Xiangbo Cai

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Education

Michigan State University *Aug 2023 – Dec 2026*

BS in Electrical Engineering + Computer Engineering (Double Major)

- GPA: 3.9/4.0 (Transcript)
- Honors College, Dean's List 2023-2025, Dean's Showcase of Stars Scholar, Wielenga Scholar
- **Coursework:** Embedded CPS, Digital Logic, Electronic Circuits & Devices, Control Systems, Computer Architecture, Circuit Analysis, Signal Processing, MPU & Digital Systems, Algorithm & Data Structures

Experience

Research Assistant, Wielenga Scholar Program *East Lansing, MI*

MSU Department of Computer Science & Engineering *Aug 2024 – May 2025*

- Conducting research in embedded systems and IoT under Dr. Zhichao Cao, focusing on low-power Bluetooth communication and real-time signal processing
- 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 *East Lansing, MI*

MSU Non-Destructive Evaluation Laboratory *Oct 2023 – present*

- Conducted research on Non-destructive evaluation (NDE), specializing in electromagnetic sensing and embedded hardware for pipeline inspection under Dr. Yiming Deng
- Designed and implemented PCB-based embedded circuits, performed schematic design, circuit simulations, debugging, and prototyping to optimize sensing accuracy and reliability
- Designed and 3D-modeled custom mechanical connectors via OnShape and SolidWorks to integrate sensing and actuation modules within the pipeline non-destructive inspection system, enabling precise alignment and secure assembly of multiple hardware components.

Teaching Assistant - ECE202 *East Lansing, MI*

MSU Department of Electrical & Computer Engineering *Aug 2025 – present*

- Provided in-person academic support for ECE202 (Circuits and Systems II), a core course in electrical engineering and computer engineering, under the supervision of Dr. Shannon Nicley
- Facilitated help room sessions to clarify concepts, troubleshoot problems, and enhance student understanding
- Accurately graded homework, quizzes, and exams for 80+ students, ensuring prompt feedback and evaluation

Teaching Assistant - MTH103 *East Lansing, MI*

MSU Department of Mathematics *Aug 2024 – present*

- Managed MSU's class MTH103(College Algebra) by teaching math concepts and mentoring 300+ students
- Provided teaching 5 hours each week with detailed feedback and work more than 2 hours in math learning center
- Answered students' questions with clear explanations by both online zoom meeting and offline help room

Student Research Assistant - Image Data Labeling *Remote*

MSU Department of Biosystems & Agricultural Engineering *Feb 2025 – Apr 2025*

- Annotated and curated 1,000+ animal images in Roboflow, applying class definitions and bounding box standards to ensure high-quality input for supervised machine learning models
- Organized and validated labeled datasets to maintain consistency, reduce annotation errors, and improve downstream model training accuracy in agricultural image recognition research.

Projects

Plowee - Winter Snow Road Tracking System *Github Repo*

- 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

NDE Pipeline Inspection Robot *Github Repo*

- Designed and implemented the robot's control system using Verilog-based finite state machine (FSM) modeling, improving navigation precision in pipelines by 15%
- Conducted extensive testing and validation, reducing operational errors by 25% and enhancing reliability in constrained environments

C2L – Connect2Learn *GitHub Repo*

- Collaborated in a 4-member team to develop *Connect2Learn*, a mobile application creating an academic social network, winning the **Best Out-of-the-Box Idea** award at GrizzHacks 6
- Designed and implemented a cross-platform educational app using Flutter and Dart, applying principles of web app architecture and front-end UI/UX design

Skills

Programming: Python, C/C++, MATLAB, Verilog, Assembly, Dart, JavaScript, HTML/CSS, LaTeX

Tools & Platforms: Flutter, Git, Altium Designer, LTspice, Multisim, SolidWorks, OnShape, Mathematica

Technical Areas: Embedded Systems, PCB Design, Signal Processing, CAD Modeling, Circuit Simulation

Language: Chinese (Native), English (Fluent)