

# 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/I<sup>2</sup>C, 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*

- 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 an IEEE TIM journal manuscript under review; 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 BLE communication on the nRF52840 platform through embedded development in 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*

- 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 turning results in an SSRN paper