Mengling Qiao

Associate Research Scientist

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CORE COMPETENCIES

- Data-Driven Strategy & Decision Support • Sustainability & Climate Risk Advisory • Urban & Infrastructure Analytics • Human Behavior & Market Dynamics Analysis

EDUCATION

Wuhan University | *Direct-Entry Ph.D. in Geographic Information Science* | *CN* — *Sept. 2015 - Dec. 2020*

- ***Awards***: Recipient of 4 graduate studies scholarships×4 (10%, *CNY 40k*), The Scholarship for Outstanding Freshmen (5%, *CNY 20k*)

Nanjing Normal University | *B.Sc. in Geographic Information Science* | *CN* — *Sept. 2011 - Jun. 2015*

- ***Awards***: Recipient of Talent Scholarship (1%, *CNY 3k*), Outstanding Student Scholarship (2%, *CNY 3k*), National Encouragement Scholarship (1%, *CNY 5k*)

EXPERIENCE

Columbia University in the City of New York — *New York, U.S.*

Associate & Postdoctoral Research Scientist | *Earth and Environmental Engineering* — *Jan. 2023 - present*

Guest Lecturer | *Civil Engineering & Engineering Mechanics* | *Data Science Institute* — *Jan. 2023 - Dec. 2024*

- **Secured & executed multi-institutional projects**: Co-led two cross-regional funded projects (*$600K*) on data-driven disaster planning, working with PI and international partners in Japan and Taiwan. Defined technical strategy and coordinated execution, directly shaping the project's direction and ensuring delivery of all major milestones.
- **Directed large-scale evidence synthesis**: Led synthesis of *900+* academic papers and *400+* industry and government reports to inform cross-agency infrastructure resilience strategies. Produced actionable insights that shaped project deliverables and cross-agency stakeholder decision-making.
- **Driving proposal development& collaboration**: Coordinating 3+ multi-disciplinary teams to develop a competitive NSF $500K proposal, managing research design, writing, and data strategy to align with funding priorities. (ongoing)
- **Designed and taught *3* graduate modules** in *3* semesters, created hands-on exercises and project rubrics to improve student project outcomes.

The Hong Kong University of Science and Technology — *Hong Kong, SAR*

Postdoctoral Fellowship | *Computer Science & Engineering* — *Jul. 2022 - Jan. 2023*

- **Supported AR/VR visualization**: Contributed to the computer science team's visualization projects via literature review, user-testing protocols, and feedback analysis to inform design iterations for decision support.
- **Advanced cross-disciplinary health research**: Provided geospatial and computational insights to a public health project on COVID-19 mental health in elderly ethnic groups, enabling feasibility and implementation improvements.
- **Delivered ahead-of-schedule results**: Accelerated the public health project progress by *4 months* beyond the proposal plan through analytical design, feasibility testing, and coordination of complex fieldwork logistics ahead of the original proposal timeline, while coordinating complex fieldwork logistics.
- **Awards:** Recipient of the Research Talent Hub of Hong Kong (*HKD 431k+*)

The Chinese University of Hong Kong — *Hong Kong, SAR*

Postdoctoral Fellowship | *Geography and Resource Management* — *Jun. 2021 - Jul. 2022*

- **Led high-impact COVID-19 research**: Served as primary technical lead on *HKD 3.51M* cross-disciplinary project on nonpharmaceutical interventions, human mobility, and behavioral change. Designed and implemented 2 complete research solutions within one year and published 2 top-tier papers that contributed to academic and policy discussions on pandemic response strategies.
- **Integrated data science into public health policy**: Delivered weekly progress briefings to PI, translating geospatial and behavioral insights into actionable strategies for pandemic resurgence prevention.
- **Delivered invited talks**: Delivered invited talks at multiple universities to disseminate findings.

PROJECTS

Urban Infrastructure Risk & Recovery Analytics GitHub — *National Science Foundation (2023–2024)*

- Conducted large-scale analysis of 3M+ multimodal transport records to identify disruptions and recovery patterns.
- Quantified disaster impacts and recovery, delivering resilience strategies for agencies and insurers.

Climate & Social Risk Modeling for City Safety — *United States-Japan Foundation (2023–2024)*

- Developed models on 15 years of socio-environmental data, improving predictive reliability by *3~5x* over benchmarks.

- Generated actionable safety forecasts to support urban planning decisions and ESG risk assessments.

Community Vulnerability Index for Health & Equity *The Chinese University of Hong Kong (2021–2022)*

- Developed vulnerability indices integrating mobility and demographics, achieving 60% stronger correlation with health outcomes vs. traditional measures.
- Delivered an enhanced modeling framework that outperformed baselines by 120% and enabled policymakers to allocate resources more effectively during COVID-19.

Housing Market Risk Forecasting & Investment Insights *Wuhan Natural Resource & Planning Bureau (2018–2019)*

- Designed forecasting model on 30K+ property transactions, reducing error rates by 25%.
- Provided early-warning insights on housing price shifts to inform investment and lending decisions.

ESG Data Innovation: Sentiment, Equity & Urban Well-being *Multiple Studies (2018–2025)*

- **Risk & Sentiment Modeling:** Applied NLP and geospatial analytics on 10M+ social media posts to capture real-time sentiment around extreme weather, strengthening ESG disclosure and communication.
- **Street View–Driven Well-being Insights:** Built computational frameworks integrating 166K+ street view images, 125K+ building footprints, and 1.6M+ social media signals; identified key thresholds (e.g., green view optimal at 45%) linking the built environment to human well-being, supporting ESG benchmarks.
- **Economic Segregation Analysis:** Developed equity metrics from 15M+ human activity records, 121K+ customer reviews, and 39K+ housing transactions, revealing hidden inequities that informed social sustainability assessments.

HIGHLIGHTS

- ***Team Leadership***: Led applications for 3 grant attempts (1 funded, 1 under review); As PI for the 1 funded research project; Led a capstone project ranked 1st of 6 teams; Supervised 3 graduate-level training projects on NLP, ML/DL, and Graph Theory (delivered 32+ invited classes for 30+ graduates), led to 2 publications and prototype deployments; mentoring 2 graduate students at the Data Science Institute.
- ***Cross-Functional Engagement***: Designed and led a 4-hour hands-on workshop on "ML/DL for socio-environmental data analytics" at I-GUIDE Forum 2025, training 15+ participants.
- ***Project Delivery***: Acted as lead representative in a multi-PI research collaboration team, regularly presenting and coordinating across faculty and researchers; Managed multiple concurrent research timelines across universities and international collaborators, consistently delivering output on time.
- ***Research Impact***
  - Published 15+ peer-reviewed papers in top outlets and 2 book chapters, advancing methods in data-driven spatiotemporal analytics and resilient human-environment systems. *Full list: Google Scholar*
  - Delivered 10+ presentations at international conferences.
  - Served as Guest Editor for Applied Science Special Issue "Geospatial Data Processing, Mining and Application".
  - Reviewer of 12+ international journals, delivering 40+ review reports
- ***Interests:*** Hiking, Nature Scene, Traveling, Boxing, Billiards, Reading

SKILLS

- **Analytical & Modeling Skills**
  - ***Data Science***: Machine/Deep learning, Time-series & geospatial analytics, NLP (BERT, LLM, Sentiment & Topic Modeling), Statistical modeling (Causal inference, Multivariate analysis), Network analysis.
  - ***Analysis & Strategy***: Policy analysis, Risk assessment, Performance metrics design, Workflow optimization. Translating analytical results into action-oriented insights for stakeholders.
- **Technical Proficiency**
  - *Languages*: Python (10+ yrs), R, SQL, C#, Java
  - *Libraries/Frameworks*: PyTorch, TensorFlow, Hugging Face Transformers, scikit-learn, NumPy, Pandas.
  - *Databases & Platforms*: Jupyter, MongoDB, Oracle
  - *GIS & Visualization*: ArcGIS, QGIS, Gephi, Origin, advanced geospatial visualization.

SELECTED PUBLICATIONS

J=JOURNAL, B=BOOK, *Full list: Google Scholar*

J1. **Qiao M.*,** Haraguchi M., Lall U. Resilience of Critical Infrastructure under Compound Climate Hazards: Interdependency, Cascading Failures, and Multi-Dimensional Impacts. (*Under Review*)

J2. **Qiao M.,** Huang B. Assessment of community vulnerability during the COVID-19 pandemic: Hong Kong as a case study. *International Journal of Applied Earth Observation and Geoinformation*. 2022, 113: 103007.

B1. Fu X., **Qiao M.,** Chen K., Huang X. Enhanced Disaster Monitoring Through Earth Observation and Social Sensing Integration in *Data-Driven Earth Observation for Disaster Management: From Theory to Practical Applications*, Elsevier, Publication Date: 01-Apr-26. ISBN: 9780443338038.