

Sara Beth Cebry

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(she/her/hers)

Education:

PhD, Civil Engineering, December 2023
Cornell University, Ithaca, NY

MEng, Structural Mechanics and Materials, May 2018
Cornell University, Ithaca, NY

BS, Civil Engineering, Structural Concentration, May 2015
Worcester Polytechnic Institute (WPI), Worcester, MA

Certifications: Engineer in Training, Massachusetts, July 2016

Research Experience:

Mendenhall Fellow: US Geological Survey, June 2024 – present
Investigate the link between induced seismicity at the laboratory and field scale primarily through laboratory experiments on the USGS's 2 m biaxial apparatus. This work will further our understanding of the physical processes which drive induced earthquakes and in turn, determine what can be done to prevent induced seismicity.

Post Doctoral Researcher: Cornell, January 2024 – May 2024
Collected and analyzed data from experiments with a focus on a geometric bump on a 0.76 m PMMA laboratory fault. Analyzed ground motions with a focus on damaging high frequency radiation and PGA.

Graduate Research Assistant: Cornell, June 2018 – December 2023
Investigated effects of fault frictional, material, and stress heterogeneities on seismicity through laboratory experiments. Collected and analyzed data from experiments focusing on heterogeneities due to direct fluid injection and gouge powder on a 0.76 m PMMA and a 3 m granite laboratory fault. Developed fracture mechanics and diffusion models to match experimental data.

MEng Independent Study: Cornell, September 2017 – May 2018
Conducted experiments to investigate the effect of fluid injection along a stressed fault line. Analyzed the effect of normal force, shear force, time delays, and fluid pressure on the instigation of slip along the fault line. Modeled the effects of fluid injection on a seismic fault using Abaqus analysis software to create a finite element model of the fault and compare to the experimental data.

Major Qualifying Project: Feasibility Study of 89 Shrewsbury Street, WPI, August 2014 – March 2015
Designed a retrofit of the internal structure for an existing mill building to fit the needs of the community.

Peer Reviewed Journal Publications:

Cebry, S. B. L. & McLaskey, G. C. (202X). Heterogeneous high frequency seismic radiation from complex ruptures. *Submitted to Seismica*.

Cebry, S. B. L., Sorhaindo, K., & McLaskey, G. C. (2023). Laboratory earthquake rupture interactions with a high normal stress bump. *Journal of Geophysical Research: Solid Earth*, 128, e2023JB027297. doi: 10.1029/2023JB027297.

Cebry, S. B. L., Ke, C.-Y., Shreedharan, S., Marone, C., Kammer, D., & McLaskey, G. (2022). Creep fronts and complexity in laboratory earthquake sequences illuminate delayed earthquake triggering. *Nature Communications*, 13(6839). doi: 10.1038/s41467-022-34397-0.

Cebry, S. B. L., Ke, C.-Y., McLaskey, G., C. (2022). The role of background stress state in fluid-induced aseismic slip and dynamic rupture on a 3-m laboratory fault, *Journal Geophysical Research: Solid Earth*, 127, doi: 10.1029/2022JB024371.

Cebry, S. B. L., and McLaskey, G. C. (2021). Seismic swarms produced by rapid fluid injection into a low permeability laboratory fault, *Earth and Planetary Sciences Letters* 557, 116726, doi: 10.1016/j.epsl.2020.116726.

Conference and Other Papers:

Cebry, S. B. L., and McLaskey, G. C. (2019) "Laboratory Stick-Slip Events Due to Direct Fluid Injection" American Rock Mechanics Association, New York, NY #ARMA 19-248

Charest, A., and Leach, S. B., (2015) "Cost Comparison: SIPs vs. Traditional Construction" Architectural Products Magazine

Invited Talks:

European Research Council TECTONIC/FEAR Seminars, June 2024

Penn State University, Geodynamics Seminar, October 2023

European Geosciences Union, General Assembly, April 2023

American Geophysical Union, Fall Meeting, December 2022

ETH Zurich, D-ERDW and SED seminar, July 2022

Conference Presentations: (Presenting author only)

Cebry, S. B. L. & McLaskey, G. C. (2024). Variable high frequency radiation from complex laboratory ruptures due to a normal stress bump. Seismological Society of America (SSA) Annual Meeting.

Cebry, S. B. L., Sorhaindo, K., & McLaskey, G. C. (2023). Complex, multi-phase ruptures with heterogeneous high frequency ground motions due to interactions with a normal stress bump. American Geophysical Union (AGU) Fall Meeting Dec. 2023. Abstract T53A-07.

Cebry, S. B. L. & McLaskey, G. C. (2023). Complex, multi-phase ruptures with heterogeneous high frequency ground motions due to interactions with a normal stress bump. European Research Council Tectonics, Sept. 2023.

Cebry, S. B., Ke, C. Y., Shreedharan, S., Marone, C., Kammer, D., & McLaskey, G. (2023). Complex laboratory earthquake sequences show asperity interactions through creep fronts and illuminate the mechanics of delayed earthquake triggering (No. EGU23-10664). European Geosciences Union General Assembly.

Cebry, S. B. L., & McLaskey, G. C. (2022). Fluid-triggered Aseismic Slip and Dynamic Rupture from Rapid Fluid Injection into Large, Low Permeability Laboratory Faults. AGU Fall Meeting Dec. 2022. AGU.

Cebry, S. B. L., Ke, C.-Y., and McLaskey, G. C. (2021) "Role of background stress state in fluid induced aseismic slip and dynamic rupture on a 3 meter laboratory fault," AGU, Fall Meeting Dec. 17, 2021, abstract # S42A-03.

Cebry, S. B. L., Ke, C.-Y., and McLaskey, G. C. (2021) "Role of background stress state in fluid induced aseismic slip and dynamic rupture on a 3 meter laboratory fault," Southern California Earthquake Center, Annual Meeting, September 12-17, 2021.

Cebry, S. B. L. and McLaskey, G. C. (2021) "Rapid Fluid Injection into a Low Permeability Laboratory Fault Promotes Seismic Swarms," SSA, Annual Meeting Apr. 19, 2021.

Cebry, S. B. L. and McLaskey, G. C. (2020) "Rapid Fluid Injection into a Low Permeability Laboratory Fault Promotes Seismic Swarms," AGU, Fall Meeting Dec. 17, 2020, abstract # MR030-01.

Cebry, S. B. L. and McLaskey, G. C. (2020) "Rapid fluid injection into a low permeability laboratory fault promotes seismic swarms," Eastern Section of the SSA, Annual Meeting, Oct. 15, 2020, Session 8, Abstract 8.

Cebry, S. B. L., Ke, C.-Y., Shreedharan, S., Marone, C., Kammer, D. S., and McLaskey, G. C. (2019) "Laboratory observations of frictional stability and fault zone evolution under heterogeneous friction, rheology, and stress conditions," AGU, Fall Meeting Dec. 11, 2019, abstract # MR31A-05.

Cebry, S. B. L. and McLaskey, G. C. (2019) "Laboratory Stick-Slip Events Due to Direct Fluid Injection," American Rock Mechanics Association, 53rd Symposium Jun. 26, 2019, #ARMA 19-248.

Teaching Experience:

Teaching Assistant: Department of Civil Engineering, Cornell University
Taught lab/discussion sections, lead office hours, created and graded assignments, and organized and managed team of undergrad graders and assistants.

Introduction to the Behavior of Metal Structures (CEE 4740) Spring 2021, 2022

Climate Change and You, the Engineer (CEE 1165) Fall 2019

Concrete Materials and Construction (CEE 4750/6750) Spring 2018

Advanced Structural Concrete (CEE 7740) Spring 2018

Design of Concrete Structures (CEE 4730/6730) Fall 2017, 2023

Interactive Qualifying Project: Teaching Practicum, WPI, August 2013 – December 2013

Served as a student teacher at Doherty Memorial High School. Demonstrated competence in the five Professional Standards for Massachusetts educators by planning lessons, teaching, testing, and grading Advanced Algebra and Pre-Calculus Honors for students in grades 9-12.

Industry Experience and Select Projects:

Engineer I, CB&I Federal Services, Canton, MA, June 2015-June 2017

Designed and analyzed structural aspects of national, state, and local government projects.

Mixed-Oxide Fuel Fabrication Facility (MOX), Aiken, SC

Performed structural analysis, design, and evaluation of steel, reinforced concrete, masonry, and wood for the Department of Energy. Utilized GTStrudl software for finite element analysis of equipment supports. Developed methodologies to analyze infill of concrete penetrations.

Ruggles Station, Boston, MA

Designed and analyzed a new precast concrete raised platform and ancillary structures for the Massachusetts Bay Transit Authority commuter rail station. Investigated the effects of wind induced vibrations on flexible steel members.

SuperPlug, Boston, MA

Developed solution to prevent existing water leakages in an I-90 tunnel for the Massachusetts Department of Transportation. Analyzed steel and concrete for tunnel movement over time.

Reviewer Activities

Journals:

Geophysical Research Letters

Journal Geophysical Research: Solid Earth

Earth and Planetary Science Letters