

JINXIN CHEN

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RESEARCH PROFILE

Ph.D. candidate in Civil Engineering with research expertise in AI-assisted structural design, machine learning for reinforced concrete and ultra-high-performance concrete (UHPC) structures, and automated interpretation of structural design codes. Research integrates multi-agent large language models, data-driven methods, physics-based models, knowledge representation, and structural engineering principles to support code-compliant design automation and infrastructure decision-making.

EDUCATION

Stevens Institute of Technology - Ph.D. Candidate in Civil Engineering GPA: 3.9/4.0	Jan. 2024 - Present
University of Maryland - Ph.D. Student in Civil Engineering	Sep. 2023 - Dec. 2023
South China University of Technology - Master of Engineering in Civil Engineering GPA: 3.8/4.0	Sep. 2019 - Jun. 2022
Anhui Jianzhu University - Bachelor of Engineering in Civil Engineering GPA: 3.0/4.0	Sep. 2015 - Jun. 2019

RESEARCH INTERESTS

- AI-assisted structural design and code-compliant automation
- Reinforced concrete, UHPC, and composite structures
- Computational structural engineering and structural optimization
- Machine learning, multi-agent LLMs, and knowledge-based systems for structural engineering

RESEARCH EXPERIENCE

Ph.D. Researcher, Stevens Institute of Technology Civil Engineering	Jan. 2024 - Present
• Developed an AI copilot research framework for automated building design in ETABS using knowledge graphs and numerical models. • Developed multi-agent large language model frameworks for code-compliant automated design of reinforced concrete and UHPC structures. • Integrated data-driven models, physics-based models, and engineering constraints to support automated structural design workflows. • Built domain-specific methods for structural design code interpretation, including LLM-based and retrieval-augmented approaches. • Investigated dataset representation bias and model generalizability in machine learning models for UHPC beam flexural property prediction.	
Graduate Researcher, South China University of Technology Civil Engineering	Sep. 2019 - Jun. 2022
• Led the implementation of concrete-filled steel tubular (CFST) fire-resistance and axial-load tests. • Led the core machine learning modeling and implementation for fire-resistance prediction of CFST columns, including ensemble learning, model interpretation, and open-source tool development. • Developed an integrated machine learning pipeline for shear strength prediction of RC beams strengthened with FRCM. • Led the core model-development and data-augmentation workflow for predicting ultimate conditions of FRP-confined recycled aggregate concrete using boosting models and tabular generative adversarial networks.	

REFEREED JOURNAL PUBLICATIONS

- [1] **Chen, J.X.** & Bao, Y. (2026). Artificial intelligence design agent for automated operation of structural software using knowledge graphs and numerical models. *Automation in Construction*, 190, 107144.
- [2] **Chen, J.X.** & Bao, Y. (2026). Multi-agent coordination of data-driven and physics-based models for automated design of ultra-high-performance concrete beams. *Advanced Engineering Informatics*, 71, 104297.

- [3] Poorghasem, S., Liu, Y., Jiang, Z., **Chen, J.X.**, & Bao, Y. (2026). Machine learning-based automatic detection and prediction of cracks and corrosion using spatiotemporal measurements from distributed fiber optic sensors. *Automation in Construction*, 181, 106679.
- [4] **Chen, J.X.** & Bao, Y. (2025). Multi-agent large language model framework for code-compliant automated design of reinforced concrete structures. *Automation in Construction*, 177, 106331.
- [5] **Chen, J.X.** & Bao, Y. (2025). Effect of dataset representation bias on generalizability of machine learning models in predicting flexural properties of ultra-high-performance concrete beams. *Engineering Structures*, 326, 119508.
- [6] **Chen, J.X.** & Zhao, X.Y. (2022). A general integrated machine learning pipeline: Its concept, main steps and application in shear strength prediction of RC beams strengthened with FRCM. *Engineering Structures*, 281, 115749.
- [7] Zhao, X.Y., **Chen, J.X.**, & Wu, B. (2022). An interpretable ensemble-learning-based open source model for evaluating the fire resistance of concrete-filled steel tubular columns. *Engineering Structures*, 270, 114886.
- [8] Zhao, X.Y., **Chen, J.X.**, Chen, G.M., Xu, J.J., & Zhang, L.W. (2022). Prediction of ultimate condition of FRP-confined recycled aggregate concrete using a hybrid boosting model enriched with tabular generative adversarial networks. *Thin-Walled Structures*, 182, 110318.

PREPRINTS AND BOOK CHAPTERS

- [1] **Chen, J.X.** & Bao, Y. (2025). ChatCivic: A domain-specific large language model (LLM) for design code interpretation. Preprint available at SSRN 5047555.
- [2] Hong, M.Y., Zhao, X.Y., **Chen, J.X.**, & Xie, T.Y. (2023). Effect of global warming on chloride resistance of concrete: a case study of Guangzhou, China. In *Adapting the Built Environment for Climate Change* (pp. 201-212). Woodhead Publishing.

PATENTS

- [1] **Chen, J.X.** & Bao, Y. (2026). Retrieval-Augmented Generation System for Structural Engineering Code Interpretation. U.S. Provisional Patent Application No. 63/997,111, filed Mar. 2026.
- [2] **Chen, J.X.** & Bao, Y. (2026). Artificial Intelligence Copilot for Automated Design of Buildings Using Knowledge Graphs and Numerical Models. U.S. Provisional Patent Application, filed Mar. 2026.
- [3] **Chen, J.X.** & Bao, Y. (2026). Multi-Agent Automated Design of Reinforced Concrete Structures. U.S. Provisional Patent Application, filed Mar. 2026.

CONFERENCE PRESENTATIONS

- Presenter, "Multi-Agent Large Language Model Framework for Code-Compliant Infrastructural Design," 27th Annual NJDOT Research Showcase, Oct. 2025.
- Presenter, "Automatic Interpretation of Concrete Design Codes Using a Domain-Specific Large Language Model," ACI Concrete Convention, Spring 2026.
- Presenter, Fourth International Interactive Symposium on Ultra-High Performance Concrete, Des Moines, IA, Jun. 2026.

TEACHING EXPERIENCE

Teaching Assistant, ENGR 211 Statics Stevens Institute of Technology	Fall 2025
Teaching Assistant, ENGR 122 Field Sustainable Systems with Sensors Stevens Institute of Technology	Spring 2026

SKILLS

Programming	Python, MATLAB, C++
Structural Analysis	ABAQUS, SAP2000, ETABS
CAD/BIM and Modeling	AutoCAD, Revit, SOLIDWORKS