Xiangbo Cai

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EDUCATION

Michigan State University – College of Engineering, Honors College **East Lansing, MI**
Bachelor of Science, Electrical Engineering & Computer Engineering (Double Major) Aug. 2023 – May 2027

- GPA: 3.9/4.0
- **Awards**: *Tau Beta Pi* (inducted 2025), *Wielenga Research Scholar* (Honors College, 2024-2025), *Winters Research Scholar* (Honors College, 2025-2026), *Dean's Showcase of Stars* (COE, 2024 & 2025), *Dean's List* (All semesters)

PROFESSIONAL EXPERIENCE

Non-destructive Evaluation Laboratory **East Lansing, MI**
Research Assistant Oct. 2023 – Present

- Developed a novel flexible Magnetic Flux Leakage (MFL) method through research on Non-Destructive Evaluation, resulting in higher resolution (<1.5 mm defect detection) and flexible sensing capability on curved pipelines
- Engineered a high-performance multi-channel sensing electronics system with circuit schematic design, PCB design, and embedded system programming, enabling high-accuracy real-time data acquisition through Hall sensors
- Applied data analysis tools (MATLAB/Python**)**, using signal processing, noise cancellation method, and visualizing sensor outputs, gaining high-quality datasets for in-depth quantitative assessment of the MFL detection accuracy
- Designed and 3D-modeled a complex mechanical connector in the MFL system, using SolidWorks and Onshape, creating a flexible joint capable of detecting signals across 15+ different geometrically complex pipeline shapes

Edge Intelligence and Networking (EIN) Group **East Lansing, MI**
Research Assistant Aug. 2024 – Apr. 2025

- Selected as one of 15 Honors College students (~top 2%) for the prestigious Wielenga Research Scholars Program
- Implemented embedded Bluetooth Low Energy (BLE) connectivity on the nRF52840 platform by programming in C/C++, achieving data transmission and BLE communication between iOS, Android, and other compatible devices
- Applied Python-based noise cancellation algorithms and signal processing to PDM microphone data acquired via UART, resulting in >15% less noise in recorded audio and improved system stability compared to initial prototype

Smart Sensing Laboratory **East Lansing, MI**
Research Assistant Feb. 2025 – Apr. 2025

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

Department of Electrical & Computer Engineering **East Lansing, MI**
Teaching Assistant Aug. 2024 – Present

- Provided professional academic support to 300+ students across core Electrical Engineering course ECE 202 (Circuits & Systems II) and Mathematics course MTH 103 (College Algebra), under faculty supervision in both departments
- Delivered 10 hours/week of tutoring, graded homework, quizzes, and exams for 200+ students with in-time feedback

EXTRACURRICULAR EXPERIENCE

Honors College – Michigan State University **East Lansing, MI**
Honors College Peer Mentor Aug. 2025 – Present

- Mentor first- and second-year income Honors College students, providing academic, social, and professional guidance
- Connect mentees with campus resources, and promote engagement in student organizations (ASPAC, FGHA, etc.)

NDE Pipeline Robotics **East Lansing, MI**

- Designed and implemented the autonomous NDE robot's control system using finite state machine (FSM) modeling and Verilog simulation, achieving a 15% improvement in navigation precision within pipeline environments
- Conducted rigorous system-level testing and validation through iterative debugging and adaptive tuning of PID parameters in MATLAB/Simulink, reducing operational errors by 25% and publishing results in an SSRN paper

SKILLS

Programming: Python, C/C++, Assembly, MATLAB/Simulink, Verilog, JavaScript, HTML/CSS, Dart, SQL
Hardware: nRF52840, Raspberry Pi, Arduino, ESP32, BLE, RTOS (FreeRTOS/Zephyr), UART/SPI/I²C
Software: PSpice/LTspice, SolidWorks, OnShape, Git, Linux, Altium Designer, Vivado, Keil uVision, ML/DL, LaTeX