Zane Mannings

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Education

Duke University, *GPA: 3.72/4.00, Durham NC* **Expected — May 2027**
Bachelor of Science in Electrical and Computer Engineering; Bachelor of Science in Computer Science

Duke Engage Uganda, *Kampala, Uganda* **Summer 2023**
Conducted clinical observations and ethnographic research at Ugandan hospitals to identify healthcare needs; developed low-resource prototypes under joint Duke-Makerere University faculty.

Plymouth Whitemarsh High School, *Plymouth Meeting PA* **Graduated — May 2023**

Technical Projects

Low-Cost In-Line IV Fluid Warmer **June 2024 — Present**

- Engineered precision IV fluid warming device achieving ±1°C temperature accuracy between 35-41°C, significantly reducing cost barriers for resource-limited healthcare settings
- Designed electronic circuit, schematic, and PCB and with a focus on modular connections, a dual power management system (battery/AC) and optimizing circuit miniaturization for space efficiency
- Performed systematic thermal analysis to establish mathematical correlations between PWM duty cycles, heating pad temperature profiles, and resultant fluid temperatures for precise temperature control
- Collaborated with multinational team members to conduct qualitative interviews and observational studies across Ugandan hospitals, translating critical clinical needs into actionable innovative solutions for perioperative temperature management

Leak Detection System for Liquid Cooled Data Centers **September 2023 — May 2024**

- Developed fluorescence-based leak detection system for NVIDIA's water-cooled server infrastructure, achieving >99% detection accuracy and <66ms response time
- Assisted in designing electronic sensor arrays and microcontroller programming for real-time monitoring of server blades
- Planned and executed comprehensive testing protocols validating system performance at temperatures up to 50°C with <2% deviation from control

Work Experience

Engineering Writing Consultant, *Duke Thompson Writing Program* **April 2024 — Present**

- Conducted quantitative analysis comparing interdisciplinary vs. intradisciplinary writing consultation effectiveness in engineering education, presenting findings to faculty and writing program staff
- Mentored engineering teams through technical documentation development, including industry specifications, testing protocols, and system requirements documentation
- Completed intensive technical communication training and provided structured feedback on engineering deliverables, including design specifications, testing methodologies, and technical presentations

Engineering Lab Assistant-Manager, *Duke Pratt School of Engineering* **January 2024 — Present**

- Guided students through prototype development using electronics, 3D printers, laser cutters, and design software, emphasizing hands-on troubleshooting and efficient workflow
- Created an automated lighting control system using motion sensing and custom circuit design that detects student presence at soldering stations and triggers light activation to increase visibility, safety, and efficiency.
- Authored technical documentation, instructional videos, and safety protocols to train first-year engineering students on lab equipment
- Trained new employees on lab protocols, safety procedures, and equipment operation for the engineering prototyping facility

Technical Skills

Skills: Embedded Systems, Control Systems, Circuit and PCB Design, Microcontroller Programming, Sensor Integration, Java, Python, MATLAB, C, C++, Communication Protocols, Digital Logic, Circuit Analysis, Computation Mathematics, Design & Analysis of Algorithms, Electricity and Magnetism, Technical Writing
Software: Fusion360, KiCad, SolidWorks, Onshape, Arduino IDE, Visual Studio Code, Excel for Data Analysis