

ZUCHEN LI

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Research Interests: Human–AI Interaction · Context-Aware Intelligent Systems · Ubiquitous Sensing · AI4Science

Education

University of Michigan, Ann Arbor <i>Major in Statistics & Computer Science; Minor in History</i>	Aug 2024 – Present 3.8/4.0
University of Illinois Urbana-Champaign <i>Major in Statistics & Computer Science; Minor in Meteorology</i>	Aug 2023 – May 2024 4.0/4.0

Research Experience

HAIL Lab (Advisor: Prof. Anhong Guo) <i>Research Assistant</i>	May 2026 – Present <i>Ann Arbor, Michigan</i>
– Developing a framework for contextualized live visual instruction that bridges generative foundation models and real-world task execution, enabling mixed-reality systems to reason over live workspaces, decompose goals into object-state transitions, and generate timely, spatially situated visual guidance.	

Ambient Intelligence Lab (Advisor: Prof. Ke Sun) <i>Research Assistant</i>	Oct 2025 – Present <i>Ann Arbor, Michigan</i>
– Visual Privacy: Developed an agentic visual privacy framework that moves beyond identifier-centric defenses by autonomously discovering, localizing, and selectively editing weak compositional cues exploited by VLMs, while supporting granular user control and iteratively verifying residual privacy leakage across identity, geolocation, affiliation, and social-relationship risks. – Computational Sensing: Investigating camera-based fabrication sensing that amplifies subtle Moiré-encoded motion to recover physiological and behavioral signals in real time, enabling unobtrusive and privacy-preserving sensing of respiration, body dynamics, and cognitive load without instrumenting the user or environment. – RespiraFrame: Collaborated with Prof. Junyi Zhu on the experimental design and evaluation of an eyeglass-based multimodal respiratory sensing system, designing protocols to characterize sensing robustness across respiratory behaviors, motion, environmental interference, and semi-wild everyday settings, and to evaluate complementary sensor modalities and fusion.	

Generative AI for Music and Audio (Advisor: Prof. Herman Dong) <i>Research Assistant</i>	Sept 2025 – Present <i>Ann Arbor, Michigan</i>
– Investigating real-time human–GenAI co-creation for controllable music generation, focusing on interaction mechanisms that preserve user agency, expressive control, and iterative creative feedback. – Prototyping gesture-driven interaction techniques that connect embodied user input to real-time musical control and generative model behavior.	

Energy Distance Dimension Reduction (Advisor: Prof. Kerby Shedden) <i>Selected Researcher, Undergraduate Research Program in Statistics (URPS)</i>	Jan 2025 – May 2025 <i>Ann Arbor, Michigan</i>
– Developed engression and sufficient dimension reduction methods for multilevel, dyadic, and longitudinal wearable data from bone marrow transplant patients, addressing non-i.i.d. structure not handled by existing methodology. – Implemented sufficient dimension reduction algorithms in JAX with GPU acceleration, achieving approximately 7,000× speedup over the original method for U-statistic computation on large sensor data series.	

Lab of Atmospheric and Earth System Sciences, Nanjing University <i>Summer Research Intern, Advisor: Prof. Minghuai Wang</i>	May 2024 – Aug 2024 <i>Nanjing, China</i>
– Studied statistical machine learning methodologies for integrating real-world sensor observations with simulated atmospheric data, enabling inference and prediction of aerosol–cloud interactions across larger spatial and temporal scales.	

E2-E Lab, University of Illinois Urbana-Champaign <i>Undergraduate Research Assistant</i>	Aug 2023 – May 2024 <i>Champaign, Illinois</i>
– Conducted airflow experiments and processed PIV/camera data using Python, OpenCV, and OpenPIV for flow-field reconstruction and particle tracking; performed CFD simulations in ANSYS Fluent to analyze particle–airflow interactions in complex 3D geometries.	

Selected Projects

MagicBaton: Gesture-Based Human–AI Music Interaction	Winter 2026
– Built a dual-IMU smart conducting baton that streams 12-axis motion at ~50 Hz and integrates real-time edge compute gesture recognition model, jerk-based beat/BPM estimation, MIDI playback, and in-browser Magenta MusicRNN generation.	

- Collected a public dataset of approximately 934 recordings across eight gesture classes.

Multimodal Finite State Machine for Adaptive Skill Guidance

Winter 2026

- Built a real-time hand-washing guidance system that fuses VLM-based visual cues and YAMNet audio classification with a 12-state finite-state machine, adapting voice-instruction level of detail when users stall or deviate from the procedure.
- Implemented switchable local Qwen3-VL and Gemini backends, sustained-condition transitions, non-blocking TTS, split-screen state visualization, and post-session scoring/logging.

How Fragile Are GUI Agents? A Controlled Perturbation Benchmark for Interface Evolution

Winter 2026

- We Developed a benchmark grounded in five recurring interface-evolution categories—layout, semantic, visual, structural, and workflow shifts—and generated controlled synthetic websites for controlled analysis of GUI-agent robustness.
- Led project organization and agent experiments using the VisualWebArena harness.

Bayesian MCMC Data Augmentation for Ebola Outbreak Data

2025

- Developed a Bayesian data-augmentation MCMC analysis for partially observed Ebola onset/removal data with censoring.

Additional Experience

Waseda University

June 2025 – Aug 2025

Summer Intern

Tokyo, Japan

- Researched postwar Japanese literature and history, analyzing literary works in relation to historical memory, identity, and social transformation in postwar Japan.

The Michigan Daily

Aug 2025 – Jul 2026

Student Reporter, Photographer & Videographer

Ann Arbor, Michigan

- Produced campus and local news coverage through interviews, field reporting, photography, and video, translating on-the-ground observations into written and multimedia stories.

Honors & Awards

UROP Summer Engineering Fellowship, University of Michigan

2026

University Honors, University of Michigan

2024-2026

Outstanding Research Paper Award, IMMC Greater China Round (top 1.875% of 800+ teams)

2022

Finalist Research Paper Award, IMMC International Round (top 8.75% internationally)

2022

Selected Coursework

EECS 545 Machine Learning · EECS 281 Data Structures and Algorithms · STATS 470 Design of Experiment · EECS 442 Computer Vision · EECS 484 Database Management System · STATS 571 Causal Inference · EECS 498 Machine Learning for Computational Sensor in Mobile/Wearable IoT System · PAT 564 Generative AI for Music and Audio · Math 451 Real Analysis

Technical Skills

Programming: Python, R, C++, LaTeX, Houdini FX
ML / AI: PyTorch, JAX, TensorFlow, vLLM, VLM/LLM inference
HCI / XR / Sensing: Unity, Meta Quest, OpenCV, OpenPIV, ESP32/IMU sensing, Intel RealSense
Systems / Tools: Git, BLE, WebSocket, ANSYS Fluent