

Rachel E. Breunig

University of Wisconsin- Madison Department of Geoscience
1215 W. Dayton St. Weeks Hall Rm. 417, Madison, WI 53715.
rachel.breunig@wisc.edu (832)-275-1375

EDUCATION

University of Wisconsin-Madison (UW-Madison)	Ph.D. Geoscience Dissertation topic: Coevolution of water, topography, and the shallow subsurface in non-traditional Critical Zones Advisors: Dr. Ken Ferrier, Dr. Michael Cardiff Minor: Civil & Environmental Engineering	Expected 2026 GPA: 4.00
University of Wisconsin-Madison (UW-Madison)	M.S. Geoscience Thesis: Architecture of the shallow Critical Zone under evolving topography Advisors: Dr. Ken Ferrier, Dr. Michael Cardiff	2022 GPA: 4.00
The University of Texas at Austin (UT), Jackson School of - Geosciences (JSG)	B.S. Environmental Science, Geology with High Honors Thesis: Evaluating chemical depletion as a weathering indicator in heterogeneous, sedimentary systems Advisor: Dr. Daniella Rempe	2020 GPA: 3.89

HONORS, AWARDS, & LEADERSHIP

UW-Madison Geoscience Faculty Liaison	2023-2024
American Geophysical Union Outstanding Student Presentation Award	2022
Thomas E. Berg Award for Excellence in Teaching, UW-Madison	2022
UW-Madison Geoscience Graduate Student Assn. President	2022-2023
UW-Madison Association of Women Geoscientists President	2021-2022
UW-Madison Geoscience Graduate Student Assn. Student Ombud	2021-2022
UW-Madison Weeks/Senger Research Assistantship	2020-2021
JSG Professional Networking Contest Awardee	2020
Wayne Franklin Bowman Endowed Presidential Scholarship	2020
Sabina Elizabeth Endowed Presidential Scholarship in Quantitative Earth Sciences	2019
Bloomer Fund for Motivated and Late Bloomer Students	2019
Robert H. Cuyler Endowed Presidential Scholarship	2019
F. W. Simonds Endowed Presidential Scholarship	2019
Vincent R. DeNino Endowed Scholarship	2019
University of Texas College Scholar, Jackson School of Geosciences	2018-2020
John H. and Luzja McCammon Endowed Scholarship	2019
Anne and Henry Hamman Scholarship in Geoscience	2019
Carroll C. Miller Endowed Presidential Scholarship	2018
Lee and Joe Jamail Endowed Presidential Scholarship	2017, 2018
Undergraduate Scholarship to Support Geoscience Students	2018
Greater Texas Foundation Endowed Scholarship in Geosciences	2018
Section Leader, UT Longhorn Band	2017-2020
University Honors, University of Texas at Austin	2016- 2020
Ben Garcia Memorial Purple Monkey Scholarship	2016
Girl Scouts of America Gold Award	2015

PUBLICATIONS

- (2) Hu, K., Ferrier, K.L., Aarons, S.M., Norris, E., Blankenship, R., Marcott, S., **Breunig, Rachel E.**, Ruetenik, G., Peters, I., Ceperley, E., 2023. *Sensitivity of soil chemical erosion rate to climate and dust along a 2.8-km elevation transect at San Jacinto Mountain, California*. *Journal of Geophysical Research: Earth Surface* [in review].
- (1) Pedrazas, M.A., Hahm, W.J., Huang, M-H., Dralle, D., Nelson, M.D., **Breunig, Rachel E.**, Fauria, K.E., Bryk, A.B., Dietrich, W.E., and D.M. Rempe, 2021. *The relationship between topography, bedrock weathering, and water storage across a sequence of ridges and valleys*. *Journal of Geophysical Research: Earth Surface*. DOI: 10.1029/2020JF005848.

AWARDED GRANTS

The University of Texas at Austin Green Fund, 2018-2019, Project: Waste Free LHB.
PIs: Rachel E. Breunig, A.M.K. Lassmann. Total award: \$5,683 over 2 years

INVITED TALKS

- UW-Madison's VEC Seminar Series (2023) "Integrated GIS for quantitative & qualitative investigation"
UT EVS121 (2023) Invited panelist, "Recent alumni in higher education"
UW-Madison's Freshwater@UW (2023) Invited panelist, "Graduate Student Panel on Research"

CONFERENCE PRESENTATIONS

- (10) **Breunig, Rachel E.**, Ferrier, K.L., Cardiff, M.A., Hu, K., Bares, V., Carson, E.C., 2022 *Variations in Regolith Thickness, Porosity, and Chemistry in Evolving Topography*. AGU Fall Meeting.
- (9) **Breunig, Rachel E.**, Igonin, N., Liberty, L.M., Ochoa, E., Moreno, D.E.M., Ferguson, J.F., 2022 *Anthropogenic Geomorphological Features Elucidated through Active Seismic Surveying: San Marcos Pueblo, Northern New Mexico*. AGU Fall Meeting.
- (8) Hu, K., Ferrier, K.L., Aarons, S.M., Norris, E., Blankenship, R., **Breunig, Rachel E.**, Ruetenik, G., Peters, I., Ceperley, E., 2022 *Soil chemical depletion and dust deposition rates along an altitudinal climate transect at San Jacinto Peak, southern California*. AGU Fall Meeting.
- (7) Hu, K., Ferrier, K.L., Aarons, S.M., Norris, E., Blankenship, R., **Breunig, Rachel E.**, Ruetenik, G., Peters, I., Ceperley, E., 2021, *Soil Chemical and Physical Erosion Rates and Dust Deposition Rates Along an Altitudinal Climate Transect at San Jacinto Peak, Southern California*. AGU Fall Meeting, E041-1579.
- (6) **Breunig, Rachel E.**, Pedrazas, M.A., Fisher, C., and D.M. Rempe, 2020, *Evaluating chemical depletion as a weathering indicator in heterogeneous, sedimentary systems*. 2020 Eel River Critical Zone's Rancho Venada/ Antelope Valley Ranch Retreat.
- (5) **Breunig, Rachel E.**, Pedrazas, M.A., Fisher, C., and D.M. Rempe, 2020, *Evaluating chemical depletion as a weathering indicator in heterogeneous, sedimentary systems*. 2020 Jackson School Research Symposium.
- (4) **Breunig, Rachel E.**, Gardiner, K., Lad, B., Montoux, I., and E.G. Ortiz, 2020, *Growing Pains: Triumphs and Trials of Student Sustainability Initiatives*. Texas Regional Alliance for Campus Sustainability Summit. (Conference cancelled for Covid-19)
- (3) **Breunig, Rachel E.** and E. Ortiz, 2019, *Green Offices on Tap*. University of Texas Sustainability on Tap.

(2) **Breunig, Rachel E.** and A.M.K. Lassmann, 2019, *Project: Waste Free LHB—Zero Waste success in collegiate marching band*. University of Texas Sustainability on Tap.

(1) **Breunig, Rachel E.** and A.M.K. Lassmann, 2018, *Zero Waste in the Longhorn Band*. University of Texas Sustainability Showcase.

SKILLS

- Proficient in Python, Matlab, LaTeX, QGIS, AdobeIllustrator, Hydrus 1D, Microsoft Office Suite
- Familiar with Groundwater Vistas, PHREEQC, ArcGIS, CSS, HTML, AdobePhotoshop, AdobeLightroom
- Field and laboratory skills: core-logging, direct-push coring, air rotary drilling, Standard Penetration Testing (SPT), Optical Borehole Imaging (OBI), Nuclear Magnetic Resonance (NMR), X-Ray Fluorescence (XRF), Inductively Coupled Plasma Optical Emission Spectroscopy, Helium pycnometry, core-scale permeametry
- Intermediate Spanish proficiency
- Public communication

UNIVERSITY TEACHING EXPERIENCE

† denotes courses that included a field component

University of Wisconsin- Madison, Department of Geoscience

GEOSCI/ GEOG 320: Geomorphology †

Teaching Assistant Spring 2022; Professor: Dr. Ken Ferrier; Enrollment: 20 students (2 grad, 16 undergrad);

TA Evaluation Rating: 4.86/5

GEOSCI/ GLE 627: Hydrogeology †

Teaching Assistant Fall 2021; Professor: Dr. Michael Cardiff; Enrollment: 31 students (8 grad, 23 undergrad);

TA Evaluation Rating: 4.91/5

GEOSCI/ ASTRON 160: Life in the Universe

Reader/ Grader Spring 2021; Professors: Dr. Ann Bauer, Dr. Stephanie Napieralski, Dr. Andrew Vanderburg; Enrollment 180 students (0 grad, 180 undergrad)

Universidad de la Frontera, Chile

Volcanoes and Ice Summer Program (Pucón, Cautín, CL) †

Teaching Assistant January 2022; Professors: Dr. Ivo Fustos, Dr. Brad Singer, Dr. Shaun Marcott, Dr. Ben Edwards, Pablo Moreno-Yaeger, Matias Romero, Yasmeen Orellana Salazar, Chelsea Volpano; Enrollment: students (0 grad; 20 undergrad)

OUTREACH

WaterCycling Team	(Community Educator)	2023-Present
UW Geology Museum	(Educator & Saturday Docent)	2021-Present
Skype a Scientist	(Volunteer Scientist & Presenter)	2021-Present
Letters to a Pre-Scientist	(Scientist PenPal)	2021-2022

WORK EXPERIENCE

Department of Geoscience, UW-Madison Madison, WI
Research Assistant 2020-Present

- Produce publication-quality datasets from drill cores, field monitoring, lab measurements, and modelling
- Communicate research results and implications to stakeholders and scientific community
- Share expertise in geo-physical & geochemical methods with labmates to support research endeavors

GeoFORCE Texas Austin, TX
Geoscience Instructor 2023

- Act as the geoscience content expert in the field and in the classroom
- Develop the GeoFORCE instructional program based on current knowledge and best practices in geoscience field learning as described by geoscience education literature
- Deliver lecture content in classroom and field-based settings to high school students
- Mentor educational coaches and research counselors in scientific approach to geologic questions

Geoscience Educational Coach 2022

- Organize and carry out in-field (i.e., Basin and Range and Colorado Plateau field experiences) and in-classroom small group activities as part of the instructional team
- Develop and lead classroom activities (e.g., games, skits, writing, and drawing exercises) that review and reinforce material
- Facilitate student learning by delivering content during field experiences, assisting with reviews and activities, and aiding the instructor

Geoscience Research Counselor 2020-2021

- Lead high school students through virtual field experiences
- Serve as lead for Water Resources Day + Landscapes Through Time Day
- Teach fundamental principles of geology to students

Critical Zone Laboratory, The University of Texas at Austin Austin, TX
Undergraduate Researcher 2018-2020

- Design and execute undergraduate research experiment
- Utilize laboratory and field equipment to collect physical and chemical rock/soil data
- Analyze, synthesize, and present data

Office of Sustainability, The University of Texas at Austin Austin, TX
Intern/ Green Offices Leader 2018-2020

- Evaluate sustainability of departmental offices on campus
- Consult with University staff on environmentally, socially, and economically sustainable practices in office environments

Longhorn Band Student Association Austin, TX
Service and Sustainability Chair 2017-2019

- Evaluate the sustainability of the largest student organization at the University of Texas
- Write grant proposals, coordinate financial activities, and execute service and sustainability projects

**Led Longhorn Band to its first waste free game in history

Westside Tennis and Fitness
Swim Instructor

Houston, TX
Summer 2015-2020

- Teach and tailor private, semiprivate, and group swim classes of all levels to children and adults
- Plan and manage a dynamic lesson schedule, communicate with parents, and create a safe, positive, and fun learning environment for all involved

ADDITIONAL AFFILIATIONS

Association of Women Geoscientists	2021-Present
GeoPath Peer-to-Peer Mentorship program	2021-Present
American Geophysical Union	2020-Present
Geoscience Graduate Student Association	2020-Present
Phi Kappa Phi Honor Society (UT Austin Chapter)	2019-2020
Undergraduate Geological Society	2016-2020
Tau Beta Sigma	2017-2020
The University of Texas Longhorn Pep Band	2017-2020
The University of Texas Longhorn Band	2016-2020