Melvin Osei Opoku

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EDUCATION

Bachelor of Science in Biomedical Engineering, Minor in Electrical Engineering — **May 2026**
GPA: 3.83/4.0
University of Florida Honors Program, Gainesville, FL

WORK EXPERIENCE

Product Design Engineer — **August 2025 – May 2026**
Exactech Inc | Gainesville, FL
- Designed a custom 4-layer PCB-based bioimpedance measurement system using AD5941 and STM32G0
- Owned schematic design, PCB layout, soldering, firmware bring-up, and hardware validation
- Wrote Embedded C firmware for SPI/I2C, OLED, GPIO, reset, and interrupt testing
- Debugged power, communication, and mixed-signal behavior during board bring-up
- Generated technical documentation for design iterations, test results, and debugging workflows

Research Assistant — **August 2023 – May 2026**
Brain Mapping Lab, University of Florida, Gainesville
- Developed multimodal pipelines (EMG, audio, video), improving tic detection
- Trained a YOLOv8 machine learning algorithm for automated tic detection in Tourette patients
- Co-authored a peer-reviewed publication on a multimodal tic detection pipeline[1]
- Presented research at the BMES 2024 Annual Meeting

Research Intern — **June 2025 – August 25**
Lewis Lab, Massachusetts Institute of Technology, Cambridge
- Segmented HERCULES-edited MRS data using EEG-based sleep stage classification
- Worked on quantifying changes in 13 brain metabolites across healthy and depressed subjects
- Assisted in overnight polysomnography and MRI data acquisition in human studies

Research Intern — **June 2024 – August 24**
Murthy Lab, Princeton University, Princeton
- Analyzed FlyWire connectome data on Drosophila LC11 neurons for structure-function relationships
- Discovered inhibitory synapse predominance, challenging the center-surround antagonism model
- Shadowed split-GAL4 genetic experiments to complement computational work
- Presented findings at Society for Neuroscience (SfN) 2024

Research Intern — **January 2023 – December 23**
American Society of Pharmacognosy, University of Florida, Gainesville
- Expressed and purified 32 UbiA terpene synthases in a GGPP-E. coli overproduction system
- Applied molecular docking and mutagenesis to characterize activity
- Co-authored 3 publications in Nature[2], ScienceDirect[3], and ACS Catalysis[4]
- Presented findings at the 2023 American Society for Pharmacognosy Annual Meeting

Resident Assistant — **August 2023 – May 2025**
Housing and Residential Life, University of Florida | Gainesville, FL
- Devise events to encourage community belonging among 32 residents
- Enforce community standards and policies to ensure a safe and supportive living environment
- Serve in an on-call rotation by responding to emergencies and crises

LEADERSHIP & SERVICE

Product Designer — **August 2023 – May 2024**
Generational Relief in Prosthetics, University of Florida | Gainesville, FL
- Designed and optimized Unlimbited prosthetic arm using SolidWorks
- 3D printed and conducted non-destructive testing on a prosthetic arm

Director of Interfaith Affairs — **August 2022 – May 2024**
Student Government, University of Florida | Gainesville, FL
- Program interfaith events to encourage a campus environment open to students of all faiths
- Ensure a cohesive relationship between the 9 religious groups on campus

Undergraduate Teaching Assistant — **August 2023 – December 2023**
Secrets of Alchemy, University of Florida | Gainesville, FL
- Graded weekly lab reports and provided helpful feedback
- Held office hours for a class of 60 students: increasing grade by 20%

- Assisted the instructor in preparing the lab, supporting students during the lab, and cleaning up

SKILLS

- **Programming:** NEURON, Python, MATLAB, C++, R, HTML, SLEAP.ai, Label Studio,
- **Design & Analysis:** MRS, SolidWorks, Fusion 360, Connectomics, AutoDock Vina, Biostatistics, EEG sleep scoring
- **Laboratory:** MRI, EEG, DMA, TMA, PCR, Genetic Mutation, NMR data analysis, Molecular Docking, GC-MS data analysis
- **Software:** Microsoft Office, Adobe Photoshop, Premiere Pro, After Effects, InDesign, Illustrator
- **Hardware:** Embedded C, STM32, AD5941, SPI/I2C, PCB Design (KiCad), Prototyping, Circuit Debugging
- **Language**: Fluent: English, Twi |Conversational: French

AWARDS/SCHOLARSHIP

- Undergraduate Student Excellence Award- UF BME **December 2025**
- AI Scholars Program- $1750 research stipend **August 2025 – May 2026**
- University Scholars Program- $1750 research stipend **August 2024 – May 2025**
- Certificate of Outstanding Merit from the College of Engineering **November 2023**
- UF Hamilton Center Society Fellow- $2,500 stipend and trip to Oxford and Cambridge University **August 2023**
- American Society of Pharmacognosy - $5000 research stipend **May 2023 –August 2023**
- Wentworth Travel Scholarship – $500 Research Travel Funding **May 2023 – August 2023**
- Emerging Scholar Award- $1000 research stipend **January 2023**
- Davis United World Scholar- $160,000 fully funded University of Florida undergraduate degree **August 2022 – May 2026**

PUBLICATIONS

[1] G. Lowor *et al.*, "A comparative study of video-based and electromyography-based detection of tics," *Clin. Park. Relat. Disord.*, vol. 14, p. 100438, 2026, doi: 10.1016/j.prdoa.2026.100438.

[2] X. Wei *et al.*, "Exploring and expanding the natural chemical space of bacterial diterpenes," *Nat. Commun.*, vol. 16, no. 1, p. 3721, Apr. 2025, doi: 10.1038/s41467-025-57145-6.

[3] T. A. Alsup, M. Osei Opoku, and J. D. Rudolf, "Characterization of UbiA terpene synthases with a precursor overproduction system in Escherichia coli," in *Methods in Enzymology*, vol. 699, Elsevier, 2024, pp. 395–417. doi: 10.1016/bs.mie.2024.02.001.

[4] T. A. Alsup *et al.*, "Discovery of UbiA-Type Cyathane Synthases in Bacteria," *ACS Catal.*, vol. 15, no. 19, pp. 16873–16881, Oct. 2025, doi: 10.1021/acscatal.5c04650.