

Joseph Ovwemuvwose

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EMPLOYMENT HISTORY

March 2021 – May 2022: Researcher, Université de Montpellier, Institut de Recherche pour le Développement (IRD), France.

Worked with a multidisciplinary team of researchers to develop and optimize a portable nuclear magnetic resonance (NMR) device to measure water uptake, transport and transpiration and carbon allocation in plant.

Designed and conducted flux and time domain nuclear magnetic resonance (TD-NMR) experiments to model plant physiological traits using the NMR signal and other measurable parameters.

Processed and analysed data with R, Matlab and Python.

Oct 2020 – Jan 2021: Technical Assistant, Vision Express, United Kingdom.

Processed the orders of more than 250 customers daily while ensuring that customers get the best service using Microsoft excel and other data processing software.

Oct 2019: Registration Assistant, One Young World, London, UK.

Registered and coordinated the activities of delegates during the 2019 One Young World summit in London.

Organized a team of 12 to facilitate the dinner programme for more than 690 international delegates.

Apr 2018 – Aug 2019: Regional Manager, Scripture Union, Nigeria.

Recruited and trained more than 250 volunteers, reached above 3000 children, established contact with ten organizations and raised about £4000 for projects within fifteen months.

Created the digital database of volunteers and children for the organization.

Jul 2016 – Dec 2017: Academic Tutor, National Open University of Nigeria, Lecture Centre

Prepared, planned, and delivered lectures and mentored undergraduates.

Apr 2015 – May 2016: National Youth Service Corps Nigeria.

Raised and coordinated a team of 16 corps members who volunteered to reached out to members of rural communities during a humanitarian campaign to donate medications, foodstuff, and clothes.

Conducted community outreaches to teach life skills to locals in rural areas.

ACADEMIC QUALIFICATIONS

PhD Research (Physics), Imperial College London (2026)

MSc. University of Nottingham (2020)

BSc. University of Benin (2015)

RESEARCH INTERESTS

My research endeavour centres on understanding the underlying dynamics and the impact genetic and environmental interactions has on plant's productivity as an individual entity and

at the ecosystem level. This involved using the omics technologies (genomics, transcriptomics, proteomics, and ionomics) to investigate some of these relations. I have used the molecular biology techniques called genome wide association studies (GWAS) of single nucleotide polymorphism (SNP) to explore the association between phenotypic traits variability in plants in response to changes in environmental variables and the possible underlying genetic influences. I am also fascinated by the development of devices to non-invasively measure plant related ecophysiological traits such as carbon allocation, water uptake, transport, and transpiration. Modelling is also a huge part of my research undertakings. It serves to quantifying these interactions to understand how plant traits (ecosystem productivity, resource use efficiency, ecosystem exchange etc) vary across different spatial (individual, biomes, ecosystem, and global level), temporal (daily, annual, decades and even centuries) scales. My modelling focus is on computing impact of changes in plant related environmental variables like precipitation, solar radiation, soil moisture content, vapour pressure deficit, atmospheric CO₂ concentration and others on single plant and whole ecosystem productivity. Managing the genetic and environmental interaction to maximize agricultural productivity to practically tackle the challenge of food insecurity especially in developing countries using techniques based on science is the core of my research interests.

AWARDS AND HONOURS

2022 - LEMONTREE PhD research scholarship award

2019 - Chevening postgraduate scholarship award (Masters)

2011 - Shell Petroleum Development Company University Scholarship award.

2006 - Shell Petroleum Development Company Secondary School Scholarship award.

RESEARCH OUTCOMES FROM ALL PREVIOUS GRANTS

My last project involves the development of a portable nuclear magnetic resonance (NMR) device to measure sap flow, transpiration, and carbon allocation in plants. Climate change is impacting land use and crop productivity due to irregular weather patterns especially in developing countries where most of the crop production is rainfed. Inadequate rainfall leads to drought which causes water stress that eventually leads to reduction in yield or complete crop failure. To tackle these challenges, crop breeders need to select climate smart crops that are resilient to environment stress such as drought and high temperature for breeding programmes. Many of the techniques used to phenotype crops for water use efficiency (amount of carbon gain per unit of water transpired) are invasive. My research was aimed at developing a portable nuclear magnetic resonance (NMR) device that operates at 340mT. It uses the magnetic properties of protons in water to generate quantifiable signals. During the project, the device was used to measure time domain NMR parameters such as longitudinal (T1) and transverse (T2) relaxation times, signal intensity, and apparent diffusion coefficient (ADC) in plant in response to variation in environmental conditions such as soil moisture content, temperature, CO₂ concentration and vapour pressure deficit. The study helps to optimize the device to non-invasively quantify the mentioned time-domain NMR parameters as a means to understanding the impact of changes in environmental variables on plants.