Xiangbo (Bo) Cai

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EDUCATION

Michigan State University, Honors College May 2027

Bachelor of Science, Electrical Engineering & Computer Engineering GPA: 3.93/4.0

Awards: *Tau Beta Pi, Wielenga Research Scholar, Winters Research Scholar, Dean's Showcase of Stars*

SKILLS

Programming Languages: C, C++, Python, ARM Assembly, MATLAB/Simulink, SystemVerilog

Hardware: nRF52840, ESP32, STM32, BLE 5.x, RTOS (FreeRTOS/Zephyr), UART/SPI/I²C, Raspberry Pi

Software: Altium Designer, LTspice, SolidWorks, Cadence OrCAD, Git, Linux, Vivado, Keil uVision, LaTeX

WORK EXPERIENCE

Engineering Research Intern – Winters Scholar Program Aug 2025 – Apr 2026

Non-destructive Evaluation Laboratory

• Designed and implemented a flexible Magnetic Flux Leakage (MFL) sensing system, achieving 1.5 mm defect detection resolution and reliable performance on curved pipeline geometries

• Engineered a multi-channel sensing electronics platform including schematic design, PCB layout, and embedded C development on STM32, enabling real-time data acquisition and performance evaluation

• Developed and 3D-modeled mechanical connectors in SolidWorks and OnShape to ensure system robustness and repeatable sensing performance across 15+ pipeline geometries

• Co-authored a journal manuscript under review for IEEE Transactions on Instrumentation and Measurement; project supported by $250,000+ U.S. DOT funding for infrastructure system reliability

Engineering Research Intern – Wielenga Scholar Program Aug 2024 – Apr 2025

Edge Intelligence and Networking (EIN) Group

• Implemented BLE communication and performance testing on the nRF52840 platform using C and C++, achieving BLE communication and data transfer across iOS, Android, and other embedded devices

• Applied MATLAB and Python signal processing algorithms to PDM microphone data, resulting in 15% noise reduction and improved system stability under varying operating conditions

Undergraduate Research Assistant Jan 2025 – May 2025

Smart Sensing Laboratory

• 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 agricultural sensing applications by modeling system dynamics and tuning PID parameters in MATLAB/Simulink, producing a 20% improvement in transient response

Teaching Assistant Aug 2024 – Dec 2025

Michigan State University

• Supported instruction for ECE 202 (Circuits & Systems II) and MTH 103 (College Algebra), delivering grading, and tutoring for 200+ students, strengthening technical communication and collaboration skills

PROJECTS

NDE Pipeline Robotics Feb 2024 – May 2024

• Designed and implemented 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 system-level testing and validation through debugging and adaptive tuning of PID parameters in MATLAB/Simulink, reducing operational errors by 25% and turn results in an SSRN paper