Weiwei Zhan, Ph.D.

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RESEARCH INTERESTS

My research interests lie primarily in bringing data science and multidisciplinary metadata into natural hazard engineering. Urban resilience relies on understanding the complex hazard-infrastructure-human interaction mechanisms and spatiotemporally predicting hazard intensity and consequence. My multidisciplinary approach combines remote sensing, signal processing, data assimilation, machine learning, and computational geomechanics, to understand mechanisms of and improve infrastructure resilience to multiple natural hazards, such as earthquake, landslide, liquefaction, and flood.

ACADEMIC POSITIONS

Jan. 2023 – Dec. 2023	**Postdoctoral Fellow**	University of Texas at Austin, USA
	Topic: HPC applications in natural hazard engineering	
	Advisor: Prof. Ellen Rathje	
Mar. 2021– Dec. 2022	**Postdoctoral Scholar**	Tufts University, USA
	Topic: Geospatial natural hazard modeling and uncertainty quantification	
	Advisor: Prof. Laurie Baise	
Jan. 2017 – Dec 2020	**Graduate Research Assistant**	Clemson University, USA
	Topic: Probabilistic liquefaction risk assessment	
	Advisor: Assoc. Prof. Qiushi Chen	
Sep. 2014 – Dec 2016	**Graduate Research Assistant**	Chengdu University of Technology, China
	Topic: Landslide mechanism and risk mitigation design	
	Advisors: Prof. Xuanmei Fan, Prof. Runqiu Huang	

EDUCATION

2020	**Ph.D. in Civil Engineering**	Clemson University, USA
	Thesis: Data-driven assessment of site responses at liquefiable sites	
	Advisor: Assoc. Prof. Qiushi Chen	
2019	**M.Sc. in Civil Engineering** *(non-thesis)*	Clemson University, USA
	Advisor: Assoc. Prof. Qiushi Chen	
2014	**B.S. in Geological Engineering**	Chengdu University of Technology, China
	Thesis: Statistical modeling of coseismic landslide mobility	
	Advisors: Prof. Xiangjun Pei, Prof. Weile Li	

AWARDS & HONORS

2022	Travel Grant for 2022 SimCenter Symposium, NHERI SimCenter (UC Berkeley)
2022	Travel Grant for 12NCEE, Earthquake Engineering Research Institute (EERI)
2016	National Scholarship, Ministry of Education of China

2016	Travel Grant for International Rockslides School, Chengdu University of Technology
2014	Top 10 Bachelor's Thesis (10/8000), Chengdu University of Technology
2014	Meritorious Mention in National Mathematical Modeling Contest, Madio.net
2013	Honorable Mention in the International Mathematics Modeling Competition (MCM/ICM) Consortium for Mathematics and Its Application (COMAP)
2012	Excellent Volunteer, Environmental Protection Agency of Sichuan Province

TEACHING & MENTORING

Teaching

2018 - 2020	**Instructor**, *Soil Mechanics Lab*
2020	Teaching Assistant, *Geotechnical Engineering*
2018 - 2019	Teaching Assistant, *Earth Slopes and Retaining Structures*
2019	Teaching Assistant, *Geotechnical Design*
2018	Teaching Assistant, *Data Mining for System Analytics*
2018	Teaching Assistant, *Uncertainty Modeling in Risk Engineering*
2017	Teaching Assistant, *Fundamentals of Risk Engineering*

Mentoring

2021 - 2022	Mentor for two Ph.D. students at Tufts Univ. (Marshall Pontrelli & Christina Sanon), "*Geospatial Database and Modeling*"
2020	Mentor for two undergraduate student interns at Clemson Univ. (William Luce & Christopher Michael Overton), "*Mechanical Properties of Lunar Regolith Simulants*"
2019	Mentor for three undergraduate student interns at Clemson Univ. (Andrew Bradley, Jason Timberlake, & William Luce), "*CT morphology for Martian Regolith Simulants*"
2018	Mentor for three high school student interns at South Carolina Governor's School for Science and Mathematics (Frankie Hawkesworth, Olivia Hilferty, & Jason Gleaton), "*Strength Tests of Bio-Cemented Martian Regolith Simulants*"

SUCCESFUL PROPOSALS & GRANTS

2022	U.S. Geological Survey Earthquake Hazards Program External Grant *HVSR Site Terms for Nonergodic Ground Motion Models* (Recommended but not funded due to insufficient funds), PI: Laurie Baise & James Kaklamanos
2022	U.S. Geological Survey Earthquake Hazards Program External Grant *Basin Effects in the Central and Eastern United States* (Recommended but not funded due to insufficient funds), PI: Laurie Baise & James Kaklamanos
2021	U.S. Geological Survey Earthquake Hazards Program External Grant, G22AP00048 *Innovative Data-Driven Frameworks for Geospatial Ground Failure Models*, $97,123 (PI: Laurie Baise & Babak Moaveni)
2021	U.S. Geological Survey Earthquake Hazards Program External Grant *Machine Learning Framework for Site Amplification Modeling* (Recommended but not funded due to insufficient funds), PI: Laurie Baise & James Kaklamanos

SUBMITTED PAPERS

2. **Zhan W**, Baise LG, Kaklamanos J. A geospatial model for site response complexity. *Bulletin of the*

Seismological Society of America. (under revision)

1. **Zhan W**, Cochran E. Reducing aleatory uncertainty of ground-motion modeling using gradient boosting model and feature selection techniques. *Bulletin of the Seismological Society of America.* (under revision)

PAPERS IN PREPARATION

2. **Zhan W**, Baise LG, Moaveni B. A Quantifying Uncertainty Framework for Geospatial Natural Hazard Modeling. Targeting *Engineering Geology.*

1. **Zhan W**, Baise LG, Moaveni B, Chansky A, et al. Updating Global Geospatial Liquefaction Models with a Focus on Feature Engineering. Targeting *Engineering Geology.*

PEER-REVIEWED JOURNAL PAPERS

*(*corresponding author)*

14. Zhang L, **Zhan W**, Wang L* (2023). Probabilistic Seismic Analyses of Earthen Levees with Finite Element Modeling. *Marine Georesources & Geotechnology*. (in press).

13. Wu R, Guo C*, Ni J, Song D, **Zhan W**, Zhong N, Yang Z, Li X, Yan Y (2023). Ancient landslide river damming event in the Batang fault zone, Tibetan Plateau. *Bulletin of Engineering Geology and the Environment,* 82: 25.

12. Li W, **Zhan W***, Lu H, Xu Q, Pei X, Wang D, Huang R, Ge D (2022). Precursors to large rockslides visible on optical remote-sensing images and their implications for landslide early detection. *Landslides,* DOI 10.1007/s10346-022-01960-1.

11. Lu J, Li W*, **Zhan W**, Tie Y (2022). Distribution and mobility of co-seismic landslides triggered by the 2018 Hokkaido earthquake in Japan. *Remote Sensing,* 14, 3957.

10. **Zhan W**, Chen Q* (2022). Nonlinear site response on liquefiable sites: insights from downhole seismic observations. *Engineering Geology*, Article 106610.

9. Luo Y, Xu Q, **Zhan W**, Grelle G (2022). Seismic hazard prediction using multispectral amplification maps in a complex topographic area: A case study of Qiaozhuang town, Sichuan Province, Southwest China. *Journal of Mountain Science*, 19: 726–739.

8. Shan S, Pei X, **Zhan W*** (2021). Estimating deformation modulus and bearing capacity of deep soils from dynamic penetration test. *Advances in Civil Engineering*, Article 1082050.

7. **Zhan W**, Chen Q* (2021). Accelerogram-based method for quick assessment of liquefaction occurrence. *Journal of Geotechnical and Geoenvironmental Engineering*, 147 (8): 04021060.

6. Gao G, Meguid MA, Chouinard LE, **Zhan W** (2021). Dynamic disintegration processes accompanying transport of an earthquake-induced landslide. *Landslides*, 18 (3): 909-933.

5. Fan X, **Zhan W***, Dong X, van Westen C, Xu Q, Dai L, Yang Q, Huang R, Havenith HB (2018). Analyzing successive landslide dam formation by different triggering mechanisms: The case of the Tangjiawan landslide, Sichuan, China. *Engineering Geology*, 243: 128-144.

4. Fan X*, Scaringi G, Xu Q, **Zhan W**, Dai L, Li Y, Pei X, Yang Q, Huang R (2018). Coseismic landslides triggered by the 8th August 2017 M s 7.0 Jiuzhaigou earthquake (Sichuan, China): factors controlling their spatial distribution and implications for the seismogenic blind fault identification. *Landslides*, 15(5): 967-983.

3. Meng X, Pei X*, Huang R, Cui S, Zhu L, **Zhan W** (2018). Shear behaviors of rock mass in the interlayer fault zone of Daguangbao landslide. *Journal of Engineering Geology*, 26 (2): 309-318. (in Chinese)

2. **Zhan W**, Fan X*, Huang R, Pei X, Xu Q, Li W (2017). Empirical prediction for travel distance of

channelized rock avalanches in the Wenchuan earthquake area. *Natural Hazards & Earth System Sciences*, 17(6): 833-844.

1. **Zhan W**, Huang R, Pei X, Li W (2017). Empirical prediction model for movement distance of gully-type rock avalanches. *Journal of Engineering Geology*, 25 (1): 154-163. (in Chinese)

PEER-REVIEWED CONFERENCE PAPERS

5. **Zhan W**, Baise LG, Kaklamanos J (2023). Predicting Within-Site Variability of Seismic Site Response Using a Geospatial Modeling Approach, *Geo-Risk 2023*, Arlington, Virginia, July 23-26, 2023. (accepted)

4. **Zhan W**, Zhang L, Wang L (2023). Probabilistic Assessment of Earthen Levees Considering Soil Spatial Variability, *Geo-Risk 2023*, Arlington, Virginia, July 23-26, 2023. (accepted)

3. **Zhan W**, Chen Q (2022). Accelerogram-based method for quick assessment of liquefaction occurrence. *GeoCalgary 2022*, Calgary, Canada, October 2-5, 2022.

2. **Zhan W**, Chen Q (2021). Assessment of liquefaction effects on ground motion frequency parameters for accelerogram-based liquefaction detection, *American Society of Civil Engineers (ASCE) Geotechnical Engineering for Extreme Events (GeoExtreme) 2021*, Savannah, GA, USA, November 7-10, 2021.

1. **Zhan W**, Baise LG, Chen Q, Juang CH, Miao F (2021). Effects of liquefaction-affected ground motions on building fragility curves, *17th World Conference on Earthquake Engineering*, Sendai, Japan, September 27-October 2, 2021.

PRESENTATIONS

Oral presentations

9. **Zhan W**, Baise LG, Moaveni B (2023). A framework for uncertainty quantification of geospatial natural hazard models, *USGS Geologic Hazards Science Center Research Seminar*, Golden, Colorado, USA, January 31, 2023 (Invited talk).

8 **Zhan W**, Baise LG, Moaveni B, Chansky A, et al (2023). Updating Global Geospatial Liquefaction Models with a Focus on Feature Engineering. *Seismological Society of America (SSA) 2023 Annual Meeting*, San Juan, Puerto Rico, April 17-20, 2022.

7 **Zhan W**, Baise LG, Moaveni B (2022). Quantifying epistemic uncertainty for global geospatial liquefaction models, *2022 SimCenter Symposium*, Austin, Texas, USA, November 3-4, 2022.

6. **Zhan W**, Baise LG, Kaklamanos J (2022). A geospatial model for predicting site response complexity. *Seismological Society of America (SSA) 2022 Annual Meeting*, Bellevue, Washington, USA, April 19-23, 2022.

5. **Zhan W**, Chen Q (2021). Assessment of liquefaction effects on ground motion frequency parameters for accelerogram-based liquefaction detection, *American Society of Civil Engineers (ASCE) Geotechnical Engineering for Extreme Events (GeoExtreme) 2021*, Savannah, GA, USA, November 7-10, 2021.

4. Gong, W, **Zhan W**, Wang L, Juang CH (2021). Design of Stabilizing Piles in Earth Slopes Considering Design Robustness, *Engineering Mechanics Institute Conference/Probabilistic Mechanics and Reliability (EMI/PMC) 2021 Conference*, Columbia University, New York City, USA, May 25-28, 2021. (Virtual oral presentation)

3. **Zhan W**, Chen Q (2020). Quick detection of subsoil liquefaction using accelerograms. *2020 AGU Fall Meeting*, San Francisco, CA, USA, December 7-11, 2020. (Virtual oral presentation)

2. **Zhan W**, Chen Q (2020). Coseismic and long-term changes of site response on liquefiable sites: a case study of Onahama Port Array in Japan. *2020 Eastern Section of the Seismological Society of America*

(ES-SSA) Annual Meeting, Atlanta, GA, USA, October 12-16, 2020. (Virtual oral presentation)

1. **Zhan W**, Huang R, Pei X (2015). Study on the Site Effects of Large-scale Landslide movement triggered by Wenchuan Earthquake, *Engineering Geological Disaster Prevention Academic Conference*, Shanghai, China, October 12-14, 2015. (in Chinese)

Poster presentations

4. **Zhan W**, Baise LG, Moaveni B (2023). How to Quantify Uncertainties for Logistic-Regression-Based Geospatial Natural Hazard Models? *Seismological Society of America (SSA) 2023 Annual Meeting*, San Juan, Puerto Rico, April 17-20, 2022.

3. **Zhan W**, Baise LG, Moaveni B (2022). Uncertainty quantification for global geospatial liquefaction models, *Natural Hazards Research Summit 2022*, Washington, DC, USA, October 6-7, 2022.

2. **Zhan W**, Baise LG, Kaklamanos J (2022). Ground-motion modeling using machine learning techniques and geospatial proxies. *Seismological Society of America (SSA) 2022 Annual Meeting*, Bellevue, Washington, USA, April 19-23, 2022.

1. **Zhan W**, Baise LG, Chen Q, Juang CH, Miao F (2021). Effects of liquefaction-affected ground motions on building fragility curves, *17th World Conference on Earthquake Engineering*, Sendai, Japan, September 27-October 2, 2021. (Virtual poster presentation)

PROFESSIONAL SERVICE

Convener	2022 SSA Session "Advances in Geospatial Modeling of Seismic Hazards"
Convener	2022 SSA Special Interest Group Discussion "Modeling of Seismic Site Amplification using AI"
Reviewer	2023 ASCE Geo-Risk, Engineering Geology, Landslides, Lithology, Natural Hazards, Frontiers in Earth Science, Bulletin of Engineering Geology and the Environment, Arabian Journal of Geosciences, Advances in Civil Engineering, Stochastic Environmental Research and Risk Assessment, etc.
Vice President	ASCE Geo-Institute Clemson University Graduate Student Organization
Member	American Society of Civil Engineers Geo-Institute (ASCE G-I)
Member	Earthquake Engineering Research Institute (EERI)
Member	Seismological Society of America
Member	American Geophysical Union

LANGUAGES & SKILLS

Languages: English (fluent), Chinese (native)

Scientific Programming: Python, R, Matlab, Tcl, Git

Numerical Simulation Tools: OpenSees, FLAC, Abaqus, PFC

Geospatial Analysis Tools: Google Earth Engine, ArcGIS, GeoPandas

Remote Sensing Techniques: Unmanned Aerial Vehicle (UAV), 3D Laser Scanning, Ground-based Synthetic Aperture Radar (GBSAR)

Geotechnical Tests: Scanning Electron Microscope (SEM), Energy Dispersive X-ray, Computerized Tomography (CT) Scan, Direct Shear Test, Cyclic Triaxial Test

REFERENCES

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