

Xiangbo (Bo) Cai

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EDUCATION

Michigan State University, Honors College	May 2027
<i>Bachelor of Science, Electrical Engineering & Computer Engineering</i>	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
<i>Non-destructive Evaluation Laboratory</i>	
• 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
<i>Edge Intelligence and Networking (EIN) Group</i>	
• 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
<i>Smart Sensing Laboratory</i>	
• 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
<i>Michigan State University</i>	
• 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	