Muhammad Saad Zaeem

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EDUCATION

Michigan State University *East Lansing, MI* | May 2027
Bachelor of Science, Electrical Engineering, Minor in Entrepreneurship & Innovation GPA: 3.4/4.0
Relevant Courses: Digital VLSI Design, FPGA-Based Systems, Embedded Systems, Analog/Digital Circuit Design

EXPERIENCE

Undergraduate Research Assistant – Heavy Metal Sensing Hardware April 2026 – Present
Michigan State University

- Designing custom potentiostat-based sensing hardware for a heavy metal detection system integrating chemical sensors, microfluidics, and analog front-end circuitry under Dr. Wen Li
- Collaborating with a PhD researcher on hardware integration, bench testing, and system-level validation of sensing prototypes
- Programming Arduino-based microcontrollers to interface with sensing hardware via I2C and UART, handling ADC reads and serial data output

Co-op Engineer – Transmission & Distribution Planning Jan 2026 – April 2026
AES Corporation

- Developed data-driven tools using Power BI, Excel, and Power Automate to automate workflows for transmission planning and reliability analysis
- Performed contingency analysis and tie-circuit load calculations for 20 circuits using power system modeling tools and circuit index schematics to support infrastructure planning

Undergraduate Research Assistant – Autonomous Vehicles Sep 2025 – Dec 2025
Michigan State University

- Programmed and tested a Quanser QCar for vision-based lane detection using MATLAB, Simulink, and YOLOv8, achieving 90%+ detection accuracy and reducing real-time response time by ~20%

Wielenga Research Scholar
Michigan State University Honors College Aug 2024 – Apr 2025

- As a Wielenga Research Scholar (top ~2% of MSU Honors College), designed and validated analog/digital sensing hardware for indoor air quality monitoring, improving particle detection sensitivity by 40% and measurement accuracy by 30%

PROJECTS

Mini Tensor Core Accelerator *(Verilog, Tiny Tapeout, Vivado)*

- Designed an INT8 2×2 systolic-array matrix multiplication accelerator with weight-stationary dataflow, ReLU activation, programmable INT8 requantization, and cycle-count performance monitoring
- Verified RTL using constrained-random cocotb tests against a Python/NumPy golden model; validated design on a Xilinx Zynq-7000 FPGA with correct outputs confirmed across all test cases
- Implemented through the Tiny Tapeout SKY130 ASIC flow, passing RTL simulation, synthesis, place-and-route, DRC/precheck, gate-level simulation, and GDS generation
- Designed a register-mapped SPI control interface enabling byte-serial weight loading, activation streaming, and result readout for direct host integration and silicon bring-up demonstration

Low-Power Calving Prediction Sensor Patch *(KiCad, ESP32-S3, BLE)*

- Designing a multi-sensor wearable PCB integrating an ESP32-S3 MCU, dual-channel HX711 strain ADC, BMI323 IMU, and DS3231 RTC for real-time calving event detection in livestock research
- Performing full PCB design cycle in KiCad including schematic capture, component selection, power architecture, routing, DRC, and Gerber generation for a low-power embedded sensing system
- Implementing BLE-based wireless data offload with store-and-forward flash buffering for intermittent gateway connectivity in a field-deployed environment

SKILLS

Hardware & Digital Design: Verilog, RTL, FPGA/Vivado, Digital Logic
Programming: Python, MATLAB/Simulink, C/C++
Embedded & Protocols: Arduino, I2C, ESP32, SPI, UART
Tools: Power BI, Power Automate, Excel, Azure, KiCad

ACTIVITIES

Resident Assistant Aug 2026 – Present

- Serve as Resident Assistant for a floor of ~90 residents, providing mentorship, guidance, and support throughout the academic year
- Lead monthly floor events and community-building programs to foster resident engagement and belonging
- Conduct duty rounds and resolve floor conflicts to maintain a safe, supportive living environment

Technology Content Creator – Saad Zaeem Technology

- Built and monetized an engineering-focused YouTube channel (7K+ subscribers, 3M+ views, $9K+ revenue)
- Produced troubleshooting and solution-based videos addressing common errors in electronics, software tools, and technical workflows