Zihui Ma

415-990-9440 | zma88@umd.edu | Zihui Ma

RESEARCH INTERESTS

My primary research thrust revolves around the effective utilization of human-generated data, with a specific emphasis on harnessing crowdsourced information. My objective is twofold: firstly, to advance our comprehension of community resilience and to facilitate informed decision-making and management strategies for natural disasters and unforeseen events. Secondly, to explore citizen awareness of climate change adaptations, with a vision of contributing to a sustainable future. At the core of my research lies a robust data-driven framework, encompassing cutting-edge techniques such as machine learning, deep learning, and epidemic modeling. My research interest extends across several pivotal domains: computational simulations for infrastructure reliability, AI-enabled risk assessment and monitoring, and transforming education with AI.

ACADEMIC APPOINTMENTS

University of Maryland – College Park 2020 – Present
Graduate Research Assistant *College park, MD*
University of Maryland – College Park 2019 – 2020
Graduate Teaching Assistant *College park, MD*

EDUCATION

University of Maryland – College Park
Ph.D. in Civil Engineering Expected May 2024
Thesis: Building Resilient Communities in Face of Wildfire: Leveraging Social Media Data for Situational Awareness Enhancement
Advisor: Gregory B. Baecher, PhD, NAE, Dist.M.ASCE
M.S. in Civil Engineering 2018 – 2020
Thesis: Reliability-Based Modeling for Missouri River Dam System
Advisor: Gregory B. Baecher, PhD, NAE, Dist.M.ASCE

San Francisco State University
M.S. in Civil Engineering 2015 – 2017
Thesis: Real-time Non-intrusive Information Extraction for Highway Trucks
Advisor: Zhaoshuo Jiang, PhD, PE, LEED AP

San Francisco State University. and Zhejiang University of Science and Technology
B.S in Civil Engineering 2011 – 2015
Joint degree program
Dean's list student

AWARDS & HONORS

Future Faulty Fellowship, A. James Clark school of Engineering, University of Maryland 2022

Undergraduate Seismic Design Competition (Rank #28), Earthquake Engineering Research Institute (EERI) 2015

Foreign Exchange Scholarship (First-class), Zhejiang University of Science and Technology 2013

INDUSTRY EXPERIENCE

Staff Engineer, Yu&Associates, Inc., Elmwood Park, NJ 2017 – 2018

Staff Engineer, JHB Engineering, Montebello, NY 2017

Intern, Zhejiang Jianjing Investment & Consultation Co. Ltd, Zhejiang, China 2018

KEY RESEARCH EXPERIENCE

Wildfire Situational Awareness and Evacuation Assessment 2021 – Present

Dissertation project, conducted at Univ. of Maryland – College Park

- Utilize advanced machine learning tools to investigate spatial-temporal patterns in Twitter community responses during wildfire seasons
- Integrate with epidemiology models and social media data to quantitatively measure community resilience at city-level scale
- Propose a real-time evacuation mapping system to discover patterns in evacuations induced by wildfires

Ex-Post Project Risk Management Performance Evaluation 2022 – 2023

Research project, conducted at Univ. of Maryland – College Park and Build American Center (BAC)

- Develop a data-drive metric that identify the types of risk project manager

COVID-19 Lockdown Policy Agreement and Vaccine Acceptance Assessment 2021 – 2022

Research project, conducted at Univ. of Maryland – College Park

- Apply social media data to evaluate social distance and monitor the risk of human interactions during the pandemic.
- Developed a rapid assessment model to investigate public vaccine acceptance at city and county levels

Blackout Responses and Community Resilience Assessment 2019 – 2020

Research project, conducted at Univ. of Maryland – College Park

- Analyze community resilience by accessing the human mental outlooks and behavioral patterns with Twitter data in the 2019 NYC blackout

Missouri River Dam System Simulation 2019 – 2020

Master's research conducted at Univ. of Maryland – College Park

Sponsor: US Army Corps of Engineers (USACE)

- Built a Monte Carlo simulation model for reliability analysis of dam operations on Missouri River

TEACHING & MENTORING

Teaching

Teaching Assistant, *Project Cost Accounting and Finance* 2019 – Present

Teaching Assistant, *Introduction to Project Management* 2022 – Present
Teaching Assistant, *Legal Aspects of Architectural and Engineering Practice* 2022
Course designer, edX course – Developing the Risk Management Plan with Expert Judgement (launched Sep.30, 2022) 2021 – 2022

Mentoring
Mentor for one graduate students at Univ. of Maryland – College Park, "Impact of hurricanes on healthcare facilities" 2023 – Present
Mentor for one undergraduate students at Univ. of Maryland – College Park, "The application of natural language processing in nature disaster" 2022 – Present
Mentor for one undergraduate students at Univ. of Maryland – College Park, "Misinformation in pandemic" 2021

PAPERS IN PREPARATION & PREPRINTS

1. **Ma, Z.***, Li, L., Hemphill, L., & Baecher, G. B. (2023). "Investigating disaster response through social media data and the Susceptible-Infected-Recovered (SIR) model: A case study of 2020 Western U.S. wildfire season" (arXiv:2308.05281). arXiv. https://doi.org/10.48550/arXiv.2308.05281, intended for *Sustainable Cites and Society*
2. Fan, L., Li, L., **Ma, Z.**, Lee, S., Yu, H., & Hemphill, L. (2023). A Bibliometric Review of Large Language Models Research from 2017 to 2023 (arXiv:2304.02020). arXiv. https://doi.org/10.48550/arXiv.2304.02020, intended for *Transactions on Information Systems*
3. **Ma, Z.,** Li, L., Mao, Y., Wang, Y., Patsy, O. G., Bensi, M. T., Hall, M. A., & Baecher, G. B. "A survey of using social media data and natural language processing techniques to investigate natural disasters. Intended for *Natural Hazard Review*
4. **Ma, Z.*,** Li, L., John, J. Thriving in a pandemic: Lessons learned from students' perceptions in a resilient university program seen through the CoI lens. Intended *Computers in Human Behavior*
5. Li, L., Gao, L., Zhou, J., **Ma, Z.**, Choy, D. F., & Hall, M. A. (2021). Can Social Media Data Be Utilized to Enhance Early Warning: Retrospective Analysis of the U.S. Covid-19 Pandemic (p. 2021.04.11.21255285). https://doi.org/10.1101/2021.04.11.21255285

JOURNAL PAPERS

*(*corresponding author)*
1. Erfani, A., **Ma, Z.**, Cui, Q., & Baecher, G. B. (2023). Ex Post Project Risk Assessment: Method and Empirical Study. *Journal of Construction Engineering and Management*, *149*(2), 04022174. https://doi.org/10.1061/JCEMD4.COENG-12588
2. Li, L., Mao, Y., Wang, Y., & **Ma, Z.** (2022). How has airport service quality changed in the context of COVID-19: A data-driven crowdsourcing approach based on sentiment analysis. *Journal of Air Transport Management*, 102298. https://doi.org/10.1016/j.jairtraman.2022.102298
3. Li, L., Zhou, J., **Ma, Z.**, Bensi, M. T., Hall, M. A., & Baecher, G. B. (2022). Dynamic assessment of the COVID-19 vaccine acceptance leveraging social media data. *Journal of Biomedical Informatics*, *129*, 104054. https://doi.org/10.1016/j.jbi.2022.104054
4. Li, L., **Ma, Z.**, Lee, H., & Lee, S. (2021). Can social media data be used to evaluate the risk of human interactions during the COVID-19 pandemic? *International Journal of Disaster Risk Reduction*, *56*, 102142. https://doi.org/10.1016/j.ijdrr.2021.102142

5. Li, L., **Ma, Z**., & Cao, T. (2021). Data-driven investigations of using social media to aid evacuations amid Western United States wildfire season. *Fire Safety Journal*, *126*, 103480. https://doi.org/10.1016/j.firesaf.2021.103480
6. Li, L., **Ma, Z.,** & Cao, T. (2020). Leveraging social media data to study the community resilience of New York City to 2019 power outage. *International Journal of Disaster Risk Reduction*, *51*, 101776. https://doi.org/10.1016/j.ijdrr.2020.101776

CONFERENCE PAPER

1. **Ma, Z.,** Li, L., Yuan, Y.,and Baecher, G.B. (2023). "Appraising Situational Awareness in Social Media Data for Wildfire Response", ASCE Inspire conference, Arlington, Virginia, November 16 – 18, 2023 (*accepted*)
2. Li, L., **Ma, Z.,** Bensi, M. T. and Baecher, G. B. (2023). "Social Media Crowdsourcing for Damage Assessment Following Earthquake Disasters", Geo-risk 2023, Arlington, Virginia, July 23-26 (*feature paper & plenary presentation, 9 of 163 papers)*
3. Erfani, A., **Ma, Z.**, Cui, Q., & Baecher, G. B. (2023). "Data-Drive Evaluation of Project Risk Registers: Theory, Method, and Case Studies", Geo-risk 2023, Arlington, Virginia, July 23-26.
4. **Ma, Z.,** Patev, R.C., Li, L., and Baecher, G.B. (2022). "Missouri River System Simulation", US Society on Dams Annual Conference, San Diego, April 11-14.

PRESENTATIONS

*(*presenter)*

1. **Ma, Z.*,** Li, L., Yuan, Y.,and Baecher, G.B. (2023). "Leveraging social media data for enhancing wildfire situational awareness", Natural Hazard Workshop, Broomfield, Colorado, USA, July 12-13, 2023. (*Oral presentation*)
2. **Ma, Z.*,** Li, L., Yuan, Y.,and Baecher, G.B. (2023). "Appraising Situational Awareness in Social Media Data for Wildfire Response", ASCE Inspire Conference, Arlington, Virginia, November 16-18, 2023 (*Poster presentation*)
3. Erfani, A., **Ma, Z.***, Cui, Q., & Baecher, G. B. (2023). "Data-Drive Evaluation of U.S. Major Transportation Project Risk Registers", Geo-risk 2023, Arlington, Virginia, July 23-26. (*Oral presentation*)
4. **Ma, Z.*,** Li, L., Bensi, M. T., Hemphill, L. and Baecher, G. B. (2023). "Epidemic model for disaster response in Twitter community: experiment in 2020 Western U.S. wildfire season", AGU Fall Meeting 2023, San Francisco, California, December 11-15, 2023. (S*ubmitted*)
5. **Ma, Z.*,** Li, L., John, J. (2023). "The impact of the COVID-19 Pandemic on Student's expectations", Affordable Degrees-at-Scale Symposium, USA, December 4-6. (*Submitted*)

ONLINE MEDIA

The research studying on wildfire evacuation patterns was reported by the *Engineering at Maryland* magazine as a part of the "Pending Disaster" feature story for the Fall 2021 issue.

SKILLS & CERTIFICATES

Software: Python, R, Tableau, AutoCAD, Revit, MATLAB/Simulink, GoldSim^{TM}, ArcGIS, Sap2000
Language: English, Chinese (Mandarin)
Certificate: Engineer-in-Training (Civil), CA|#159139