Claire E. Ruggles

PhD Candidate · Structural Geology and Geophysics

Department of Geosciences, University of Wisconsin - Madison, 1215 W Dayton St, Madison, WI 53706

+1 847-528-2799 | cruggles@wisc.edu | claireeruggles.com

Education

University of Wisconsin - Madison — *Madison, WI*
PhD Geoscience, Minor in Statistics — *2021 - present*
- Advisor: Dr. Basil Tikoff

Iowa State University — *Ames, IA*
MS Structural Geology — *2018 - 2020*
- Advisors: Dr. Sven Morgan and Dr. Jacqueline Reber

University of Wisconsin - Madison — *Madison, WI*
BS Geology and Geophysics, Minors in Physics and German — *2014 - 2018*
- Advisor: Dr. Basil Tikoff

Professional Experience

2021-2026 **Graduate Research and Teaching Assistant**, University of Wisconsin - Madison
2025 **Course Instructor**, University of Wisconsin - Madison
2024 **Course Instructor**, University of Wisconsin - Platteville Baraboo Sauk Co
2024 **Geology Intern**, Hess Corporation
2021-2023 **Head Teaching Assistant**, Wasatch-Uinta Field Camp
2018-2020 **Graduate Research and Teaching Assistant**, Iowa State University
2018 **Geodesy Intern**, USGS Cascades Volcano Observatory
2017-2018 **Undergraduate Research Assistant**, University of Wisconsin - Madison

Awards, Fellowships, & Grants

2025 **Rick Sarg Distinguished Graduate Fellowship**, University of Wisconsin - Madison
S.A. Tyler Award for Excellence in Teaching, University of Wisconsin - Madison
AGU Chapman Travel Grant, American Geophysical Union

2024 **Best Student Presentation Award**, GSA Geophysics & Geodynamics Division

2022-2024 **Thomas E. Berg Award for Excellence in Teaching**, University of Wisconsin - Madison

2023 **UW Madison Graduate Student Research Grant**, University of Wisconsin - Madison

2022 **GSA Graduate Student Research Grant**, Geological Society of America

2021 **Student Research Grant**, GSA Geophysics & Geodynamics Division
Departmental Research Funding, University of Wisconsin - Madison
Jack Kleinman Grant, The Community Foundation for Southwest Washington

2020 **John Lemish Memorial Scholarship**, Iowa State Univsersity

2019 **ExxonMobil/GSA Student Geoscience Grant**, ExxonMobil/Geological Society of America
Outstanding Mention for GSA GSRG, Geological Society of America

2018 **Georgia and Carl Vondra Fellowship**, Iowa State University
Eugene Cameron Scholarship, University of Wisconsin - Madison

2014-2018 **Thermo-Fisher STEM Scholarship**, University of Wisconsin - Madison

2017 **Field Camp Scholarship**, University of Wisconsin - Madison

Publications

Published

Nelson, E.M., **Ruggles, C.**, Tikoff, B., Patzke, M., Surpless, K., Vervoort, J., Gaschnig, R., 2025, The Early Cretaceous Hazard Creek arc, western Idaho, in Gordon, S.M., Miller, R.B., Rusmore, M., and Tikoff, B., eds., Jurassic–Paleogene tectonic evolution of the North American Cordillera: Geological Society of America Special Paper

Ruggles, C.E., Miller, C., Tikoff, B., 2025, Shallow intrusion imaged by gravimetry records transient magma storage at the Laguna del Maule volcanic field, Chile. Journal of South American Earth Sciences. Vol. 161. 10.1016/j.jsames.2025.105573

Ruggles, C.E., Morgan, S., Reber, J.E., 2021, A multiple-pulse emplacement model for the Shonkin Sag laccolith, Montana, USA. Journal of Structural Geology. Vol. 149. 10.1016/j.jsg.2021.104378

In Prep

Ruggles, C.E., and Flinders, A., Structural controls on magma localization at Kīlauea based on gravimetry before and after caldera collapse. To be submitted to Bulletin of Volcanology.

Ruggles, C.E., Miller, C., Tikoff, B., Le Mével, H., Gravity detects magma intrusion at the Laguna del Maule volcanic field, Chile. To be submitted to Geology.

Anticipated Manusctripts (2026)

Ruggles, C.E., Watts, E., Penne, P., Schoene, B., and Tikoff, B. Structurally controlled, incremental emplacement of the Duncan Hill pluton.

Ruggles, C.E., Akin, K., Hazeltine, W., Mahrt, A., and Tikoff, B., Timing of the Moine thrust zone based on structural and gravimetric studies of the Loch Borralan pluton, Scotland.

Select Presentations

Ruggles, C.E., Watts, E., Schoene, B., and Tikoff, B., 2025, Structural and Geochronological Investigations of the Duncan Hill Pluton: What Can the Plutonic Record Tell Us About Transcrustal Magma Plumbing Systems? AGU Fall Meeting, New Orleans, USA, Dec. 12-19. Talk.

Ruggles, C.E. and Tikoff, B., 2025, The influence of tectonic controls on plutonism and volcanism: Comparing the Cretaceous Sierra Nevada batholith and the active El Salvador volcanic arc. GSA Cordilleran, Sacramento, CA, USA, Apr. 1-4. Talk.

Tikoff, B. and **Ruggles, C.E.**, 2025, Tectonics of the backarc of the Cascadia subduction system and the role of tectonic inheritance. GSA Cordilleran, Sacramento, CA, USA, Apr. 1-4. Talk.

Ruggles, C.E., and Flinders, A., 2025, Structural controls on caldera collapse at Kīlauea volcano: Insights from a high resolution 2023 Bouguer gravity survey. AGU Chapman, Hilo, HI, USA, Feb. 10-14. Poster.

Ruggles, C.E., Miller, C., Tikoff, B., and Le Mével, H., 2024, Mass flux and magma storage at the Laguna del Maule volcanic field: Magma reservoir evolution on human timescales. GSA Connects, Anaheim, CA, USA, Sept. 22-25. Poster.

Ruggles, C.E., Flinders, A., and Tikoff, B., 2023, Imaging the structure of the summit region of Kilauea volcano through a high-resolution gravity survey. AGU Fall Meeting, San Francisco, CA, USA, Dec. 11-15. Talk.

Ruggles, C.E., Morgan, S., and Reber, J.E., 2021, An emplacement model for low-volume intrusions based on the Shonkin Sag laccolith, Montana. GSA Connects, Portland, OR, USA, Oct. 10-13. Talk.

Ruggles, C.E., Morgan, S., and Reber, J.E., 2019, Pulses, folding and faulting: What can a structural perspective on the Shonkin Sag laccolith tell us about shallow magma emplacement? AGU Fall Meeting, San Francisco, CA, USA. Dec. 9-13. Poster.

Ruggles, C.E., Tikoff, B., Patzke, M., Surpless, K., and Vervoort, J., 2018, Integrated fabric, U-Pb zircon ages, and zircon Hf data from the Hazard Creek complex, western Idaho. Joint Rocky Mountain/Cordilleran Annual Section Meeting, Flagstaff, AZ, USA. May 15-17. Poster.

Research & Work Experience

University of Wisconsin - Madison, Department of Geoscience *Madison, WI*

Graduate Resarch Assistant *2021 - Present*

- Advisor: Dr. Basil Tikoff
- Dissertation: "Rates and Structural Accommodation of Upper Crustal Magmatism: Examples from Active and Ancient Settings"
- Investigations of structural controls on shallow magma transport and storage using a combination of geophysics and structural geology
- Methods utilized include gravimetry, rock magnetism, and structural analyses

Hess Corporation *Houston, TX*
Geology Intern *Summer 2024*
- Assessed prospectivity in the Gulf of Mexico
- Methods employed included seismic interpretation and rock physics analyses

Iowa State University - Department of the Earth, Atmosphere and Climate *Ames, IA*
Graduate Research Assistant *2018-2020*
- Advisors: Dr. Sven Morgan and Dr. Jacqueline Reber
- Thesis: "A multiple-pulse emplacement model for the Shonkin Sag laccolith, MT"
- Investigated shallow magma emplacement using concepts of structural geology
- Methods applied included structural analyses, rock magnetism, and thermal modeling

United States Geological Survey - Cascades Volcano Observatory *Vancouver, WA*
Geodesy Intern *Summer 2018*
- Supervisors: Dr. Daniel Dzurisin and Rebecca Kramer
- Aided in deploying semi-continuous GPS stations, gravity surveys, and GPS campaigns
- Field sites include Three Sisters, OR; Mt. St. Helens, WA; and Lassen Volcanic Field, CA, respectively

University of Wisconsin - Madison, Department of Geoscience *Madison, WI*
Lab Assistant *2017 - 2018*
- Advisor: Dr. Basil Tikoff
- Senior Thesis: "Integrated fabric, U-Pb zircon ages, and zircon Hf data from the Hazard Creek complex, western Idaho"
- Investigated the emplacement and deformational history of a granitic complex near the Western Idaho Shear Zone, ID
- Methods included microstructural analyses and interpretation of spatial patterns in U-Pb zircon ages and zircon Hf data
- Assisted in paleomagnetic and gravity surveys at the Laguna del Maule volcanic field, Chile

Teaching Experience

University of Wisconsin - Madison, Department of Geosciences *Madison, WI*
Course Instructor *Fall 2025*
- Course Instructor for GEOSCI 202: Intro to Geologic Structures
- Taught lecture for an introductory course on geologic structures and field methods and led five days of field trips
- Developed syllabus, lecture content, exams, quizzes, and in-class assignments

University of Wisconsin - Madison, Department of Geosciences *Madison, WI*
Graduate Teaching Assistant *2021 - 2025*
- Courses include GEOSCI 109: Geology of the National Parks; GEOSCI 202: Intro to Geologic Structures; GEOSCI/GLE 455 Structural Geology; GEOSCI/GLE 594: Introduction to Applied Geophysics; and GEOSCI/GLE 595: Field Methods in Applied and Engineering Geophysics
- Instructed labs; graded labs, homework, and exams; occasionally created course content; substituted occasional lectures

University of Wisconsin - Platteville Baraboo Sauk Co, Department of Civil Engineering *Baraboo, WI*
Course Instructor *Fall 2024*
- Lecturer for GEOLOGY 1140: Physical Geology
- Developed syllabus, lecture content, exams, quizzes, and in-class assignments

Wasatch-Uinta Field Camp Consortium *Park City, UT*
Head Teaching Assistant *2021-2023*
- Traditional six-week field course based out of the Wasatch and Uinta ranges in Utah
- Topics include constructing geologic maps and cross-sections, rock identification, and interpreting geologic field data

Iowa State University, Department of the Earth, Atmosphere, and Climate *Ames, IA*
Graduate Teaching Assistant *2018 - 2020*
- Courses include GEOL 1000: How Earth Works, GEOL 1010: Environmental Geology, and GEOL 2010: Geology for Engineers and Environmental Scientists
- Instructed labs; graded labs, homework, and exams

Student Advising & Mentoring

2025	**Emma Marble**, Geoscience Education & Mentorship Support (GEMS) Mentee
2024	**Aryssa Mahrt**, Senior Thesis Student: "Integrating Magnetic Fabric Analyses and Gravimetry to Interpret Pluton Emplacement in the Moine Thrust Zone, Scotland"
2022-2024	**Will Hazeltine**, Senior Thesis Student: "Constraining the subsurface geometry of the Loch Borralan pluton in the Moine Thrust Zone, Northwest Highlands, Scotland"
2024	**Kate Akin**, Senior Thesis Student, "An evaluation of relationships between emplacement and internal fabrics of the Loch Borralan Pluton, Northwest Highlands, Scotland"
2022-2023	**Patrick Penne**, Senior Thesis Student, "Documenting variations in microstructures and petrology within the Duncan Hill pluton, WA"

Skills

Software: Python; R; MATLAB; LaTeX; ArcGIS; QGIS; Oasis Montaj; SimPEG; GeoScience ANALYST; Petrel; StraboSpot2; StraboMicro; Adobe Suite

Geophysics and Rock Magnetism: Gravimetry using LaCoste and Romberg and Scintrex meters; GPS data collection and reduction; seismic data collection using SmartSolo nodes; Kappabridge KLY-3S automated susceptibility systems

Field: Geologic mapping; structural observation, data collection and interpretation; oriented sample collection; oriented drill core collection; hand-held magnetic susceptibility meters

Certifications: Adult Mental Health First Aid (Sep 2025); Adult and Pediatric First Aid/AED/CPR (Sep 2025)

Grant Writing: To date, I have personally secured over $13,000 of research funding through small grants. Additionally, I co-wrote an NSF RAPID proposal and a Wisconsin Alumni Research Foundation Fall Competition proposal which resulted in $99,402 and $43,000 grants (respectively) to support my research on the Laguna del Maule volcanic field.

Field Experience

Structural Fieldwork:
Duncan Hill pluton, WA - Seven weeks, 2021, 2022, 2025
Shonkin Sag laccolith, MT - Two weeks, 2018, 2019
Hazard Creek complex, ID - Three days, 2017

Gravity Fieldwork:
Eocene core complexes, Northern Washington - One week, 2025
Laguna del Maule volcanic field, Chile - Nine weeks, 2018, 2024, 2026
Kīlauea volcano, HI - Three weeks, 2023
Mt St Helens, WA - Two days, 2018

Geodetic Fieldwork:
Three Sisters, OR - One week, 2018
Lassen volcanic field, CA - Five days, 2018

Field Course Instruction:
Wasatch-Uinta Field Camp, UT - Three six-week sessions, 2021, 2022, 2023
Black Hills, SD - One week, 2022

Service & Professional Development

Service

Geological Society of America
Geophysics and Geodynamics Division - Student Representative (2025 - Present)

University of Wisconsin - Madison, Department of Geoscience
Very Early Career Seminar Series - Established, organized, and co-led inaugural and second year of series (2023 - 2025)
Geo. Grad. Student Association - GeoPath Chair (2022-2023, 2024-2025); Ombudsman (2023-2024); Secretary (2021-2022)
Association for Women Geoscientists - Vice President (2023-2024); Treasurer (2021-2023)

Iowa State University - Department of the Earth, Atmosphere and Climate
Geology Graduate Student Organization - Vice President (2019-2020)

Development

Teaching Structural Geology Using Math, Statistics, & Computation, 2025: A two-week workshop focused on learning how to incorporate quantitative methods into teaching and researching structural geology.

Mentoring & Advising Graduate Students, 2025: A workshop focused on advising in the framework of care and wholeness.

Springboard to Success, 2024: A two-week workshop focused on developing teaching and mentoring skills.

Peer Review

GSA Books

Professional Memberships

Geological Society of America
American Geophysical Union