Xiangbo Cai

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Education

BS **Michigan State University**, Computer Engineering — Aug 2023 – Dec 2026

- GPA: 3.916/4.00 (Transcript)
- Dean's List Scholar, Dean's Showcase of Stars Scholar, Honors College, Wielenga Scholar, NDE Lab Research
- **Coursework:** Embedded Systems, Digital Logic Design, FPGA & ASIC Design, Microcontrollers & Microprocessors,Computer Architecture, Circuit Analysis, C/C++, Verilog, Signal Processing, Algorithm & Data Structures, Python

Experience

MSU Non-Destructive Evaluation Laboratory, Research Assistant — East Lansing, MI, Oct 2023 – May 2025

- 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
- Integrated hardware component into pipeline inspection using CAD software (OnShape & SolidWorks)

MSU Department of Computer Science & Engineering, Research Assistant — East Lansing, MI, Aug 2024 – May 2025

- Conducting research in embedded systems and IoT under Dr. Zhichao Cao, specializing in low-power Bluetooth wireless communication and real-time signal processing
- Developing embedded firmware on the nRF52840 platform to collect PDM data via Bluetooth and UART and perform data processing using Python, aimed at real-time Bluetooth audio authentication
- Collaborating with a team of 5 PhD students to conduct research, targeting publication and potential patent by the end of the semester

MSU Department of Mathematics, Teaching Assistant — East Lansing, MI, Aug 2024 – Dec 2024

- Managed MSU's MTH 103 (College Algebra) class 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 confirming College Algebra mastery and led offline office hours

Outlier AI, LLM Developer & Trainer — Remote, May 2024 – July 2024

- Refined the AI software through 5-6 collaborative projects including Flamingo Tech and AI LLM models
- Worked in a bilingual environment (Chinese/English), evaluating Chinese responses generated by AI LLM model
- Analyzed work of other Outlier members to ensure over 30% precision & efficiency in feedback

Projects

Trackle github repo

- Trackle is a privacy and accessibility-focused app that provides users with control over their device's privacy settings. Trackle makes it easy to monitor, track, and adjust permissions such as geolocation, microphone access, and system changes in a user-friendly manner.
- Tools Used: C++, Flutter, Dart, Android Studio

C2L-Connect2Learn github repo

- Connect2Learn, A mobile application creating an academic social network that connects students to learning opportunities.
- Tools Used: Python, Flutter, Dart, Android Studio

Pipeline Inspection Robot github repo

- Developed a pipeline inspection robot that utilizes NDE techniques, which can detect defects in the pipeline and provide a visual representation of the pipeline's condition.
- Tools Used: Verilog

74LS161 Hexadecimal Counter github repo

- Simulated a 74LS161 integrated circuit to create a hexadecimal counter using Visual-Based Multisim and Verilog.
- Tools Used: Multisim, Verilog

Publications/Pre-print

Simulations of Hexadecimal Counters via the 74LS161 Integrated Circuit - Applications of Visual-Based Multisim and Verilog Projections Aug 2024

Xiangbo Cai, Peter Pena

10.2139/ssrn.4921697

Advanced Pipeline Inspection Robot Development Utilizing Non-Destructive Evaluation and Simulated with Verilog July 2024

Xiangbo Cai

10.2139/ssrn.4894242

Verilog vs. C for Matrix Multiplication':' A Performance Comparison on FPGA and ARM CPU May 2025

Xiangbo Cai, Chenxin Zhang

10.13140/RG.2.2.32015.50082

Skills

Skills Proficient: Python | C/C++ | LaTeX | SPICE | Verilog | OnShape | MATLAB | Wolfram Mathematica | Git | Microsoft Suite

Skills Familiar: Dart | Flutter | HTML | CSS | JavaScript | SolidWorks | Altium Design | SQL | Jupyter Notebook | NI Multisim | Machine Learning