Xiangbo Cai

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Education

Michigan State University **East Lansing, MI | December 2026**

- BS, Electrical Engineering + Computer Engineering (Double Major) GPA: 3.9/4.0 (Transcript)
- College of Engineering, Honors College, Tau Beta Pi

Coursework: Embedded CPS, Digital Logic Design, FPGA/ASIC Design, MCU/MPU, Control System, Computer Architecture, Electronic Circuit, Circuit Analysis, Signal Processing, Data Structures & Algorithms

Skills

Languages: Chinese (Native), English (Fluent)
Programming & HDL: Python, C/C++, Embedded C, MATLAB/Simulink, Verilog, JavaScript, HTML/CSS, Dart
Embedded & IoT: nRF52840, Raspberry Pi, Arduino, BLE, RTOS (FreeRTOS/Zephyr), UART/SPI/I²C
Test & Measurement: Oscilloscope, Function Generator, Spectrum Analyzer, Logic Analyzer, Multimeter
Tools & Frameworks: Git, Vivado, Keil uVision, Flutter, LaTeX

Experience

Research Assistant | *Non-destructive Evaluation Laboratory* *East Lansing, MI* | Oct 2023-present

- Conducted research on Non-destructive evaluation, developed a novel flexible Magnetic flux leakage (MFL) method
- Developed multi-channel sensing electronics with Hall sensors, ADC, and MCU for real-time USB data acquisition
- Applied data analysis tools (MATLAB/Python**)** for signal processing, noise cancellation, and visualizing sensor outputs
- Designed and 3D-modeled mechanical connectors via SolidWorks and integrated electronic and mechanical frames
- Output novel MFL probe can detect a defect 1.5mm, authored a manuscript currently under review for publication

Research Assistant | *Wielenga Research Scholar* *East Lansing, MI* | Aug 2024-April 2025

- Researched embedded systems and IoT, focusing on low-power Bluetooth communication and real-time signal process
- Reproduced and enhanced embedded firmware on the nRF52840 platform, enabling PDM microphone data acquisition via UART with improved audio recording quality compared to the original Ph.D. student prototype
- Independently developed Bluetooth Low Energy (BLE) connectivity on the nRF52840 platform, enabling basic data transmission and BLE connection between iOS, Android, and other compatible devices

Research Assistant | *Department of Biosystems & Agricultural Engineering* *East Lansing, MI* | Feb 2024-April 2025

- Curated 1,000+ agricultural images in Roboflow, preparing datasets for TensorFlow/PyTorch deep learning models
- Validated annotations and organized datasets, improving data quality, consistency, and downstream training accuracy

Teaching Assistant | *ECE202 & MTH103* *East Lansing, MI* | August 2024-present

- Provided academic support for 300+ students across the electrical engineering core class ECE202 (Circuits & System II) and mathematics courses MTH103 (College Algebra), under the supervision of faculty in both departments
- Delivered 10 hours/week of instruction, graded homework, quizzes, and exams for 200+ students with in-time feedback

Honors Navigator Peer Mentor | *MSU Honors College* *East Lansing, MI* | August 2025-present

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

Project & Awards

NDE Pipeline Inspection Robot

- Designed and implemented the robot's control system using finite state machine (FSM) modeling and Verilog simulation, achieving a 15% improvement in navigation precision within pipeline environments
- Conducted extensive testing and validation, reducing operational errors by 25%, and turned results into an SSRN paper

C2L – Connect2Learn

- Awarded the *Best Out-of-the-Box Idea* award at GrizzHacks 6, selected from 113 participating teams
- Collaborated with a 4-member team to develop *Connect2Learn*, a mobile app for academic networking
- Designed cross-platform educational app using Flutter, applying web app architecture and front-end UI/UX design

Plowee – Winter Snow Road Tracking System

- Designed and implemented a Raspberry Pi-based GPS tracking system, integrating GPS modules with snowplows to collect and transmit real-time snowplow vehicle location data via Wi-Fi to cloud servers
- Developed Python scripts to parse GPS data and implement communication protocols, resulting in a 20% improvement in data accuracy and transmission efficiency between hardware and software backend
- Collaborated with a team of 4 to simulate the system across 10+ real-life tests, enhancing winter road maintenance

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