

CHENXU ZHANG

Computer Science Ph.D. Applicant | Fall 2027

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RESEARCH INTERESTS

Efficient and reliable systems for AI and scientific computing; reproducible, data-intensive computational workflows; graph-based simulation and model validation; real-time perception and closed-loop systems. Research experience spans executable causal-loop models, research-software infrastructure, and hardware-integrated experiments.

EDUCATION

Northeastern University

Boston, MA

M.S. in Software Engineering Systems

Apr 2025

M.S. in Finance, major Quantitative Finance

Dec 2022

Southern University of Science and Technology (SUSTech)

Shenzhen, China

Bachelor of Economics in Finance

Jun 2021

RESEARCH EXPERIENCE

Northeastern University

Boston, MA

Research Assistant / Lead Developer, Flow-CLD / Loopy-v2

Sep 2023 – Present

- Led end-to-end development of a Python/FastAPI and React research platform that converts causal-loop diagrams into executable signed-graph simulations for a banking-supervision collaboration with Aalto University.
- Implemented NumPy simulation modules with stochastic interactions, delays, decay, and persistence, together with sensitivity analysis, cycle analysis, and stability diagnostics to examine how network structure and parameters shape simulated dynamics.
- Developed simulation and diagnostic workflows for supervisory mental-model research, including a signed graph with **23 variables and 53 edges**, to examine feedback dynamics and structural counterfactuals.
- Built a background-job runner for long-running simulations outside the HTTP request lifecycle; implemented job dispatch, batch-state tracking, structured failure reporting, and versioned run manifests for reproducible simulation and parameter-grid experiments.
- Defined REST API contracts and validation schemas connecting a React graph editor to simulation workflows; implemented versioned result exports and research artifacts used in ISDC 2025 replication materials.
- Standardized Docker/Conda environments and built a GitHub Actions CI pipeline with **82 automated tests** supporting the simulation codebase and replication package.
- Coauthored research on hybrid causal-loop elicitation and validation against an independently developed agent-based macroeconomy, accepted for a **long presentation at CSS2026**.

The Rowland Institute at Harvard

Cambridge, MA

Research Assistant, Real-Time Vision & Closed-Loop Systems

Jul 2024 – Dec 2024

- Implemented and integrated a multithreaded OpenCV/Cython pipeline combining FLIR camera acquisition, visual tracking, and projector commands at a sustained **16 FPS** for closed-loop behavioral experiments.
- Coordinated acquisition, processing, and projection using timestamped queues and hardware synchronization; implemented camera-projector calibration, coordinate mapping, and **5-mm trigger-zone logic** for timing-sensitive visual feedback.
- Extended tracking and visual-guidance workflows to multi-agent prototypes with **2, 5, and 10 agents**, integrating tracked positions with stimulus commands for group experiments.
- Built Python/MATLAB trajectory diagnostics to identify identity swaps, calibration drift, alignment faults, and latency spikes during closed-loop experiments.

Southern University of Science and Technology (SUSTech)

Shenzhen, China

Research Assistant, Intelligent Tracking & Obstacle-Avoidance Car

Feb 2019 – Sep 2019

- Programmed an Arduino/C++ autonomous-car prototype integrating sensor input, line tracking, obstacle avoidance, and motor control.
- Field-tested the prototype and tuned signal-processing rules to improve path stability and response reliability.

CONFERENCE PAPERS & PRESENTATIONS

- Oet, Monahov, **Zhang**, and Jakki.
Hybrid Elicitation of a Causal Loop Model to Validate an Agent-Based Macroeconomy: The Debt-Service-to-Income Channel.
Accepted for a long presentation, CSS2026, Computational Social Science Society of the Americas, 2026.
- Oet, Kvedaravičiūtė, and **Zhang**.
The Triple Bind in AI-Driven Financial Risk Management: From Static Paradox to Dynamic Solutions Through System Simulation.
Accepted for presentation, World Finance & Banking Symposium, Riga, 2026.
- Kvedaravičiūtė, Oet, Gargava, Lyytinen, and **Zhang**.
Dead on Arrival? Feedback Dynamics and Policy Support in the Blockchain Transformation of Credit Intermediation.
Accepted for presentation, World Finance & Banking Symposium, Riga, 2026.
- Oet, **Zhang**, and Shah.
Eliciting the Dynamics of Regional Banking from Banking Supervisors.
Presented at ISDC 2025 and CSSSA. **Oral presentation by Chenxu Zhang**, Fields Institute, Workshop on Complex Networks in Banking & Finance, June 27, 2024.

RESEARCH MANUSCRIPTS

- Oet and **Zhang**.
When Supervisors Expect Collapse: Simulating the Elicited Mental Model of Regional Banking.
Research manuscript; submitted to CSS2026.
- Oet, Zellner, Hemsath, Ryu, Garcia, and **Zhang**.
Indigenous Perspectives on Green Finance & Digital Infrastructure.
Research manuscript; methods presented in seminars and workshops.

ACKNOWLEDGED RESEARCH CONTRIBUTIONS

- Iwasaki et al. *Drosophila learn to prefer immobile spherical objects through repeated physical interaction.* *Current Biology*, 2025. doi:10.1016/j.cub.2025.09.073. **Acknowledged for helpful discussions.**

TEACHING & ACADEMIC DEVELOPMENT

Northeastern University – College of Professional Studies

Boston, MA

Part-Time Lecturer & Graduate Course Developer

May 2025 – May 2026

- Contributed to graduate course development and redesign in quantitative methods, risk analytics, investment analysis, accounting fundamentals, and managerial finance.
- Developed analytical modules and assignments incorporating **Python/R code** and reproducible data-analysis workflows for quantitative reasoning and applied financial analysis.
- Implemented course materials in Canvas to support project-based learning, structured data analysis, and communication of analytical results.

ADDITIONAL ANALYTICAL EXPERIENCE

Hua An Fund Management Co. Ltd.

Shenzhen, China

Data Analyst Intern, Equity Research Division

May 2020 – Sep 2020

- Developed a Python/Excel pipeline integrating operating metrics, market data, financial statements, peer benchmarks, and demand indicators for equity-research analysis.
- Performed regression and forecasting analyses and documented modeling assumptions for analyst review.

TECHNICAL SKILLS

Languages: Python, C++, C, Java, JavaScript, SQL, R, MATLAB.

Scientific computing: NumPy, pandas, OpenCV, Cython, scikit-learn.

Computational methods: Stochastic simulation, sensitivity and stability analysis, graph/cycle analysis, parameter sweeps.

Systems: Multithreading, background-job execution, hardware synchronization, performance profiling, structured logging.

Development: Linux, Docker, Conda, Git, GitHub Actions, CI/CD, automated testing.

Applications & data: FastAPI, Flask, React, REST APIs, schema validation, PostgreSQL, MySQL.