

GRACE ONESIME ZONGO

Electrical Engineer | Embedded System, Power Electronics, PCB Design

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SUMMARY

Electrical Engineering student (B.S expected May 2027) with three engineering internships across embedded firmware, power electronics, and HVAC controls. Experienced taking boards from schematic capture and PCB layout through bring-up, validation, and field deployment. Bare-metal C/C++ on STM32, RTOS, Altium and KiCad, Verilog and FPGA.

EDUCATION

University of Wisconsin-Madison, Madison, WI

September 2024 - May 2027

- B.S. Electrical Engineering, Certificate in Computer Science. JCKF Scholar, UWCU Scholar, WIF Fellow
- Relevant coursework: Power Electronics, Control System, Signal and System, Embedded Systems (FreeRTOS), Digital System Design

Madison College, Madison, WI

January 2022 – May 2024

- Associate degree, Liberal Arts Transfer: Science / Math / Technology

TECHNICAL SKILLS

Programming: C/C++, Python, Java, Verilog, MATLAB, Assembly

Hardware Design: Schematic Capture, multi-layer PCB layout (Altium, KiCad), BOM, DFM/DFT, datasheet analysis, PCB bring-up, soldering.

Power Electronics: DC-DC buck converters, switch-mode power supplies, gate drive, current sensing, Li-ion battery systems, low power design

Embedded / Firmware: STM32, finite state machines, ISRs, timers, PWM, ADC, sleep-mode power management, sensor drivers, data logging

Protocols: UART/USART, I²C, SPI, SDI-12, CAN

Test and Tools: Oscilloscope, DMM, signal generator, logic analyzer, SWD debugging, LTspice, Inter Quartus (FPGA), GitHub, Bash

INTERNSHIP EXPERIENCES

Automatic Weather Station (AWS) Engineering Intern | SSEC – UW Madison

April 2024 – Present

- Cut station sleep current from 32mA to 7mA (78% reduction) and improved runtime efficiency by 85% by designing a custom low-power sleep mode and a C++ finite state machine in bare-metal firmware.
- Integrated multiple sensor classes over SPI, I2C, SDI-12, and frequency interfaces, writing drivers and validating readings on the bench prior deployment.
- Delivered the firmware that ran unattended in Antarctica for a full year. Added on-board data logging for field debugging and I am developing an automated self-diagnostic subsystem.

Design Engineer Intern | Alpha Controls and Services, Middleton, WI

May 2025 – December 2025

- Produced control schematics and panel wiring diagrams for commercial HVAC projects, working from equipment submittals and sequence of operation.
- Analyzed mechanical blueprints to perform material takeoffs and specify sensors, actuators, and Schneider Electric controllers against the control sequence.
- Prepared project cost estimates by quantifying control components, wiring, and materials.

Electrical Engineering Intern | Bemis Manufacturing Company, Madison, WI

June 2022 – August 2022

- Prototyped Bemis's first health-monitoring bidet seat, integrating and optical heart-rate sensor and data recording

PROJECTS

Digitally Controlled Synchronous Buck Converter (personal project)

Summer 2026

- Designed a synchronous DC-DC buck converter with UART-programmable 1.8-10V output: bare-metal C on STM32 with 200kHz PWM, ADC voltage and current sensing, and a 10kHz PID loop.
- Laid out the power-stage PCB in Altium, verified the converter in LTspice, and debugged bring-up errors on the bench.

Electric Catamaran | Promoting Electric Propulsion (PEP) competition

September 2023 – April 2024

- Designed a dual 18650 Li-ion battery system and differential thrust control for an electric catamaran, contributing to a 2nd place finish at the PEP 2024 Competition.

8-bit CPU on FPGA | Honors Project

June 2023 – December 2023

- Designed and simulated a Von Neumann 8-bit CPU: 8-bit register, RAM, ALU, and instructions from scratch using Quartus.
- Implemented FETCH, LOAD, and ADD instructions, and designed binary to BCD converter for segment displays.

PUBLICATION AND LEADERSHIP

Co-author, presentation at the 21st Workshop on Antarctic Meteorology and Climate (WAMC), 2020. NSF-supported.

Wisconsin Idea Fellow | Tech'Up Jeunes Initiative, UW-Madison

May 2026 – May 2027

Design and lead a hands-on electronics program for high-school students in Burkina Faso with Leading Change Africa.

Clubs Development Coordinator | Executive Leadership Team , Madison College

March 2022 – May 2024

Supported 50+ student clubs, administered the campus-wide club platform, and organized officer training.