Qianyi Liu

Ph.D. Student, Department of Civil Engineering, Stony Brook University
qianyi.liu@stonybrook.edu | Stony Brook, NY, USA | ASCE Student Member | AGU Student Member

EDUCATION

Stony Brook University 08/2025–Present
Ph.D. in Civil Engineering; GPA: 4.00/4.00 *Stony Brook, NY, USA*
- Research focus: geotechnical/geohazard engineering, landslide susceptibility mapping, GIS, spatial machine learning, causal and explainable AI. Advisor: Prof. Te Pei.

University of Macau 08/2023–06/2025
M.S. in Coastal Environment and Safety; GPA: 3.25/4.00 *Macau, China*
- Relevant modules: Hydrodynamics and Floods (A); Advanced Computational Methods: Principles and Applications (A-).

Capital University of Economics and Business 09/2019–06/2023
B.Eng. in Safety Engineering; GPA: 3.81/5.00 (88.2/100) *Beijing, China*
- Relevant modules: Electrical Safety Engineering (100), Systems Engineering (100), Engineering Drawing II (99), Python Data Analysis (93).

RESEARCH INTERESTS

Geotechnical engineering; landslide susceptibility mapping; geohazard assessment; trustworthy AI; causal and explainable machine learning; spatially aware machine learning; GIS and remote sensing; hydrodynamic and compound-flood modeling; spatial cross-validation; SHAP analysis; infrastructure resilience.

RESEARCH EXPERIENCE

Landslide Susceptibility Mapping and Geohazard Assessment 08/2025–Present
Ph.D. Researcher, Stony Brook University *Stony Brook, NY, USA*
- Developing geospatial machine-learning workflows for landslide susceptibility and slope-related geohazard assessment, emphasizing physically meaningful, spatially robust, and interpretable outputs.
- Integrating terrain, hydrological, soil-related, vegetation, and rainfall-related factors to analyze spatially varying slope-instability mechanisms.
- Applying spatial cross-validation, explainable AI, causal-graph analysis, and GIS-based mapping to improve model reliability and engineering interpretability.

Flood Susceptibility Mapping with Explainable Ensemble Machine Learning 08/2023–08/2024
Research Assistant, University of Macau *Macau, China*
- Conducted research on flood susceptibility mapping using GIS, multi-source environmental data, hydrodynamic modeling, and explainable ensemble machine-learning methods.
- Developed flood susceptibility maps for the Greater Bay Area / Pearl River Delta case study and analyzed feature contributions using SHAP-based interpretation.

Smart Emergency Response Development Strategy (2035) 09/2020–10/2020
National Key Project; Team Member; Lead: Academician Weicheng Fan *China*
- Synthesized national macro policies related to smart emergency management and contributed to drafting the policy environment and national demand section for smart emergency development.

PUBLICATIONS AND MANUSCRIPTS

Peer-Reviewed Journal Articles

- **Liu, Q.**, Gao, L., Du, H., Pei, T., Kuok, S.-C., & Chen, S. (2026). Integrating explainable ensemble machine learning with hydrodynamic modeling to assess tropical cyclone-induced flood susceptibility. *Geoscience Frontiers*, 17(5), Article 102355. https://doi.org/10.1016/j.gsf.2026.102355.
- Ma, S., **Liu, Q.**, & Zhang, Y. (2021). A prediction method of fire frequency: Based on the optimization of the SARIMA model. *PLOS ONE*, 16(8), Article e0255857. https://doi.org/10.1371/journal.pone.0255857.

Manuscripts Under Review

- **Liu, Q.**, Liu, X., Cui, H., Tian, Y., Devineni, N., & Pei, T. (2026). *Spatially Robust Explainable Machine Learning for Landslide Susceptibility Mapping: Interpreting Spatially Heterogeneous Controls*. Submitted to *Bulletin of Engineering Geology and the Environment*. Status: Under Review.
- Du, H., Fei, K., **Liu, Q.**, & Zhang, L. (2026). *Tropical Cyclone-Induced Compound Flooding Reveals Critical Flood Zone Transitions in the Pearl River Delta*. Submitted to *Ocean Engineering*. Status: Under Review.

CONFERENCE ABSTRACTS AND PRESENTATIONS

- **Liu, Q.**, Liu, X., Pei, T., Devineni, N., & Tian, Y. (2025). Understanding Geo-Environmental Factors for Landslide Occurrences Using Geographically Explainable AI: A Case Study from the Northeastern United States. *AGU Fall Meeting Abstracts*, 2025, NH33F-0502.
- **Liu, Q.**, Liu, X., & Pei, T. (2026). Uncovering Spatial Heterogeneity in Landslide Controls through a Causality-Aware and Explainable Machine Learning Framework. 2026 NSF NHERI GSC Mini-Conference.
- **Liu, Q.**, Liu, X., & Pei, T. (2026). Trustworthy AI for Geohazard Mitigation: A Causal and Explainable Framework for Landslide Susceptibility Mapping. SUNY AI Symposium.
- **Liu, Q.**, Liu, X., Pei, T., Devineni, N., & Tian, Y. (2027). Physics-Guided and Spatially Aware Machine Learning for Trustworthy Landslide Susceptibility Mapping in Heterogeneous Terrain. ASCE 2027 Abstract.
- **Liu, Q.**, Liu, X., Pei, T., Cui, H., Devineni, N., & Tian, Y. (2027). Causality-Constrained Explainable Machine Learning for Identifying Spatially Varying Controls in Landslide Susceptibility Mapping. ASCE 2027 Abstract.

TEACHING EXPERIENCE

Department of Civil Engineering, Stony Brook University 08/2025–Present
Teaching Assistant *Stony Brook, NY, USA*
- Support course instruction, grading, laboratory/problem-solving sessions, and student guidance for undergraduate civil engineering courses.
- Help students connect experimental or computational results with civil engineering concepts and reporting standards.

ACADEMIC SERVICE

2026 NSF NHERI GSC Mini-Conference 04/2026
Reviewer, NSF NHERI Graduate Student Council
- Reviewed student conference submissions and contributed to the academic review process for the 2026 NHERI GSC Mini-Conference.

ADDITIONAL PROFESSIONAL EXPERIENCE

China Aerospace Construction Group Co., Ltd. 06/2022–07/2022; 09/2022–10/2022
Intern *Beijing, China*
- Compiled safety inspection records for the Pinggu Men Station natural gas project, organized ledgers, and developed educational safety materials and emergency response plans.
- Supported implementation of corporate safety protocols and enhanced execution methods for safety management under pandemic-related constraints.

Beijing GuoXinAn Technology Co., Ltd. 07/2021–08/2021
Intern *Beijing, China*
- Assisted SMEs with risk-source declaration in Changping District through direct offline engagement and online reporting support.
- Supported community-level enterprise safety and regional risk management practices.

AWARDS AND HONORS

- First Place, Individual Poster Presentation, 2026 NSF NHERI GSC Mini-Conference, 2026.
- Second Prize, National College Students' Mathematics Modelling Competition, Team Leader, 09/2021.
- Second Prize, National College Students' Mathematics Modelling Competition, 09/2020.
- Honorable Mention, Mathematical Contest in Modeling (MCM/ICM), 09/2021.
- Second Prize, Beijing Energy Conservation and Emission Reduction Competition, Team Leader, 09/2021.
- Key Project Leader, Summer Social Practice by the College, 09/2021.

PROFESSIONAL MEMBERSHIPS

- American Society of Civil Engineers (ASCE), Student Member.
- American Geophysical Union (AGU), Student Member.

TECHNICAL SKILLS

- **Geospatial analysis:** ArcGIS Pro, ArcMap, GIS-based spatial analysis, raster data processing, susceptibility mapping.
- **Programming and data analysis:** Python, Jupyter Notebook, MATLAB, statistical analysis, Microsoft Office Suite.
- **Machine learning and interpretation:** Ensemble machine learning, trustworthy AI, causal and explainable AI, SHAP analysis, model evaluation and visualization.
- **Specialized software:** SPSS, Stata, Citespace, Origin. **Languages:** Mandarin Chinese (native), English (fluent). **Certificates:** CET-4, CET-6.

SELECTED INTERESTS

Swimming; model aviation; Pokemon Trading Card Game.