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 (numpy, matplotlib), Assembly, MATLAB/Simulink, Verilog, C#

Hardware: PCB layout, SEGGER, Oscilloscope, nRF52840, ESP32, STM32, BLE, UART/SPI/I²C, Raspberry Pi

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

WORK EXPERIENCE

Engineering Research Intern – Winters Scholar Program Oct 2023 – Present

Non-destructive Evaluation Laboratory

- Created a novel flexible Magnetic Flux Leakage (MFL) sensing system, achieving less than 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 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 an IEEE TIM journal; research project supported by $250K+ U.S. DOT funding

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

Edge Intelligence and Networking (EIN) Group

- Implemented Bluetooth Low Energy (BLE) communication on the nRF52840 using embedded C/C++, achieving BLE communication and data transfer across iOS, Android, and other compatible 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

- Processed 2,000+ agricultural images in Roboflow by performing data augmentation and annotation, creating high-quality datasets for deep learning models in TensorFlow and PyTorch
- Constructed 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 – May 2026

Michigan State University

- Supported ECE 480 (Senior Design), ECE 202 (Circuits & Systems II), and MTH 103 (College Algebra) via grading homework/exams and tutoring, strengthening communication and collaboration skills

PROJECTS

NDE Pipeline Robotics Feb 2024 – May 2024

- Designed 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 through debugging and adaptive tuning of PID parameters in MATLAB/Simulink, reducing operational errors by 25% and turning results in an SSRN paper