

# Samuel Folorunsho

## Curriculum Vitae

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### Education

- Jan 2021 – May 2023 **University of Illinois at Urbana-Champaign, M.S., Agricultural & Biological Engineering.**  
Specialization: Dynamics, Control and Computer vision systems  
Current GPA: 3.87/4.0
- Oct 2012 – Sep 2017 **University of Ilorin, Ilorin, Nigeria, Bachelor of Science, Agricultural & Biosystems Engineering.**  
Specialization: Power and Machinery Engineering  
Degree GPA: 4.54/5.0 *Graduated departmental summa cum laude*

### Experience

#### Research Experience

- Jan 2021 – present **Graduate Researcher, University of Illinois, Urbana, Illinois.**  
*Allen Research Group*  
Advisor: Dr Cody Allen  
– **Look ahead controller for a self-propelled agricultural boom sprayer** with trajectory planning and obstacle avoidance  
– **Real time vision-based control** of a self-propelled tractor for tillage applications
- Oct 2016 – Jun 2017 **Undergraduate Researcher, University of Ilorin, Ilorin, Nigeria.**  
*Power, Machinery and Control Lab*  
Advisor: Dr. Joshua Olaoye  
– **Developed** an automatic poultry house lighting control system
- Jul 2016 – Sept 2016 **Undergraduate Researcher, University of Ilorin, Ilorin, Nigeria.**  
*University of Ilorin Renewable Energy Lab*  
Advisor: Dr. Clement Akoshile  
– **Investigated** the enabling features of low-temperature combustion with biodiesel in improving emission and efficiency

#### Industry Experience

- Jun 2022 – Aug 2022 **Robotics and Automation Intern, CORTEVA INC., University of Illinois Research Park, Urbana, Illinois.**  
– **Supported the development of updated software** for an under-canopy robot which reduced the robot crash rate below 2 in 1000 ft  
– **Utilized RGB images from under canopy robot to develop vision based models** which improved crop phenotyping and breeding  
– **Developed a DeepSORT model** for easier crop trait identification, tracking and counting
- Jan 2018 – Dec 2020 **Associate, SOLINA CENTRE FOR INTERNATIONAL DEVELOPMENT AND RESEARCH, Abuja, Nigeria.**  
*Northern Nigeria Routine Immunization Strengthening Program*  
– **Coordinated the costing, procurement and installation of 40 solar direct drive refrigerators** and 3 walk-in cold rooms which improved cold chain equipment saturation in Yobe state from 72% to 90%  
– **Managed the biweekly distribution of potent vaccines** (worth thousands of dollars) and reduced vaccine stock out from 21% to 2% within one year at 375 service delivery points in Yobe State, Nigeria  
– **Served as lead assessor** in the GAVI/Federal Government of Nigeria funded Cold chain equipment optimization plan assessment across 119 facilities in Yobe State  
– **Developed excel-based dashboards and models** for company wide streamlining of routine analysis and report, thereby enhancing work output and timeliness  
– **Coordinated data gathering process from all data sources** and was responsible for timely preparation of weekly, monthly, quarterly, and annual reports sent to the program funders and other stakeholders.

- Jul 2015 – Jan. 2016 **Intern**, NATIONAL CENTER FOR AGRICULTURAL MECHANIZATION, Ilorin, Nigeria.  
 – Participated in the design, fabrication, and installation of agro-allied and fast-food machines  
 – Involved in the design and development of control system of a “tricketor” -3 wheeled mini farm tractor- for the integrated farm

### Teaching Experience

- Aug 2022 – Dec 2022 **Teaching Assistant**, ABE 466: OFF-ROAD VEHICLES ENGINEERING, University of Illinois, Urbana.  
 Organized office hours, conducted lab sessions and graded lab reports and homeworks
- Oct 2014 – Jun 2017 **Undergraduate-level Engineering course tutor**, UNVIERSITY OF ILORIN, Ilorin, Nigeria.  
 Taught classes including algebra, calculus, mechanics, controls, dynamics, hydraulics, thermodynamics, and heat transfer

### Leadership , Volunteer and Outreach Experience

- Jun 2021 – present **Sound technician**, TWIN CITY BIBLE CHURCH, Urbana, Illinois.  
 Setup, maintain, operate and mix sound systems for church activities
- Feb 2019 – present **Volunteer**, SOLARAID, London, United Kingdom.  
 Eradicating poverty and climate change in Africa, through innovations and awareness creation.
- Apr 2018 – present **Member**, YOUNG AFRICAN LEADERS INITIATIVE, Washington DC, United States.  
 Raising awareness and spurring action on energy and environmental challenges in Africa
- Oct 2016 – Aug 2017 **President**, DAREWORD STUDENT ASSOCIATION, University of Ilorin, Nigeria.  
 Pioneered a mentoring program that helped 45 freshmen adjust to college in its first year. The program has been self sustaining
- Oct 2016 – Aug 2017 **Mentor**, DAREWORD PEER MENTORING, University of Ilorin, Ilorin, Nigeria.  
 Provided both academic and non-academic guidance to new students helping them adapt to new life in the University
- Oct 2016 – Nov 2016 **Team lead**, ENGINEERING COMMUNITY BASED EXPERIENCE SCHEME, Ilorin, Nigeria.  
 Led 40 seniors on a community development project. We repaired water systems, roads and gave career talks at the high school

### Honors

- [2021] Awardee, Nigerian Petroleum Technology Development Fund(PTDF) Overseas scholarship
- [2017] Best Graduating Student, Department of Agricultural and Biosystems Engineering , University of Ilorin
- [2013 – 2017] University Scholar, University of Ilorin Senate
- [2017] Most innovative senior , Department of Agricultural and Biosystems Engineering, University of Ilorin
- [2016] Recipient, Rev. Tony Akinyemi Foundation Scholarship (rTSF)
- [2015] Faculty of Engineering Scholar, Faculty of Engineering and Technology, University of Ilorin

### Projects

- [2022] Co-developed a vision and LIDAR based navigation and control software for an under-canopy robot  
 – Updated software improved the performance of the robot with crash rate reduced below 2 in 1000ft
- [2021] Co-developed a dynamic model of an autonomous tractor-cart system controlled using MRAC and L1 adaptive controllers  
 – Analysis of the system shows that L1 adaptive control is superior to MRAC as L1 decouples the adaptation loop from the control loop, enabling arbitrarily fast adaptation without sacrificing robustness
- [2017] Developed an automatic Poultry House Lighting Control System utilizing Proteus and C  
 – A time & event-based system that controls the lighting in a poultry house based on the age and lighting requirement resulting in 20% reduction in energy consumption and improved productivity

- [2017] Investigating the enabling features of low-temperature combustion with biodiesel in improving emission and efficiency
  - Experiment revealed that biodiesel improved combustion phasing substantially relative to petroleum diesel, causing the indicated fuel conversion efficiency of biodiesel to be 6% higher
- [2015] Supported the development of biogas digester and production of methane gas
  - The digester produced 2200 Litres of biogas (55.3% CH<sub>4</sub>, 43.9% CO<sub>2</sub>, and 0.8% H<sub>2</sub>)

## Skills and Software Experience

General PYTHON, MATLAB, SIMULINK, C++, AUTOCAD, SOLIDWORKS, ROS, TORCH, PLC, PROTEUS, R

Others ARDUINO, L<sup>A</sup>T<sub>E</sub>X, MS SUITE, YALMIP, SPSS, LABVIEW, ARCGIS, RASPBERRY PI, PHOTOSHOP

Languages FLUENT ENGLISH, NATIVE YORUBA, CONVERSATIONAL SIGN LANGUAGE

## Professional Activities

Member Nigerian Society of Engineers

Graduate member SAE International

Attendee AgTech Summit, IL. 2022

Attendee Controls symposium: Control challenges in soft Robotics, IL. 2021

Attendee AgTech Summit, IL. 2021

Attendee Electrical safety symposium, IL. 2021

Attendee Illinois Autonomous Farm workshop, IL. 2021

## Relevant Experience/Coursework

- PID, MRAC, L1, LQR & Model Predictive Control
- Autonomous Vehicle Systems & ROS
- Off-Road Vehicle Design & 3D Printing
- Bio-inspired robots and biological systems
- Stereo and multi-spectral camera and sensors
- Deep learning and computer vision
- Nonlinear/Linear Control Theory and Design
- Powertrains and I.C Engine Modeling
- Image processing
- Tractor testing