

Melvin Osei Opoku

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EDUCATION

Bachelor of Science in Biomedical Engineering, Minor in

May 2026

Electrical Engineering

GPA: 3.82/4.0

University of Florida Honors Program, Gainesville, FL

WORK EXPERIENCE

Undergraduate Research Assistant

August 2023 – Present

Brain Mapping Lab, University of Florida, Gainesville

- Developed multimodal pipelines (EMG, audio, video), improving tic detection by 70%
- Built machine learning algorithms for automated tic detection in Tourette patients
- Co-authored a manuscript
- Presented findings 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 UbiA terpene synthases in a GGPP-E. coli overproduction system
- Screened 32 enzymes, identifying 5 novel diterpene synthase functions
- Applied molecular docking and mutagenesis to characterize activity
- Co-authored 3 publications in Nature[1], ScienceDirect[2], and ACS Catalysis[3]
- 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 2025 – Present

Exactech Inc | Gainesville, FL

- Designed electronic circuitry for a hand-held intra-operative humeral bone quality assessment tool
- Benchmark tested electrical impedance against humeral bone quality

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:** 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:** Circuitry, PCB Design (KiCad), Prototyping
- **Language:** Fluent: English, Twi | Conversational: French

AWARDS/SCHOLARSHIP

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| • 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] *Xiuting Wei, Wenbo Ning, Caitlin A. McCadden, Tyler A. Alsup, Zining Li, Diana P. Łomowska-Keehner, Jordan Nafie, Tracy Qu, Melvin Osei Opoku, Glen R. Gillia, Baofu Xu, Daniel G. Icenhour & Jeffrey D. Rudolf. "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.*
- [2] *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.*
- [3] *Tyler A. Alsup, Diana P. Łomowska-Keehner, Melvin Osei Opoku, Zining Li, Caitlin A. McCadden, Tracy Qu, Glen Gillia, Jordan Nafie, and Jeffrey D. Rudolf, "Discovery of UbiA-Type Cyathane Synthases in Bacteria," ACS Catal., vol. 15, no. 19, pp. 16873–16881, Oct. 2025, doi: 10.1021/acscatal.5c04650.*