

# Francis Aweenagua

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

## EDUCATION

### Ashesi University

BSc. Computer Engineering

Berekuso, Eastern Region, Ghana

Graduated: June 5, 2021

## RESEARCH INTERESTS

Multi-Robot, Human-Robot Collaboration, Networked Robots, Sensing, Learning, Internet of Things, Safe and Autonomous Planning Under Uncertainty, Robot Perception.

## 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 and currently implementing an interactive multi-robot assistant platform to serve as delivery robots and campus guides for Ashesi University.

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

Mar 2024 – Present

#### Founder and Organising Committee Chair

- Founded and organized the Ashesi Micromouse Robotics Competition in collaboration with the Faculty of Engineering and Computer Science to promote robotics, hone students' skills, and foster experiential learning.
- Trained over 70 students to become proficient in robot design, algorithms, circuit design, and PCB design.

### 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

- Developed and tested a novel semi-automated solar panel soiling measurement approach and integrated Internet of Things technologies for remote data collection, analysis, and insight generation. [\[Link\]](#)
- 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. [\[Link\]](#)

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

Feb 2022 – Present

#### Engineering and Social Media Lead

- Coordinated the engineering team and provided technical and logistical support for developing 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," *IEEE International Conference on Artificial Intelligence and Green Energy (ICAIGE 2024)*, Yasmine Hammamet, Tunisia. IEEE 2024. (Accepted).
- **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," *52nd IEEE Photovoltaic Specialists Conference (PVSC 52)*, Seattle, Washington. IEEE 2024. [\[Paper\]](#).
- **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. [\[Paper\]](#).

## 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 [\[Poster\]](#). **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 2018**
- 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, OpenAI Gym, Stable Baselines3, Linux, Git/GitHub, OpenCV, MATLAB, KiCAD, Cisco Packet Tracer.

## REFERENCES

Heather Beem, Ph.D Senior Lecturer in Engineering Ashesi University Address: 1 University Avenue, Ghana Phone: +233 26 443 1089 Email: hbeem@ashesi.edu.gh	G. Ayorkor Korsah, Ph.D Senior Lecturer of CS & Robotics Ashesi University Address: 1 University Avenue, Ghana Phone: +233 30 261 0330 Ext. 1029 Email: akorsah@ashesi.edu.gh	Stewart Isaacs, Ph.D Postdoctoral Research Fellow Massachusetts Institute of Technology Phone: +1 (513) 446 0309 Email: sisaacs@mit.edu
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\*Dean's List – Awarded to students with a GPA of 3.5 and above