Xiangbo Cai

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LinkedIn | Google Scholar | GitHub

EDUCATION

Michigan State University, Honors College Expected May 2027
B.S. (Hons) in Electrical Engineering and Computer Engineering
GPA: 3.93/4.00

PUBLICATION

[1] L. Peng, **X. Cai**, N. Zhang, Z. Li, and Y. Deng, "*In-line Inspection for Steel Ferromagnetic Bent Pipe Using 3D-Printed Flexible MFL Sensor Array*," IEEE Transactions on Instrumentation and Measurement, under review.

RESEARCH EXPERIENCE

Non-destructive Evaluation Laboratory Oct 2023 – Present
Research Assistant, Winter Research Scholar *Advisor: Prof. Yiming Deng*

• Developed an innovative flexible Magnetic Flux Leakage (MFL) method, resulting in higher resolution (<1.5mm defect detection) and flexible sensing capability on curved pipelines
• Engineered a multi-channel sensing electronics system with circuit schematic design, PCB design, and embedded C programming in STM32, enabling real-time data acquisition through Hall sensors
• Designed and 3D-modeled connector in the MFL system, using SolidWorks and OnShape, creating a flexible joint capable of going across 15+ different geometrical pipeline shapes

Edge Intelligence and Networking (EIN) Group Aug 2024 – Apr 2025
Research Assistant, Wielenga Research Scholar *Advisor: Prof. Zhichao Cao*

• Implemented Bluetooth Low Energy (BLE) connectivity on the nRF52840 by programming in C++, achieving BLE communication between iOS, Android, and other compatible devices
• Applied Python noise cancellation algorithms and signal processing to PDM data, resulting in >15% less noise in recorded audio and improved system stability compared to initial prototype

Smart Sensing Laboratory Jan 2025 – May 2025
Research Assistant

• Curated 2,000+ agricultural images in Roboflow by performing data augmentation and annotation, creating high-quality datasets for training deep learning models in TensorFlow and PyTorch
• Constructed feedback control systems for an agricultural application by tuning PID parameters in MATLAB/Simulink, producing a 20% improvement in transient response

TEACHING & MENTORING EXPERIENCE

Fall 2024 – MTH103 (College Algebra)

- A freshman-level math course, holding two lectures a week for 45 students, and grading exams, quizzes. Providing 2 hours of tutoring per week at MLC (math learning center).

Fall 2025 – ECE202 (Circuits & Systems II)

- A sophomore-level electrical engineering core course, grading student homework & exams.

Fall 2025 – Honors College Academic Peer Mentor

- Providing professional academic support for freshmen & sophomore honors college students.

HONORS & AWARDS

Tau Beta Pi, National Engineering Honors Society, 2025
Winter Research Scholar, Michigan State University Honors College, 2025 – 2026
Wielenga Research Scholar, Michigan State University Honors College, 2024 – 2025
Dean's Showcase of Stars, MSU College of Engineering, 2024 & 2025
Think Outside the Pizza Box Winner, GrizzHacks 6, 2024
Dean's List, All semester

TECHNICAL SKILLS

Programming Languages: Python, C, C++, ARM Assembly, MATLAB/Simulink, System Verilog
Hardware: nRF52840, ESP32, STM32, BLE 5.x, RTOS, UART/SPI/I²C, Raspberry Pi
Software: Altium Designer, LTspice, SolidWorks, Git, Linux, Vivado, Keil uVision, LaTeX

LANGUAGES

English
Mandarin Chinese