

Zihui Ma

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EDUCATION

University of Maryland – College Park

Ph.D. in Civil Engineering

Expected May 2024

Dissertation: *“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

RESEARCH INTERESTS

- Informed Crisis/Emergency Response and Recovery
- Computational Social Science and Communication Strategy
- Infrastructure Sustainability, Resilience, and Equity
- Climate Change Mitigation and Adaptations
- Data-driven Project Risk Assessment and Monitoring
- Urban Informatics and City Planning
- AI-enabled Higher Education

ACADEMIC APPOINTMENTS

University of Maryland – College Park

2020 – Present

Graduate Research Assistant

University of Maryland – College Park

2019 – 2020

Graduate Teaching Assistant

KEY RESEARCH EXPERIENCE

Wildfire Situational Awareness and Evacuation Assessment

2021 – Present

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

- Utilized advanced machine learning tools to investigate spatial-temporal patterns in Twitter community responses during wildfire seasons
- Integrated epidemiology models and social media data to quantitatively measure community resilience at city scale
- Proposed 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)

- Developed data-drive metrics 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

- Applied 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

- Analyzed 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

PAPERS IN PREPARATION & PREPRINTS

(*corresponding author)

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 Cities and Society (*Submitted*).
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 (*Under review*).
3. **Ma, Z.***, Li, L., Mao, Y., Wang, Y., Patsy, O. G., Bens, 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 (*Submitted*).
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

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., **Ma, Z.**, Fan, L., Lee, S., Yu, H., & Hemphill, L. (2023). ChatGPT in education: A discourse analysis of worries and concerns on social media. *Education and Information Technologies* (Accepted)
3. 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>
4. 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>
5. 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>
6. 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>
7. 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 & INVITED TALK

(*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*)

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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. (*Submitted*)
 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. (*Accepted*)
 6. **Ma, Z. *** “Investigating disaster response through social media data and the Susceptible-Infected-Recovered (SIR) model”, invited presentation to co-host seminar by the Center for Disaster Resilience and Center for Risk and Reliability, University of Maryland, September 20, 2023.

TEACHING & MENTORING

Teaching

Teaching Assistant, <i>Project Cost Accounting and Finance</i>	2019 – Present
Teaching Assistant, <i>Introduction to Project Management</i>	2022 – Present
Teaching Assistant, <i>Introduction to Construction Management</i>	2023
Teaching Assistant, <i>Legal Aspects of Architectural and Engineering Practice</i>	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

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

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.

SERVICE TO PROFESSION

Journal Article Reviewer

- International Journal of Disaster Risk Reduction
- International Journal of Transportation Science and Technology
- Intelligent Automation & Soft Computing
- Computers, Materials & Continua

Conference Proceeding Reviewer

- 12NCEE National Conference on Earthquake Engineering

LEADERSHIP & ACTIVITIES

A member of Graduate Assistant Advisory Committee (GAAC)

2022 – present

INDUSTRY EXPERIENCE

Staff Engineer, Yu&Associates, Inc., Elmwood Park, NJ

2017 – 2018

- Overseen the preliminary subsurface investigation of various construction projects, e.g.,
 - *the rehabilitation of Throgs Neck Bridge*
 - *reconstruction of the playground in Bensonhurst Park*
 - *construction of new facilities at the Springfield Gardens United Methodist Church*
- Provided support to the senior project manager for boring location plans and soil profiles drawing
- Conducted cost estimation for bidding proposals and geotechnical report

Staff Engineer, JHB Engineering, Montebello, NY

2017

- Conducted field readings and building condition inspection survey during the pre-construction phase
- Performed excavation and foundation design
- Managed daily logistics and collaborated with external contractors during construction to resolve issues and enhance project timelines

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

2018

- Provided assistant in project planning, scheduling, and coordination
- Reviewed all requests for information and change requests, providing timely and appropriate responses

SKILLS & CERTIFICATES

Software: Python, R, Tableau, AutoCAD, Revit, MATLAB/Simulink, GoldSim, ArcGIS, Sap2000

Language: English, Chinese (Mandarin)

Certificate: Engineer-in-Training (Civil), CA/#159139