

MOLLY GALLAHUE

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2145 Sheridan Road
Evanston, IL 60208

Research interests: Seismic hazard, seismology, plate tectonics, statistics

EDUCATION

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|------------|---|---------------|
| PhD | Northwestern University, Earth and Planetary Sciences
Thesis title (working): <i>Exploring the causes of the discrepancy between probabilistic seismic hazard maps and observed shaking data</i>
Committee: Seth Stein (chair), Bruce Spencer, Norman Abrahamson, Susan Hough | Expected 2023 |
| MS | Northwestern University, Statistics | Expected 2023 |
| BS | St. Norbert College, Geology and Mathematics
Graduated Summa Cum Laude
Study abroad at University College Cork, Ireland | May 2018 |

PUBLICATIONS

***INVITED**

Gallahue, M., Abrahamson, N. New methodology for unbiased ground-motion intensity conversion equations (GMICE). Accepted for publication in *Bulletin of the Seismological Society of America*.

Gallahue, M., Salditch, L., Lucas, M.C., Neely, J., Stein, S., Abrahamson, N., Hough, S. Exploring the effect of minimum magnitude on California seismic hazard models. In review with *Seismica*.

Gallahue, M., Salditch, L., Lucas, M.C., Neely, J., Stein, S., Abrahamson, N., Williams, T., Hough, S. (2021) On the effect of site response for California seismic hazard map assessment. *Frontiers in Earth Science* 10, 931340.

Stein, C., Stein, S., **Gallahue, M.**, Elling, R. (2021) Revisiting hotspots and continental breakup - Updating the classical three-arm model. Foulger, G.R., Hamilton, L.C., Jurdy, D.M., Stein, C.A., Howard, K.A., and Stein, S., eds., *In the Footsteps of Warren B. Hamilton: New Ideas in Earth Science: Geological Society of America Special Paper 553*, pp. 1–17.

Hough, S.E., Page, M., Salditch, L., **Gallahue, M.M.**, Lucas, M.C., Neely, J.S., Stein, S. (2020) Revisiting California's past great earthquakes and long-term earthquake rate. *Bulletin of the Seismological Society of America*, 111(1), pp.356-370.

***Gallahue, M.M.**, Stein, S., Stein, C.A., Jurdy, D., Barklage, M., Rooney, T. (2020) A compilation of igneous rock volumes at volcanic passive continental margins. Invited paper for *Marine and Petroleum Geology*, 122, 104635.

Salditch, L., **Gallahue, M.**, Lucas, M., Neely, J., Hough, S.E., Stein, S. (2020) California Historical Intensity Mapping Project (CHIMP) – A consistently reinterpreted dataset of seismic intensities for the past 162 years and implications for seismic hazard maps. *Seismological Research Letters*, 91(5), pp.2631-2650.

PRESENTATIONS AND INVITED LECTURES

***INVITED | ^WON OSPA**

(Upcoming – April 2023) **Gallahue, M.**, Salditch, L, Lucas, M.C., Neely, J., Stein, S., Abrahamson, N., Hough, S.E. (2022) Why do seismic hazard models predict higher shaking than that observed historically? European Geophysical Union Annual Meeting, Vienna, Austria.

(Upcoming – April 2023) **Gallahue, M.**, Abrahamson, N. (2023) Methods for Unbiased Ground-Motion Intensity Conversion Equations and Implications for Hazard Map Assessment in California. Seismological Society of America Annual Meeting, San Juan, Puerto Rico.

***Gallahue, M.**, Salditch, L, Lucas, M.C., Neely, J., Stein, S., Abrahamson, N., Hough, S.E. (2022) Exploring the discrepancy between seismic hazard maps for California and historic shaking observations. Invited seminar at University of Illinois Chicago Earth and Environmental Science.

Gallahue, M., Abrahamson, N. (2022) Re-evaluating Ground Motion Intensity Conversion Equations for California and Implications for Hazard Map Assessment. American Geophysical Union Annual Meeting, Chicago, IL.

Gallahue, M., Abrahamson, N. (2022) Re-Evaluating Ground Motion Intensity Conversion Equations (GMICE) For California, U.S.A. 8th Asia Conference on Earthquake Engineering, Online.

***Gallahue, M.**, Salditch, L, Lucas, M.C., Neely, J., Stein, S., Abrahamson, N., Williams, T., Hough, S.E. (2022) Why do earthquake hazard maps predict higher shaking than observed? Geological Society of America Annual Meeting, Denver, CO.

Gallahue, M., Salditch, L, Lucas, M.C., Neely, J., Stein, S., Abrahamson, N., Williams, T., Hough, S.E. (2022) Why do seismic hazard maps overpredict historically observed shaking? International Workshop on Paleoseismology, Active Tectonics and Archeoseismology, Aix en Provence, France.

Gallahue, M., Salditch, L, Lucas, M.C., Neely, J., Stein, S., Abrahamson, N., Williams, T., Hough, S.E. (2022) Why do standard hazard maps overpredict shaking in France, California, and elsewhere? Sigma2 Closing Symposium, Avignon, France.

Gallahue, M., Salditch, L., Lucas, M.C., Neely, J., Stein, S., Abrahamson, N., Williams, T., Hough, S.E. (2022) Exploring the discrepancy between seismic hazard maps for California and historic shaking observations. USGS Geologic Hazards Science Center. Online.

Gallahue, M., Salditch, L., Lucas, M.C., Neely, J., Stein, S., Abrahamson, N., Williams, T., Hough, S.E. (2022) Exploring potential causes for observed overprediction of ground shaking by USGS hazard maps relative to historical shaking data. Seismological Society of America Annual Meeting, Bellevue, WA.

Gallahue, M., Salditch, L., Lucas, M.C., Neely, J., Stein, S., Abrahamson, N., Williams, T., Hough, S.E. (2022) Why does the seismic hazard map for California predict much higher shaking than observed? Geodesy and geophysics seminar of the Upper Midwest virtual seminar.

Gallahue, M., Salditch, L., Lucas, M.C., Neely, J., Hough, S.E., Stein, S., Abrahamson, N., Williams, T. (2021) Exploring site effects in probabilistic seismic hazard maps. American Geophysical Union Annual Meeting, Online.

Gallahue, M., Salditch, L., Lucas, M.C., Neely, J., Hough, S.E., Stein, S., Abrahamson, N., Williams, T. (2021) California Historical Intensity Mapping Project (CHIMP): A consistently reinterpreted dataset of seismic intensities for the past 162 years and implications for seismic hazard maps. European Seismological Commission Annual Meeting, Online.

Gallahue, M., Salditch, L., Lucas, M.C., Neely, J., Stein, S., Abrahamson, N., Williams, T., Hough, S. (2021) Probabilistic seismic hazard maps for California do not perform better relative to historical shaking data when site-specific VS30 is considered. European Geophysical Union Annual Meeting, Online.

Gallahue, M., Salditch, L., Lucas, M.C., Neely, J., Stein, S., Abrahamson, N., Williams, T., Hough, S. (2021) Site specific velocity corrections do not improve seismic hazard map performance for California when compared with historical shaking data. Seismological Society of America Annual Meeting, Online.

Gallahue, M., Stein, S., Stein, C.A., Jurdy, D.M., Barklage, M. (2020) How much melt forms in continental rifting and where does it go? American Geophysical Union Annual Meeting, Online.

***Gallahue, M.,** Salditch, L., Lucas, M., Neely, J., Hough, S.E., Stein, S., Abrahamson, N., Williams, T. (2020) Assessment of seismic hazard map performance for California through comparison with historical shaking data. Invited presentation. American Geophysical Union Annual Meeting, Online.

Gallahue, M., Stein, S., Stein, C.A., Jurdy, D.M., Barklage, M. (2020) Exploring the relationship between volcanic passive margins and adjacent Large Igneous Provinces. Geological Society of America Annual Meeting, Online.

Gallahue, M., Salditch, L., Hough, S.E., Stein, S., Spencer, B., Brooks, E., Neely, J., Lucas, M. (2019) CHIMP – A shaking dataset for historical large earthquakes in California. American Geophysical Union Annual Meeting, San Francisco, CA.

Gallahue, M., Stein, S., Stein, C.A., Jurdy, D.M., Barklage M. (2019) Compilation of igneous rock volumes and geometries at volcanic passive continental margins to explore the processes of continental rifting and breakup. American Geophysical Union Annual Meeting, San Francisco, CA.

Gallahue, M., Salditch, L., Hough, S.E., Stein, S., Spencer, B., Brooks, E., Neely, J., Lucas, M. (2019) CHIMP – A shaking dataset to assess the performance of earthquake hazard maps for California. Geological Society of America Annual Meeting, Phoenix, AZ.

Gallahue, M., Stein, S., Stein, C.A., Jurdy, D.M., Barklage M. (2019) Exploring the role of hotspots in initiating continental breakup from volcanic volumes at rifted margins. Geological Society of America Annual Meeting, Phoenix, AZ.

SCHOLARSHIPS, AWARDS AND GRANTS

<u>Student Presentation Award</u> / Geophysics & Geodynamics Division, GSA	2022
<u>Early Career Researcher Travel Grant</u> / INQUA/TERPRO	2022
<u>Northwestern TGS Conference Travel Grant</u> / Northwestern University	2022
<u>Outstanding Graduate Teaching Assistant Award</u> / NU EPS	2022
<u>Global Travel Grant</u> / Seismological Society of America	2022
<u>Annual Meeting Travel Grant</u> / Seismological Society of America	2022
<u>Global Travel Grant</u> / Seismological Society of America	2021
<u>Honorable Mention</u> / NSF Graduate Research Fellowship Program	2020
<u>Outstanding Student Presentation Award</u> / American Geophysical Union	2019
<u>Centennial Grant (Coinvestigator)</u> / American Geophysical Union	2019
<u>Northwestern TGS Conference Travel Grant</u> / Northwestern University	2019
<u>North-Central Section Student Travel Grant</u> / Geological Society of America	2019
<u>Maria Luisa Crawford Scholarship</u> / Association for Women Geoscientists	2018
<u>The Geology Award</u> / St. Norbert College	2018

OUTREACH

GSA Geophysics and Geodynamics Division
Student Representative, 2021-present

The Field Museum of Natural History
Docent, 2019-2020

PRESS COVERAGE

“Earthquake hazard maps may overestimate shaking dangers.” 2020. Temblor.
<https://temblor.net/earthquake-insights/earthquake-hazard-maps-may-overestimate-shaking-dangers-11929/>

“Doctoral Students Hunt for Seismic Memories.” 2019. Northwestern Magazine.
<https://magazine.northwestern.edu/news/doctoral-students-hunt-for-seismic-memories/>

“Northwestern students gather earthquake memories.” 2019. Northwestern Now.
<https://news.northwestern.edu/stories/2019/10/northwestern-students-gather-earthquake-memories/>

TEACHING ASSISTANTSHIPS

Northwestern University, EARTH 202: Earth’s Interior	2023
Northwestern University, EARTH 101: Earth Science for the 21 st Century	2022
Northwestern University, EARTH 352: Global Tectonics	2021
Northwestern University, ENV SCI 203: Humans and the Environment	2020
Northwestern University, EARTH 101: Earth Science for the 21 st Century	2019
St. Norbert College, Geology Department	2015-2018
St. Norbert College, Mathematics Department	2017-2018

EDUCATIONAL COURSES

Peter Bormann Young Seismologist Training Course

European Seismological Commission, 2021

Selected to participate in a week-long course focused on seismology for science and society. Course offered lectures on topics including seismic risk, earthquake response, and macroseismology.

Seismic Hazard Analysis and Design Ground Motions

University of California, Berkeley, 2021

Engaged in a semester-long course focused on seismic hazard taught by PhD. committee member, Norman Abrahamson. Course focused on probabilistic seismic hazard analysis, culminating in a hazard project.

Remote Online Session for Emerging Seismologists,

American Geophysical Union Seismology Section, 2020

Participated in an 11-week workshop focused on online learning in seismology. Workshop offered Python-based tutorials in data processing, modeling, and interpretation.

COMPUTER SKILLS

Proficient in LaTeX, R, Python, ggplot2 and Adobe Illustrator