

# Francis Aweenagua

faweenagua@gmail.com

[LinkedIn](#) | [GitHub](#) | [Website](#)

## EDUCATION

### Ashesi University

BSc. Computer Engineering

Berekuso, Eastern Region, Ghana

Graduated: 5 June 2021

## RESEARCH INTERESTS

Robot Learning, Robot Perception, Computer Vision, Robot Decision Making, Robot Autonomy, Multi-Agent Robot Systems, Sensing, Internet of Things.

## ACHIEVEMENTS/AWARDS

<b>Spot Award Winner (Scholarship)</b> , Ashesi University	<b>Oct 2023</b>
<b>Most Outstanding Teaching Assistant (Nominee)</b> , Ashesi University	<b>Nov 2022</b>
<b>Magna Cum Laude</b> , Ashesi University	<b>Jun 2021</b>
<b>First Runner-up</b> , Ashesi University Table Tennis Tournament	<b>Nov 2019</b>
<b>Best Young Researcher (Honorary Award)</b> , ACM SIGCAS COMPASS	<b>Jul 2019</b>
<b>*Dean's List</b> (all semesters), Ashesi University	<b>Dec 2017 – May 2021</b>
<b>Foundations of Design and Entrepreneurship Idea Competition Winner</b> , Ashesi University	<b>Dec 2017</b>
<b>MasterCard Foundation Scholarship</b> , Ashesi University	<b>Aug 2017 – Jun 2021</b>
<b>RISE Robotics Competition Winners (Northern Zone)</b> , Ghana Robotics Academy Foundation	<b>Sept 2013</b>

## WORK AND RESEARCH EXPERIENCE

### Ashesi Robot Assistant Platform – Ashesi University

**Sep 2024 – Present**

#### Research Assistant

- Designed a ROS-enabled interactive service robot for use as a research platform at Ashesi University and other universities across Africa.

### Ashesi Micromouse Robotics Competition [\[Link\]](#) – Ashesi University

**Mar 2024 – Present**

#### Founder and Organising Committee Chair

- Founded and organized the first-of-its-kind student robotics competition at Ashesi University to promote robotics education, hone students' skills, and foster experiential learning.
- Trained over 70 students to become proficient in circuit and PCB design, robot design, and algorithms.

### Dignitti Robotics [\[Link\]](#) – Accra, Ghana

**Mar 2023 – Present**

#### Founder and CEO

- Founded Dignitti Robotics to develop cutting-edge robotics solutions through research and development while actively promoting the growth of robotics in Africa through targeted education and training initiatives.
- Trained over 50 elementary and middle school students to become proficient in building and programming robots to accomplish diverse tasks, including obstacle avoidance, line following, and navigation.

### Ashesi Resourceful Engineering Lab – Ashesi University

**Jun 2022 – Aug 2024**

#### Research Assistant

- Engineered a solar panel soiling monitoring system to collect performance data from mounted solar panels and environmental conditions for investigating solar panel soiling.
- Developed a smart biogas digester equipped with sensors to monitor digester conditions and transfer data via Wi-Fi to the cloud for centralized storage, visualization, and in-depth analysis.

### ÉnergieRich [\[Link\]](#) – Tamale, Ghana

**Feb 2022 – Present**

#### Engineering and Social Media Lead

- Coordinated the engineering team and provided technical and logistical support for the development of locally made solar panels to provide cheap and reliable electricity to over 150 people in three rural communities.
- Developed a STEM education program and trained over 150 kids from underprivileged communities to become proficient in basic electronics, programming, e-waste recycling, and data analytics.

### Engineering Department – Ashesi University

**Sept 2021 – Dec 2022**

#### Teaching Assistant: Digital Systems Design, Internet of Things,

Introduction to Engineering, Year III Group Project & Seminar

- Prepared comprehensive and hands-on lab experiments to enrich students' understanding of course concepts through practical application.
- Nominated among the top four nominees for the Most Outstanding Teaching Assistant Award by my students.

### RePsyche App – Ashesi University

**Mar – Jun 2019**

#### Researcher and App developer

- Researched the efficacy of a reward-based plastic segregation and collection mobile application for sustainable plastic recycling in Ghana.
- Presented our research poster at the 2019 ACM SIGCAS Conference on Computing and Sustainable Societies in Ghana, for which I was awarded the honorary Best Young Researcher Award.

## PUBLICATIONS

- **F. Aweenagua**, S. Isaacs, J. Takyi, A. Antwi Afari, and H. R. Beem, "Experimental Approaches for Estimating the Mass of Dust Soiling on PV Modules Using Coupons," presented at the *IEEE International Conference on Artificial Intelligence and Green Energy (ICAIGE 2024)*, Yasmine Hammamet, Tunisia, 2024. (Awaiting publication).
- **F. Aweenagua**, S. Isaacs, J. Takyi, and H. R. Beem, "Ashesi Solar Monitoring Network (ASMONET): An IoT-Enabled Network for Ground-Based Soiling Measurements in West Africa," presented at the *52nd IEEE Photovoltaic Specialists Conference (PVSC 52)*, Seattle, Washington, 2024. (Awaiting publication).
- **F. Aweenagua**, J. Takyi, M. N. V. Williams, F. A. Gatsi and H. R. Beem, "Design and Implementation of an IoT-based Smart Household Biogas Digester," *2024 IST-Africa Conference (IST-Africa)*, Dublin, Ireland. IEEE 2024. [\[Link to paper\]](#).

## PRESENTATIONS AND CONFERENCES

- Virtual Oral Presentation** – "Experimental Approaches for Estimating the Mass of Dust Soiling on PV Modules Using Coupons." IEEE International Conference on Artificial Intelligence and Green Energy (ICAIGE 2024) [\[Video\]](#). **Oct 2024**
- Poster Presentation** - "Ashesi Solar Monitoring Network (ASMONET): An IoT-Enabled Network for Ground-Based Soiling Measurements in West Africa." 52nd IEEE Photovoltaic Specialists Conference (PVSC 52), Seattle, Washington. **Jun 2024**
- Virtual Oral Presentation** - "Design and Implementation of an IoT-based Smart Household Biogas Digester." 2024 IST-Africa Conference (IST-Africa) [\[Video\]](#). **May 2024**
- Oral Presentation** – "Health Kiosk: An IoT-Based Community Health Centre." 1st Annual Engineering Conference. Accra, Ghana. **Nov 2023**
- Virtual Guest Lecture** – "The impact of Socio-cultural diversity and the lack of quality environmental data on collecting and interpreting environmental data in Ghana." University of California, Santa Barbara. **Oct 2023**
- Virtual Guest Lecture** – "Ghanaian cultural practices and their influence on environmental data biases and accuracy." University of California, Santa Barbara. **Apr 2022, Oct 2022**
- Poster Presentation** – "RePsyche: Sustainable Plastics Recycling Management." ACM SIGCAS Conference on Computing and Sustainable Societies, Accra, Ghana. **Jul 2019**

## PROJECTS

- Face Tracking Drone Project** – Ashesi University **Nov 2023**
- Implemented a PID-controlled face-tracking algorithm for a quadcopter drone using OpenCV and Python.
- Line Following Drone Project** – Ashesi University **Sep 2023**
- Programmed a quadcopter drone to navigate a confined area by following a line using OpenCV and Python.
- Robotics Software Engineer Nanodegree** - Udacity **Aug - Dec 2023**
- Derived Inverse and Forward Kinematics for a Kuka KR210 robotic arm and implemented the kinematics using Python and ROS for a pick-and-place project simulated using Gazebo and Rviz.
- Fire Alert Robot (FARbot)** - Ashesi University **Apr - Dec 2019**
- Built a four-wheeled robot with autonomous and manual navigation and environmental sensor integration for indoor condition surveillance and display on a mobile application.
- Robotic Arm and Conveyor Belt** - Ashesi University **Jun - Aug 2018**
- Developed a pick and place sorting system comprising an autonomous and manually operated robotic arm and conveyor belt system with a custom remote control.

## GRANTS

- Scholars Entrepreneurship Fund** – MasterCard Foundation, Ashesi University **Aug 2022**
- OSUN Civic Engagement Grant** – Open Society University Network **Oct 2021**
- Baobab Opportunity Search Fund** – Baobab, Arizona State University **Feb 2021**

## RELEVANT SKILLS

- **Programming Languages:** Advanced in C/C++, Python, JavaScript, PHP, HTML, CSS, Bootstrap, MySQL, and Arduino | Intermediate in LaTeX, React, Java.
- **Software Tools:** Arduino, ROS, Gazebo, Rviz, MoveIt, Linux, Git/GitHub, OpenCV, MATLAB, KiCAD
- **Microsoft Packages:** Advanced in PowerPoint and Word, Intermediate in Excel.

## REFERENCES

Dr. Dena Montague Executive Director ÉnergieRich Address: 1409 De La Vina St #7, USA Phone: +1 650 336-3247 Email: denam@stanford.edu	Dr. Heather Beem Senior Lecturer in Engineering Ashesi University Address: 1 University Avenue, Ghana Phone: +233 26 443 1089 Email: hbeem@ashesi.edu.gh	Mr. Francis Gatsi Lecturer in CSIS Ashesi University Address: 1 University Avenue, Ghana Phone: +233 24 430 1112 Email: fgatsi@ashesi.edu.gh
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\*Dean's List – Awarded to students with a GPA of 3.5 and above