan

***Campbell Dunn –** *University of Wisconsin,* **Research Collaborator & Mentor** *2021 – 2022*

Peter Mitchell – *University of Minnesota,* **Honors Thesis Committee & Collaborator** *2020 – 2021*

Jesse Schewe – *University of Minnesota,* **Fieldwork Supervisor** *Summer 2021*

INVITED PRESENTATIONS

Speaker, **Soft Rock Seminar**, ***University of Texas Austin*** *Spring 2025*
Sediment, Water, Change: Post-glacial to post-agricultural evolution of river systems in the Upper Mississippi River Valley

Speaker, **Ronneberg Lecture, *Denison University*** *Spring 2024*
Axe vs Ice Age: Contextualizing the impacts of Euro-American Agriculture and paleoenvironmental change on catchment averaged erosion rates from the Last Glacial Maximum to the post-settlement period in southeastern Minnesota, USA

Invited Presenter, **EPSP General Contributions, *AGU Fall Meeting*** *Fall 2022*
Using Paired Optically Stimulated Luminescence and Cosmogenic Nuclide ^{10}Be Dating to Understand Changes in Erosion Rate within a Fill–Cut Terrace Sequence: Whitewater River, Southeastern Minnesota, USA

Panel Moderator, **Beyond the Lab Speaker Series, *Saint Anthony Falls Laboratory*** *Fall 2022*
The Ghost Valley: Human Impacts on the Whitewater River Valley, southeastern Minnesota, Panel Discussion

Departmental Seminar Speaker, **Geology Department Seminars, *Carleton College*** *Spring 2022*
Linking river profile, base level change, and glaciation across timescales: Whitewater River, Southeastern Minnesota

Co-Presenter, **Source-to-Sink Webinar Series** *Spring 2022*
Waves of ice-sheet-mediated aggradation and incision transform upper Mississippi valley networks

Invited Speaker, ***Minnesota Geological Survey*** *Spring 2021*
Building coding tools to constrain fluvial response to glaciation in southeastern Minnesota

Invited Speaker, ***American Institute of Professional Geologists, Minnesota Section*** *Spring 2021*
Impacts of Glaciation on River Profile Morphology and Evolution

SELECTED CONFERENCE ABSTRACTS **Denotes Undergraduate Advisee*

[15] **Penprase, S.,** Wilwerding, A., McKenzie, M., Wickert, A., Larson, P., Rittenour, R., Slackwater sediments reveal time-variable glacial meltwater routing down the Upper Mississippi River at the Younger Dryas–Holocene transition. *American Geophysical Union Annual Meeting,* Washington D.C, December 9–13, 2024.

[14] **Penprase, S.**, Wickert, A., Larson, P., Larsen, I.J., Rittenour, T., Faulkner, D., Running, G. (2023) *Using Paired Optically Stimulated Luminescence and Cosmogenic Nuclide ^{10}Be Dating to Understand Changes in Erosion Rate within a Fill–Cut Terrace Sequence: Whitewater River, Southeastern Minnesota, USA.* Abstract (talk), presented at 2023 Fall Meeting, American Geophysical Union, San Francisco, CA, 11-15 Dec.

[13] *Wilwerding, A., **Penprase, S.**, and Wickert, A., 2024, Unraveling Early Holocene Glaciofluvial activity in the upper Mississippi Valley, USA: Insights from slackwater deposits in the Whitewater River Region, *in* GSA, https://gsa.confex.com/gsa/2024NC/webprogram/Paper399004.html.

[12] **Penprase, S. B.,** Wickert, A., Larson, P., Larsen, I.J., Rittenour, T., Faulkner, D., Running, G. (2022*) Using Paired Optically Stimulated Luminescence and Cosmogenic Nuclide ^{10}Be Dating to Understand Changes in Erosion Rate within a Fill–Cut Terrace Sequence: Whitewater River, Southeastern Minnesota, USA.* ***Invited.*** Abstract (poster), 2022 Fall Meeting, American Geophysical Union, Chicago, IL. 12-16 Dec.

[11] **Penprase, S. B.,** Wickert, A., Larson, P., Faulkner, D., Barefoot, E., Wood, J., Jones, J., *Dunn, C., Larsen, I., Rittenour, T., and Running, G. (2022) *Impacts of Changing Climate and Glacially Driven Base Level on an Upper Mississippi River Tributary During the Most Recent Glacial–post-Glacial Transition.* Abstract (poster), 2022 Fall Meeting, American Geophysical Union, Chicago, IL. 12-16 Dec.

[10] **Penprase, S.B.,** Wickert, A., Larson, P., *Dunn, C., Bezada, M., Running, G., Faulkner, D., Jones, J., *Schewe, J. (2021) *Characterizing River Profile, Concavity, and Sediment Discharge Response to Changes in Base Level across*

Timescales: Whitewater River, Southeastern Minnesota, USA. Abstract EP 45C-1533 (poster), presented at 2021 Fall Meeting, American Geophysical Union, New Orleans, LA. 13-17 Dec.

[9] **Penprase, S.B.,** Wickert, A.D, Clubb, F.J. (2020) *Signatures of glaciation on river channel long profiles: changes in slope and concavity.* Abstract EP012-0025 (poster), presented at 2020 Fall Meeting, American Geophysical Union, Virtual, 1-17 Dec.

[8] Romero, M., **Penprase, S.B.,** Van Wyk De Vries, M. S., Wickert, A.D. MacGregor, K.R., Brignone, G., Martini, M., Strelin, J.A. (2020) *Geomorphological Expression of the Last Glacial Maximum (LGM) in Lago Argentino, Southern Patagonian Icefield.* Abstract EP029-0005 (poster), presented at 2020 Fall Meeting, American Geophysical Union, Virtual, 1-17 Dec.

[6] Wickert, A.D., Schildgen, T.F., Tofelde, S., Savi, S., Rojo, Y., Fleagle, S., Callaghan, K.L., Barnes, R., **Penprase, S.B.,** Larson, P., Roth, D.L. (2020) *Self-consistently matching sediment supply, water discharge, and channel slope: Lane's balance at the catchment scale.* Abstract EP014-06 (talk), presented at 2020 Fall Meeting, American Geophysical Union, Virtual, 1-17 Dec.

[5] **Penprase, S.B.,** Wickert, A.D., Larson, P., Clubb, F.J., Kurak, E. (2019) *Isolating climatic and glacial impacts on river morphology: a paired-catchment study in the upper Mississippi River watershed.* Abstract EP53I-2253 (poster), presented at 2019 Fall Meeting, American Geophysical Union, San Francisco, CA, 9-13 Dec.

[4] Popken, B., Van Wyk de Vries, M.S., Wickert, A.D., **Penprase, S.B.** (2019) *Ice flow dynamics during retreat induced separation of a tributary glacier.* Abstract C31B-1518 (poster), presented at 2019 Fall Meeting, American Geophysical Union, San Francisco, CA, 9-13 Dec.

[3] Van Wyk de Vries, M.S., Wickert, A.D., Ito, E., Rada, C., Roberti, G., Popken, B., **Penprase, S.B.** (2019) *Large Volcanic Landslides on the Southern Patagonian Icefield and Linkages to Glacial Retreat.* Abstract V52C-07 (talk), presented at 2019 Fall Meeting, American Geophysical Union, San Francisco, CA, 9-13 Dec.

[2] **Penprase, S.B.,** Kimball, B.E. (2015) *Acid mine drainage simulated leaching behavior of goethite and cobalt substituted goethite.* Abstract GC51F-1147 (poster), presented at 2015 Fall Meeting, American Geophysical Union, San Francisco, 14-18 Dec.

[1] **Penprase, S.B.,** Abramson, N., LaSharr, K., Chorover, J. (2014) *The effects of rock type and landscape position on solution chemistry of soils in the Biosphere 2 Desert Site of the Santa Catalina Mountains Critical Zone Observatory.* Abstract EP23B-3597 (poster), presented at 2014 Fall Meeting, American Geophysical Union, San Francisco, 15-19 Dec.

SERVICE

- **Ad hoc Reviewer,** *Water, Landscape, and Critical Zone Processes (WalCZ), National Science Foundation* — *Spring 2025*
- **Primary Convener, *Landscape Evolution Beneath & Beyond the Ice***, *American Geophysical Union Annual Meeting* — *2025*
- **Co-Convener, *Landscape Evolution Beneath & Beyond the Ice***, *American Geophysical Union Annual Meeting* — *2024, 2023, 2022*
- **Steering Committee & Network Committee,** *Advancing Geochronology Science, Spaces, and Systems* — *2022 – 2024*
- **Student Committee, Earth & Planetary Surface Processes**, *American Geophysical Union* — *2022 – 2024*
- **Landscape Evolution Outreach Event with 8th Grade Girls,** *Girls Inc and Eureka! Program* — *Summer 2023*
- **Board Member, Association of Women Geoscientists (AWG): Minnesota Chapter** — *2020 – 2024*
- **Founder**, **Incoming Graduate Student Mentoring Program,** *ESCI, University of Minnesota* — *2020 – 2023*
- **Member, Sedimentary Systems Faculty Search Committee,** *University of Minnesota* — *2021 – 2022*
- **Mentor, Women in Science and Engineering (WISE),** *University of Minnesota* — *2020 – 2021*
- **Planning Committee, Earth Student Research Symposium,** *University of Minnesota* — *2019 – 2021*

LABORATORY EXPERIENCE AND PROFESSIONAL DEVELOPMENT

Wilderness Advanced First Aid (WAFA), *NOLS Global Wilderness School* 2025–Present

PaleoCAMP, *Paleoclimate Modeling and Fieldwork Short Course* 2024

^{10}Be Cosmogenic Nuclide Dating, *Field & Lab (Supported by AGeS2 Award)* 2022
University of Massachusetts Amherst, *Collaborator: Dr. Isaac Larsen*

Optically Stimulated Luminescence Dating, *Field & Lab* 2021, 2019
Utah State University, *Collaborator: Dr. Tammy Rittenour*

Geoprobe Sediment Core Processing & Description, *Field & Lab* 2021 – 2024
University of Minnesota

Teaching Certificate 2021
Preparing Future Faculty Program
Center for Educational Innovation, University of Minnesota

SELECTED FIELD EXPERIENCE

- Alluvial Fan Field Mapping and Paleoclimate Lake Bathymetry, **Northwest Territories, Canada,** *One field season*
- Glacial–Post-Glacial Transition, **Minnesota, USA**, *Three field seasons*
- Hydrogeology Field Camp, **Minnesota, USA**, *One field season + One online field season*
- Glacial Isostatic Adjustment, **Southern Patagonian Icefield, Argentina** , *One field season*
- Field Camp, Carleton College Geology Department, **New Zealand**, *One field season*

PROFESSIONAL AFFILIATIONS

- Asian Americans and Pacific Islanders in Geosciences (AAPIiG)
- Association of Women Geoscientists (AWG)
- Earth Science Women's Network (ESWN)
- American Quaternary Association (AMQUA)
- American Geophysical Union (AGU)
- Geological Society of America (GSA)