Safiu Sumani Benin

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Education

Scholarships & Honors

Educational Pathways International (EPI) Scholar

Awarded a competitive scholarship based on academic excellence and leadership potential.

University of Ghana — Accra, Ghana

B.Sc. Biomedical Engineering | CGPA: 3.84/4.0
Graduation Date: September 2025
Thesis: *Automated Segmentation and Classification of Tumor Masses and Calcifications for Early Breast Cancer Detection*
Honors: Dean's Honor List
Relevant Coursework: Programming for Engineers (Python Programming), Statistics for Engineers, Numerical Methods, Engineering Graphics with CAD, Biomedical Engineering Systems, Bioinstrumentation, Medical Imaging, Medical Signal & Image Processing, Biomechanics, Biomaterials, Design and Selection of Biomaterials, Design of Mechanical Systems, Cell and Molecular Biology, Tissue Engineering, Research Methods, Bio-photonics, Anatomy and Physiology, Engineering Principles of Anatomy & Physiology, Bioelectronics, Biophysics, Bioinformatics, Medical Physics.

Nandom Senior High School — Nandom, Ghana

Program: General Science
WASSCE Aggregate: 10
Duration: September 2018 – October 2021

Experience

Operation Smile – Medical Mission Internship

Koforidua, Ghana
June 2024 (8-day intensive mission)

- Set up operating room (OR) theatres daily alongside the Biomedical Engineering lead.
- Performed maintenance, cleaning, packing, and minor repairs of mission equipment and surgical tools.
- Conducted safety checks and functionality testing on biomedical devices prior to procedures.
- Supported equipment logistics, including inventory management, allocation, and end-of-day shutdown procedures.

University of Ghana, Biomedical Engineering Department — ML/AI & Molecular Docking Intern

Accra, Ghana
March – April 2024

- Executed a capstone project on prostate cancer detection and segmentation using Machine Learning and Deep Learning.
- Performed molecular docking of protein–ligand complexes using AutoDock and PyRx.
- Completed daily ML and DL exercises, implementing small models and tasks.

Upper West Regional Hospital — Biomedical Engineering Intern

Wa, Ghana
September – October 2023

- Set up operating room equipment for daily surgical use.
- Conducted daily ward rounds to inspect and verify equipment functionality across hospital departments.
- Operated the hospital's oxygen plant for two weeks, assisting in oxygen production and quality checks.
- Assisted in troubleshooting and repairing a dental X-ray machine and recalibrating steam sterilizers/autoclaves at the CSSD.

Leadership & Activities

Engineering Students of University of Ghana (ESUG) — Accra, Ghana

Head, Financial Committee | *2023–2024 Academic Year*

- Oversaw budgeting, dues management, and financial planning for engineering student activities.
- Coordinated financial logistics for events, workshops, and student initiatives.

Biomedical Engineering Class of 2025 — University of Ghana

Course Representative (Level 100 – Level 300)

- Served as liaison between faculty and students, communicating academic updates and coordinating coursework-related issues.

Sissala Students Union, University of Ghana Chapter — Accra, Ghana

Public Relations Officer

- Managed communications, publicity, and engagement strategies for student events and programs.

Co-Founder — Student Study Group

- Organized peer-learning sessions and collaborative academic support for engineering students.

Nandom Senior High School — Nandom, Ghana

- House Prefect
- Organizer—Science and Maths Quiz Club

Community Volunteering

Volunteer Teacher — Community Basic School

Membership in Professional Associations

VISPAD Research Team

- Ghana Society of Biomedical Engineers (GSBE-UG Chapter)
- Engineering Students of University of Ghana (ESUG)
- Ghana Muslim Students Association (GMSA)

Projects

Electronic Health Records System (EHRS)

BMEN 202 – Introduction to Biomedical Engineering | Semester Project, 2022/2023
Tools: Python, HTML, CSS, SQL, PowerPoint, Word

- Developed a web-based EHRS for efficient doctor–patient interaction and secure data storage.
- Designed patient and doctor portals for appointment scheduling and data requests.

Wheelchair Design for Persons with Disability

SENG 105 Engineering Graphics with CAD & SENG 107 Introduction to Engineering | 2022/2023
Tools: SolidWorks, PowerPoint, Word

- Designed a complete CAD model of a wheelchair in SolidWorks.
- Applied engineering design principles and delivered a full technical design report.

Quantification of CO Emissions & Eco-Friendly Coal Pot Design

BMEN 315 – Research Methodology | Semester Project, 2023/2024
Tools: PowerPoint, Word

- Researched quantification methods for CO emissions from traditional coal pots.
- Proposed an Fe_2O_3-based coal pot design to minimize CO exposure and emissions.

Mobile IV Delivery System for Enhanced Patient Mobility

BMEN 306 – Design and Selection of Biomaterials | 2023/2024
Tools: SolidWorks, Fusion 360, PowerPoint, Word

- Designed a mobile IV delivery system using the engineering design process.

- Created mock-ups and conducted Finite Element Analysis (FEA) using SolidWorks and Fusion 360.

Adjustable Ankle Orthotic Shoe Lift for LLI Patients

BMEN 308 – Design of Mechanical Systems | 2023/2024
Tools: SolidWorks, Fusion 360, PowerPoint, Word

- Designed an adjustable ankle orthotic shoe lift for patients with leg-length inequality (LLI).
- Performed material selection and conducted FEA simulations.

Refrigeration System for Everlasting Morgue Consortium (Benchmarking Study)

BMEN 322 – Local Issues in Biomedical Engineering | 2023/2024
Tools: Excel, SolidWorks, PowerPoint, Word

- Researched industry refrigeration systems and created a benchmarking framework.
- Selected optimal brands and produced CAD models of the top recommendations.

Low-Cost SMS-Enabled Telemetry System for Detecting Febrile Hypoxia

BMEN 416 – Telemetry and Telemedicine | 2024/2025
Tools: Arduino, Hubtel API, SolidWorks

- Programmed Arduino microcontroller for physiological monitoring.
- Integrated Hubtel SMS API for remote data access and alerts.
- Designed a device housing model using SolidWorks.

Thoraco-Lumbo-Sacral Orthosis (TLSO) – CASH Brace Design

BMEN 422 – Orthotics and Prosthetics | 2024/2025
Tools: SolidWorks, Fusion 360

- Reverse-engineered the Cruciform Anterior Spinal Hyperextension (CASH) brace.
- Created a full 3D design model using SolidWorks and Fusion 360.

Automated Segmentation & Classification of Breast Cancer Tumors and Calcifications

BMEN 400 – Final Year Project | 2024/2025
Tools: Python, PyTorch, Kaggle, Google Colab, HTML, CSS

- Collected and preprocessed datasets from INBreast and CBIS-DDSM.
- Built ML models for tumor and calcification segmentation and classification.
- Deployed the model through a web application for clinical integration.

Skills & Interests

Technical Skills: Python (PyTorch, TensorFlow, OpenCV), Arduino, SolidWorks, Fusion 360, Proteus, PyMOL, PyRx, MODELLER, AutoDock

Laboratory & Engineering Skills: Imaging analysis, Signal analysis, Biomedical equipment troubleshooting, Engineering Design, Research

Languages: English (Official Language), Local Languages: Sissali (fluent), Twi (beginner)
Interests: Anime & Manhwa, Gaming, Coding for fun