

SABINE LOOS

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PROFESSIONAL APPOINTMENTS

University of Michigan <i>Assistant Professor of Civil & Environmental Engineering</i>	2023– Ann Arbor, MI
United States Geological Survey, Natural Hazards Center <i>Mendenhall Postdoctoral Fellow</i>	2021-2023 Golden, CO
Nanyang Technological University <i>Visiting Researcher at the Earth Observatory of Singapore</i>	2019–2020 Singapore

EDUCATION

Stanford University <i>Ph.D. in Civil Engineering, Advisors: Jack Baker, David Lallemand</i>	2018–2021 Stanford, CA
Stanford University <i>M.S. in Sustainable Design & Construction</i>	2016–2018 Stanford, CA
Ohio State University <i>B.S. in Civil Engineering, graduated Summa Cum Laude</i>	2012–2016 Columbus, OH

GRANTS & AWARDS

Mendenhall fellowship and grant , United States Geological Survey	2021-2023
Editor's Choice November 2022 , ASCE Natural Hazards Review	2022
STAR award , United States Geological Survey	2022
John A. Blume Fellowship in Earthquake Engineering , Blume Foundation	2021
2020 Best Graduate Student Paper Award , Earthquake Engineering Research Institute	2020
Singapore Ministry of Educ. Tier 1 Grant , Earth Observatory of Singapore	2020
Nextprof Nexus 2020 selected participant , University of Michigan, Berkeley, Georgia Tech	2020
Collaborative Data Innovations Grant , Global Partnership for Sustainable Development Data	2017-2019
Graduate Research Fellowship , National Science Foundation	2016 - 2019
Best Visual Design , World Bank & Mapbox VizRisk Challenge	2019

INDUSTRY EXPERIENCE

The World Bank and NASA JPL-ARIA <i>Consultant to validate remote sensing (inSAR) based damage proxy maps</i>	2017-2018 Auckland, NZ
Turner Construction Company <i>Field engineering intern</i>	2015 - 2016 Columbus, OH
Jezerinac, Geers and Associates <i>Structural engineering intern</i>	Summer 2014 Columbus, OH

RESEARCH EXPERIENCE

User-centered and equitable approaches for earthquake risk and loss products <i>Postdoctoral research, conducted at the U.S. Geological Survey and the Natural Hazards Center</i>	2021 - Present
<ul style="list-style-type: none">Designed and led 15 focus groups with 49 global disaster management professionals to understand decisions that prioritize social equity and corresponding informational needs.	

<p>Evaluating the accessibility of crowdsourced earthquake shaking intensity data <i>Postdoctoral research, conducted at the U.S. Geological Survey and the Natural Hazards Center</i></p> <ul style="list-style-type: none"> Analyzing large scale panel data on responses to the Did You Feel It? crowdsourcing platform for earthquake intensities to evaluate how to improve its accessibility. 	2021 - Present
<p>Tracking the uses of post-earthquake building damage data <i>Postdoctoral research, onducted at the U.S. Geological Survey and the Natural Hazards Center</i></p> <ul style="list-style-type: none"> Document and meta-data analysis to evaluate flows of post-earthquake building damage to earthquake responders. 	2021 - Present
<p>Integrating damage data: a multiple country perspective <i>Dissertation project, conducted at Stanford University</i></p> <ul style="list-style-type: none"> Evaluating the integration of building damage data from NASA derived products, USGS models, digital crowdsourcing, and field surveys using data from four earthquakes of the past decade. Reproducible code available here: https://sabineloos.github.io/GDIF-Gen/Diagnostics.html. 	2019 - 2021
<p>Non-recovery—a holistic and context-specific vulnerability metric <i>Dissertation project, conducted at Earth Observatory of Singapore and Kathmandu Living Labs</i></p> <ul style="list-style-type: none"> Developed a data-driven metric that predicts the areas that are expected to struggle during recovery due to geographical, economic, social, or other challenges specific to affected regions. Project outputs hosted on The World Bank’s website: https://www.worldbank.org/en/data/statistical-capacity-building/data-innovation-fund/mapping-to-assess-post-disaster-impact 	2018 - 2020
<p>A geospatial data integration framework to rapidly estimate post-disaster damage <i>Dissertation projects, conducted at Stanford University and Kathmandu Living Labs</i></p> <ul style="list-style-type: none"> Developed a geostatistical framework to more accurately estimate regional damages by integrating geospatial damage data that are standardly available after a disaster. Created reproducible code for practitioners to use in the field and other researchers to build on, available at https://sabineloos.github.io/GDIF-damageprediction/GDIF_nb.html. 	2017 - 2019
<p>Developing and understanding crowdsourcing of building damage <i>Master’s research conducted at Stanford University</i></p>	2016 - 2018
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<p>LEADERSHIP & SERVICE</p>	
<p>U.S. Geological Survey Environmental Justice Task Force <i>Core Member</i></p>	2022-2024
<p>Risk & Resilience DATArtathon <i>Co-founder and Projects Lead</i></p> <ul style="list-style-type: none"> Co-developed structure and curriculum for a three-week intensive online event for 10 international early-career students and practitioners to learn data visualization skills and create individual projects. Facilitate the development of visualization projects through interactive feedback sessions. More information at http://datartathon.com/. 	2020–Present Virtual
<p>Natural Hazards Center Annual Researchers’ Meeting <i>Co-chair (2020-Present), session organizer (2019)</i></p> <ul style="list-style-type: none"> Co-chair of the Annual Researchers’ Meeting, both of which convened over 400 disaster researchers from around the world, developing conference topical themes and sessions, leading soliciting/reviewing abstracts, and encouraging cross-disciplinary participation. Developed and moderated panel on “Transdisciplinary and transcontinental data convergence for decision support in the Asia-Pacific region”, bringing together a panel of six researchers, policy makers, and data providers. 	2019-Present

NHESS Special Issue on Advances in machine learning for natural hazards risk assessment <i>Guest Editor</i>	2021-Present
IJMED Special Issue on Longitudinal Recovery Research: Progress in Theories, Methodologies, Ethics, and Applications <i>Guest Editor</i>	2021-Present
World Bank, Earthquake Spectra, Society for Risk Analysis, USGS Earthquake Hazards Program, Bulletin of the Seismological Society of America <i>Reviewer</i>	2018 – Present
Stanford Urban Resilience Initiative (SURI) <i>Graduate student leader</i>	2017 – Present
Civil and Environmental Engineering Graduate Leadership Council <i>Structural Engineering Representative</i>	2018, 2020
Earthquake Engineering Research Institute (EERI) <i>Stanford Chapter Activities coordinator</i>	2017 – 2018
Leaders of the Built Environment <i>Philanthropy Chair</i>	2016 – 2017

TEACHING & MENTORING

Research advisor for undergraduate/graduate students <i>U.S. Geological Survey, Stanford University, Nanyang Technological University</i>	2019- Multiple
<ul style="list-style-type: none"> • Research mentor for 2 undergraduate student interns and 2 graduate student interns at the U.S. Geological Survey, covering topics on data analytics, user research, and communication. • Served as primary advisor for two Stanford undergraduate interns (Summer 2019), one of whom continued conducting research for two years, and one undergraduate student at Nanyang Technological University (Spring 2020). 	
Risk in Humanitarian Engineering and Science (Graduate), Nature & Society (GEOG365, Undergraduate), SURI Round Tables (Graduate) <i>Guest lecturer</i>	2021,2022 Multiple
<ul style="list-style-type: none"> • Guided discussion on emergency management, interdisciplinary hazards research, and disaster data (Risk in Humanitarian Engineering and Science, CO School of Mines) • Developed lecture and breakout discussion activity on an introduction to disaster justice for a class of 10 undergraduate students in Geography (Nature & Society, University of New Mexico) • Developed reading list and guided discussion on the concept of disaster justice for graduate-level engineers and social scientists (SURI Round Table, Stanford University) 	
Probabilistic Methods for Civil & Environmental Engineers (CEE203, Graduate) <i>Graduate Teaching Assistant</i>	Autumn 2020 Stanford, CA
<ul style="list-style-type: none"> • Held weekly interactive office hours for 40+ students using alternative online platform that allowed students to work collaboratively and access 1-1 assistance with me • Developed and taught the midterm review, graded assignments weekly • Constructed final project on comparing flood mitigation program (insurance, structural retrofits) in a local community 	

Disaster Resilience Seminar (CEE209S, Graduate)

Graduate Teaching Assistant

Autumn '18, '20

Stanford, CA

- Developed itinerary of invited speakers, ensuring representation from multiple experience levels, backgrounds, and disciplines
- Led discussions between speakers from academia and industry and class of 40 graduate students surrounding the theme of decision support for disasters

Data Science in Earth and Environmental Systems Science (Graduate)

Visiting Lecturer – “Data Visualization & Communication”

Spring 2020

Singapore

- Developed curriculum and lectured for 2 classes on the principles and process of data visualization and communicating scientific results for a class of 30 students.

Stanford Splash

Graduate Teacher

2016, 2017

Stanford, CA

Introduction to Transportation Engineering (Undergraduate Level)

Course Grader

Autumn 2015

Columbus, OH

PUBLICATIONS

Journal Articles

- J1 **Loos, S**, Lallemand, D., Khan, F., McCaughey, J., Banick, R., Budhathoki, N., Baker, J. (2023). “A data-driven approach to rapidly estimate recovery potential to go beyond building damage after disasters.” *Nature Communications Earth and Environment*, (*in press*).
- J2 **Loos, S.**, Levitt, J., Tomozawa, K., Baker, J., Lallemand, D. (2022). “Efficacy of damage data integration: A comparative analysis of four major earthquakes”. *Natural Hazards Review*. [10.1061/\(ASCE\)NH.1527-6996.0000581](https://doi.org/10.1061/(ASCE)NH.1527-6996.0000581). **Selected as Editor’s Choice for Journal Issue.**
- J3 Lallemand, D., Rabonza, M., Lin, Y. C., Tadepalli, S., Wagenaar, D., Nguyen, M., Choong, J., Liu, C., Mestav Sarica, G., Widawati, B. A. M., Balbi, M., Khan, F., **Loos, S.**, Ning, L. T. (2022). Shedding light on avoided disasters: Measuring the invisible benefits of disaster risk management using probabilistic counterfactual analysis. *United Nations Disaster Risk Reduction Global Assessment Report*.
- J4 Bhattacharjee, G., Soden, R., Barns, K., **Loos, S.**, Lallemand, D. “Factors affecting earthquake responders’ building damage information needs and use,” *Earthquake Spectra*. *In Press* (2021) 1–25. <https://doi.org/10.1177/87552930211030297>.
- J5 **Loos, S**, Lallemand, D., Baker, J., McCaughey, J., Budhathoki, N., Yun, S., Khan, F., Singh, R. “G-DIF: A Geospatial Data Integration Framework to Rapidly Estimate Post-Earthquake Damage.” *Earthquake Spectra*, 2020. DOI: [10.1177/8755293020926190](https://doi.org/10.1177/8755293020926190). **Winner of 2020 EERI Graduate Student Paper Award.**
- J6 Schmuhl, D, **Loos, S**, Hur, J & Shafieezadeh, A (2018). “Time-dependent Probabilistic Capacity Degradation Assessment of Prestressed Concrete Piles in Marine Environment”. *Structure and Infrastructure Engineering*, DOI: [10.1080/15732479.2018.1442483](https://doi.org/10.1080/15732479.2018.1442483)
- J7 Lallemand, D., Soden, R., Rubinyi, S., **Loos, S.**, Barns, K., & Bhattacharjee, G. (2017). “Post-Disaster Damage Assessments as Catalysts for Recovery: A Look at Assessments Conducted in the Wake of the 2015 Gorkha, Nepal, Earthquake”. *Earthquake Spectra*: December 2017, Vol. 33, No. S1, pp. S435-S451. DOI: [10.1193/120316eqs222m](https://doi.org/10.1193/120316eqs222m).

Technical Reports

- T1 Lallemand, D., **Loos, S.**, McCaughey, J., Budhathoki, N., Khan, F. 2020. “Informatics for Equitable Recovery: Supporting equitable disaster recovery through mapping and integration of social vulnerability into post-disaster impact assessments.” DOI: [10.32656/IER_Final_Report_2020](https://doi.org/10.32656/IER_Final_Report_2020)
- T2 **Loos, S**, Barns, K, Bhattacharjee, G, Soden, R, Herfort, B, Eckle, M, Giovando, C, Girardot, B, Deierlein, G, Kiremidjian, A, Baker, J & Lallemand, D. (2018). “The Development and Uses of Crowdsourced Building Damage Information based on Remote-Sensing”. *Blume Earthquake Engineering Center Technical Report 197*. Stanford Digital Repository. Available at: <https://purl.stanford.edu/bj915mt6570>

Conference Papers and Presentations

- C1 **Loos, S.**, Wald, D., Macías, M., Karr, M., Ludwig, K., Peek, L., “Beyond deaths and dollars: The need for comprehensive loss modeling that address user needs for equity-centered disaster information”. **Conference paper, Mini Symposium Organizer** *International Conference on Applied Statistics and Probability in Civil Engineering* July 11, 2023, Dublin, Ireland.
- C2 **Loos, S.**, “Towards more accessible and equity-centered USGS real-time earthquake information”. **Invited presentation to the Director of the USGS.** *Geologic Hazards Science Center* January 11, 2023, Golden, Colorado.
- C3 Paudel, S., Soden, R., **Loos, S.** “Understanding AI and Disaster Risk Models: A Historical and Anticolonial Analysis”. **Conference presentation, 4S: Society for Social Studies of Science**, December 09, 2022, Cholula, Mexico.
- C4 **Loos, S.**, Soden, R., Barns, K., Lallemand, D., Davis, L. “Incorporating Equity into Risk Modeling: Setting a Vision for the Future”. **Focus Day Session, Session Lead**, *Understanding Risk 2022*, November, 28, 2022, Florianopolis, Brazil.
- C5 **Loos, S.**, Lallemand, D., Wald, D. “Best practices for collecting usable post-earthquake damage data: lessons from Haiti and other past events”. **Conference paper, Invited Presentation**, *12th National Conference on Earthquake Engineering*, June 29, 2022, Salt Lake City, UT.
- C6 Levitt, J., **Loos, S.**, Baker, J. “Differential household recovery: the factors not accounted for by a damage-based earthquake reconstruction policy and the disparate long term results”. **Conference poster, advisor**, *EERI Annual Meeting*, March 23, 2021, virtual.
- C7 Nguyen, M., **Loos, S.**, Lallemand, D. “Modelling spatial correlation in earthquake-induced damage and its impact on regional loss estimation”. **Conference paper** *ICOSSAR 2021-2022, 13th International Conference on Structural Safety & Reliability*.
- C8 Lin, Y, **Loos, S.**, Melville-Rea, H., Crawford, S., Sims, H., Ratner, J. “DAT/Artathon: Turning risk data into visual art”. **Conference panel organizer**, *Understanding Risk 2020*, December 2020, Virtual. Recording online at: <https://understandrisk.org/dat-artathon-turning-risk-data-into-visual-art-2/>
- C9 **Loos, S.**, Lallemand, D., Mccaughey, J., Budhathoki, N., Khan, F., Singh, R., Baker, J. (2020). “Beyond building damage: modeling post-disaster need”. **Conference paper and oral presentation**, *17th World Conference on Earthquake Engineering*. September 2020, Sendai, Japan.
- C10 **Loos, S.**, Lallemand, D., Mccaughey, J., Budhathoki, N., Khan, F. (2020). “Building Transparent, Human-Centric Tools to Rapidly Assess Post-Disaster Impacts and Needs”, **Oral Presentation**, *Natural Hazards Workshop*, July 2020, Broomfield, CO.
- C11 **Loos, S.**, Baker, J., Lallemand, D., Mccaughey, J., Budhathoki, N., Singh, R., Khan, F. (2020). “Post-disaster informatics: a technological approach to recovery planning”, **Session Organizer and Oral Presentation**, *Natural Hazards Workshop*, July 2019, Broomfield, CO.
- C12 **Loos, S.**, Baker, J., Lallemand, D. “Geospatial data integration framework to estimate post-earthquake regional damages”, **Invited Presentation**, *United States Geological Survey*, July 2010, Boulder, CO.
- C13 Yun, SH., Hua, H., Jo, M., Hill, E., Zimmaro, P., Wald, D., **Loos, S.** “Global Rapid Damage Mapping Systems with Spaceborne SAR Data”, **Oral Presentation**, *NASA Disasters Program Kickoff Meeting*, July 2019, Broomfield, CO.
- C14 **Loos, S.**, Lallemand, D., Baker, J., “Rapid integration of post-disaster data: a basis to estimate impact for recovery planning”, **Oral Presentation**, *Geospatial Analysis for International Development*, November 2018, Berkeley, CA. Recording online at https://www.youtube.com/watch?v=M1Q_fQ6UrNk.
- C15 “Spatial integration of post-earthquake building damage data to support response and recovery decisions”, **Invited Presentation**, *American Geophysics Union Fall Meeting*. December 2018, Washington, DC. Poster online at agu2018fallmeeting-agu.ipostersessions.com/Default.aspx?s=B1-03-53-F0-09-A1-8F-DF-B0-63-E7-38-0E-B8-A1-F7.
- C16 **Loos, S.**, Barns, K., Bhattacharjee, G., Soden, R., Herfort, B., Giovando, C., Saito, K., Deierlein, G., Kiremidjian, A., Baker, J., Lallemand, D. (2018). Crowd-Sourced Remote Assessments of Regional-Scale Post-Disaster Damage. **Conference paper and oral presentation**, *Eleventh U.S. National Conference on Earthquake Engineering*. Los Angeles, CA.
- C17 Bhattacharjee, G., Barns, K., **Loos, S.**, Lallemand, D., Deierlein, G., Soden, R. (2018). Developing a User-Centric Understanding of Post-Disaster Building Damage Information Needs. **Conference paper**, *11th U.S. National Conference on Earthquake Engineering*. Los Angeles, CA.

Online Media

- M1 **Loos, Sabine.** (2021). Why you should build your dataviz toolset early. *Institute for the Public Understanding of Risk*. .
- M2 Hivemapper. (2019). Forest Fire Prevention with Hivemapper High-Resolution 3D Maps. <https://blog.hivemapper.com/forest-fire-prevention-with-hivemapper-high-resolution-3d-maps-2eea11e1e0bf>
- M3 **Loos, Sabine,** Barns, K., Koirala, A., 2019. “After the Quake.” <http://afterthequake.surge.sh/>
- M4 **Loos, Sabine** and Lin, Yolanda 2019. “Converging Disaster Researchers in the Asia-Pacific” *Stanford Urban Resilience Initiative*. <https://urbanresilience.stanford.edu/news/converging-disaster-researchers-asia-pacific>.
- M5 **Loos, Sabine.** 2018. “Informing Equitable Disaster Recovery: More than Just Economic Losses.” *Stanford Urban Resilience Initiative*. <https://urbanresilience.stanford.edu/news/informing-equitable-disaster-recovery-more-just-economic-losses>.