Aina Ademola Ibukun, Ph.D.

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Trait and Gene Discovery | Quantitative & Population Genetics | Computational Biology

Professional Profile

Plant quantitative geneticist with strong research background in molecular breeding, computational biology, and genotype-phenotype interaction studies. Proven expertise in quantitative trait loci (QTL) and genome-wide association studies (GWAS), trait discovery, marker validation, marker-assisted and genomic selection, study of abiotic stress effects on crops, and the development of cost-effective and high-throughput phenotyping and genotyping methods to improve crop quality and yield. Experienced in the design and implementation of greenhouse and field experiments, conducting multi-omics data analysis, and collaborating in international research consortia.

Research Interests

• Plant Physiology and Characterization • GWAS, QTL Mapping, and Functional Genomics • Plant Evolution, Domestication and Breeding • Alternative Crops and Wild Species Genetics • Soil Health, Forage agronomy and Rangeland Restoration

EDUCATION

International Institute of Tropical Agriculture, (IITA) HQ

Doctor of Philosophy in Plant Genetics December 2021

University of Ibadan, Nigeria

Master of Science in Environmental Biology October 2012

Ahmadu Bello University, Zaria

Bachelor of Science in Agriculture (Crop Science) April 2009

TECHNICAL SKILLS

- **Data analysis:** Proficient in R-programming, Unix/Linux command line, Basic Python, and several genomic and phenomics data analytical tools and software
- **Computer and writing skills:** Proficient in MS office, X/V_LOOKUP, Reference Manager, scientific publication and reviews

EMPLOYMENT HISTORY AND RESEARCH EXPERIENCE

University of Wyoming
Department of Plant Sciences, Sheridan Research and Extension Center (ShREC) Sheridan, WY
Research Scientist – Population and Quantitative Genetics September 2025 - present

- Preparing grant applications, assisting with post award management, and reporting for multiple grants
- Planning and designing, implementing, analyzing (large genomic and phenotypic data sets), and interpretation of lab and field research studies
- Preparing and publishing peer review journal articles and extension outreach publications
- Coordinating research team and activities on a daily and weekly basis while effectively communicating with the larger ShREC management team to ensure coordination of needs and efforts
- Overseeing daily activities of undergrads, grad students, interns, research assistants and other team members
- Supporting research focused largely on plant breeding and genetic improvement through field, greenhouse, and laboratory studies
- Conceptualize and support research across a wide array of subjects, including forage agronomy, rangeland restoration and conservation, weed science, precision agriculture, and breeding

University of Wisconsin-Madison
Department of Plant and Agroecosystem Sciences Madison, WI
Postdoctoral Research Associate - Population and Quantitative Genetics June 2022 – Aug 2025

- Led and collaborated with a diverse team of researchers and citizen scientists to collect and document feral hemp (*Cannabis sativa* L.) populations across the U.S. This is the first ever attempt at creating U.S. feral hemp germplasm ever since its prohibition nearly a century ago
- Coordinated and led projects between faculty at the University of Minnesota and University of Mississippi on PACE assay genotyping markers and GC-MS to analyze cannabinoids in industrial hemp germplasm (~1800 accessions) to ensure diverse and compliant germplasm (<0.3% THC)
- Designed and performed field experiments for phenotypic evaluation of 1800 feral hemp germplasm over multiple years for flowering time, seed quality, seed-nutritional composition, height and yield
- Developed cost effective phenotyping methods for fiber quality and yield traits in hemp
- Performed genomic DNA extraction and library preparation for genotyping by sequencing
- Analyzed highly dimensional genomic and phenomic data sets using *Cannabis* pangenomes for genetic mapping of flowering time, seed quality, and fiber traits
- Assist with permitting and reporting to state authorities and funding agencies
- Produced peer-reviewed publications and develop grant proposals for additional funding for research, education and outreach publications

University of Cambridge Global Challenges Research Fund (GCRF) Project Cambridge, UK
Sainsbury Laboratory and Genetic Resources Center, IITA
Research Supervisor – Plant Imaging June 2019 – August 2020

- Coordinated and led projects between IITA, Sainsbury Laboratory, and University of Ibadan
- Designed field trial experiments for phenotypic evaluation of 100 African yam bean (AYB) accessions for flowering time, photoperiodic sensitivity, and seed quality and yield related traits
- Characterized AYB tuber development and imaging in tuber-forming accessions postharvest
- Coordinated data collection and processing on tuber, bean and nodule yield
- Curated collected data and performed some descriptive analysis
- Monitored and documented the production and flow of plant germplasm among collaborators
- Mentored 5 African plant breeding grad students at the Pan African University for Life and Earth Sciences Institute (Including Health and Agriculture)
- Reported weekly in writing on activities and work plans to the project lead

International Institute of Tropical Agriculture, HQ Ibadan, NG
Graduate Research Fellow March 2015 – April 2020

- Designed field evaluation trials for 96 AYB germplasm across multiple locations for two years
- Collected and managed high quality phenotypic data from multilocational trials using field-book apps
- Maintained legume identity through entire breeding stages by tracking samples from screenhouses/field to lab using DNA markers
- Performed regular molecular biology procedures (plant genomic DNA/RNA extraction, PCR, gel electrophoresis, and fragment analysis).
- Trained undergrads, interns, and staff on basic molecular techniques and field experimental designs
- Performed statistical analysis of genotype-phenotype data and developed manuscripts for publication

Sainsbury Laboratory, University of Cambridge Cambridge, UK
Visiting Research Scholar September 2018

- Performed plant RNA extraction and RT-PCR for detection of plant viruses
- Conducted immunodiagnostic tests to identify plants infected with CMV
- Conducted marker-trait association studies to determine pungency in Chilli pepper
- Performed bioinformatics analysis of association mapping with GAPIT in R, mapping markers and trait loci with R/QTL

University of California Genome and Biomedical Sciences Facility Davis, USA
Visiting Research Scholar December 2016 – July 2017

- Coordinated research project between UC-Davis Potter Lab and IITA Genetic Resources Center
- Established and maintained 93 accessions of AYB seedlings in germination chambers and the greenhouse of UC-Davis Vegetable and Crop Research Station
- Performed leaf tissues sample collection, DNA extraction, quality and quantity check
- Performed DNA library preparation, quantification, optimization of double digest restriction-site associated DNA sequencing protocol for high-throughput genotyping
- Performed genome sequencing (RADseq)using Illumina Hi-seq 4000 machine
- Conducted statistical analysis using R and several genomic statistical tools and software for large genotypic NGS data analysis
- Developed manuscript for publication

IITA-Bioscience Center, Yam and Cocoa Breeding Unit Ibadan, NG
Research Technician June 2014 – July 2014

- Designed and established multilocational yam (100 clones) breeding trials in Nigeria
- Maintained germplasm resources both *ex situ* and *in situ* conservation
- Conducted phenotypic data collection using field book apps
- Performed DNA extraction, PCR, Gel electrophoresis, and preliminary data analysis
- Performed sample preparation and validation for genotyping by sequencing (DArTseq analysis)
- Maintained laboratory equipment and kept records
- Other responsibilities as assigned by my supervisor

RESEARCH GRANTS

- £80,000 Global Challenges Research Fund: *Peas 'n Chips*: *Enhancing Nigeria's Food Resilience and Soil Health Through Rehabilitating African Yam Bean*. (CO-I) (2019-2021). Initiated collaboration as off shoot from my Ph.D. research findings (grant was between three institutes (UI, IITA, and the University of Cambridge)

- £20,000 Cambridge-Africa ALBORADA: *'Peas 'n Chips Entrepreneurs: Rehabilitating African Yam Bean for Food Resilience and Soil Health in Nigeria (Bean_preneurs)' and "Characterizing tuber development of an underutilized Legume Crop, The African Yam bean*". (CO-I) (2018 - 2019). Initiated collaboration as off shoot from my Ph.D. research findings (grant was between three institutes (UI, IITA, and the University of Cambridge)

- £5,000 Research Fellowship: Sainsbury Laboratory, University of Cambridge, England (2018)

- $5,000 UC-Davis travel grant to Global Food Security Conference, Cape Town, South Africa (2018)

- $35,000 Norman E. Borlaug Leadership Enhancement in Agriculture Program: USAID through UC-Davis, USA (2016 – 2017)

- $,5000 UC-Davis travel grant to the World Food Prize meeting, Des Moines, Iowa (2017)

- $100,000 Global Trust Crop for Ph.D. research fellowship, Genetic Resources Center, International Institute of tropical Agriculture, headquarters, Ibadan. Nigeria (2015-2018)

- $200,000 funding provided for my postdoc appointment through a USDA-NIFA SAC grant award

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AWARDS

- 2018 – Promising African Ph.D. student, JR Biotek Foundation, UK
- 2017 - Excellence in communicating scientific research, Borlaug LEAP, UC-Davis
- 2016 – Promising African student in the field of Agriculture, Borlaug LEAP, USAID

TEACHING EXPERIENCE

- Advanced Genetics I&II (CPE 741 & 742) – Graduate course
- Cytogenetics (CPE 744) – Graduate course
- Applied genetics (CPE 510) – Undergrad course

Taught part of the above courses, designed experimental demonstrations, supervised exams, score and graded quizzes and exams

- Guest lecturer: Tropical Horticultural Systems (Hort 376), Department of Plant and Agroecosystems, University of Wisconsin- Madison

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COURSES, TRAININGS AND WORKSHOPS ATTENDED

- 2025 – Technical University of Madrid - Genomic Selection in Plant Breeding
- 2025 – VSNi Online Training – Implementing Genomic Selection from Theory to Practice
- 2024 – UW-Madison Genetics and Biotech Center - Linux Essentials (bash) v.5.1
- 2024 - UW-Madison Genetics and Biotech Center – Next Generation Sequence Analysis
- 2024 – BIOLEARN - Real World Bioinformatics Analysis in R
- 2024 – BIOLEARN – Cell_Line_to_Command_Line Bioinformatics
- 2024 – DIYTranscriptomics – Open-Source Tools to Analyze RNA-Seq Data
- 2023 – UW-Madison OSG Summer School – High-throughput Computing

- 2023 - University of Minnesota, St.Paul – PCR Allele Competitive Assay (PACE) Genotyping
- 2022 – Transmitting Science ForBio – Research School in Biosystematics, Barcelona, Spain *Phylogenetic Analysis Using R
- 2022 – Makerere University Regional Centre for Crop Improvement (MaRCCI), Uganda *Statistical Data Analysis for Post-Graduate Students and Staff Using R programming
- 2018 - JR Biotek/University of Cambridge; Hands-on Molecular Training Workshop (For African-based Agricultural Scientists)

CONFERENCES ATTENDED

- 2024 – Botany 2024 Invited Speaker on the topic "*Research Priorities for Traditional African Crops*" Grand Rapids, MI
- 2024 – Plant and Animal Genome Conference, gave a presentation on "*Genotypic and Chemotypic Diversity of American Feral Germplasm*" Town and Country Resorts, San Diego, California
- 2020 - Cambridge Science Festival, University of Cambridge, UK
- *Poster presentation and showcase of the African yam bean crop
- 2018 – 21st Annual Symposium of the International Association of Research Scholars and Fellows, International Institute of Tropical Agriculture, Ibadan, Nigeria
- *Oral presentation: *Next-generation sequencing of African yam bean using Restriction-associated DNA sequencing*
- 2018 – Annual Conference and Stakeholders Forum on African yam bean and other Underutilized legumes. Biotechnology Center, Covenant University, Nigeria**.**
- *Oral presentation: Genetic Diversity of African Yam Bean Accessions using Cowpea-derived Simple Sequence Repeat Markers
- 2018 - UK-Africa Food Security Symposium. Sainsbury Laboratory, University of Cambridge
- *Presentation: Bio-innovation for Africa pitching Competition; e-science molecular hub for connecting students with potential supervisors in the field of molecular biology
- 2017 - 3rd International Conference on Global Food Security. Cape Town, South- Africa
- *Poster presentation: *Next Generation Sequencing of African yam bean Accessions*
- 2017 - World Food Prize delegate as a Borlaug LEAP Fellow. Des Moines, Iowa, USA
- *Oral presentation: *Next-Generation of African yam bean accessions*

PUBLICATIONS (In review and published)

1. **Aina, A**., Wenger, J.P., Stanton, E., Majumdar, C.G., ElSohly, M., Weiblen, G.D. and Ellison, S., 2025. Genetic diversity, population structure, and cannabinoid variation in feral Cannabis sativa germplasm from the United States. *Scientific Reports*, *15*(1), p.20423.

2. Ford, Tori, **Ademola Aina**, Shelby Ellison, Tyler Gordon, and Zachary Stansell. "Utilizing digitized occurrence records of Midwestern feral Cannabis sativa to develop ecological niche models." *Ecology and Evolution* 14, no. 7 (2024): e11325.
3. Ndenum Shitta, Abebe Abush, Eliot Stanton **Ademola Aina** (2025) Genome wide association mapping of nutritional traits for developing improved African yam bean varieties. *Scientific reports* (In prep).
4. **Ademola Aina**, Jillian Abendroth, Shelby Ellison (2025) Association mapping in industrial hemp (*Cannabis sativa*) identifies loci associated with agronomic and grain nutritional traits. BMC Genomics (In prep).
5. **Ademola Aina**, Donna Harris, Brian Mealor (2025). Mungbean Breeding and Improvement: An Emerging Field and Forage Crop with Potential for Wyoming Cropping Systems. Genomics aided research. *Frontiers in Plant Science, section Genomics of plants and the Phtyoecosystem* (In prep).
6. Oluwole, O. O., Aworunse, O. S., **Aina, A. I**., Oyesola, O. L., Popoola, J. O., Oyatomi, O. A., & Obembe, O. O. (2021). A review of biotechnological approaches towards crop improvement in African yam bean (Sphenostylis stenocarpa Hochst. Ex A. Rich.). *Heliyon*, *7*(11), e08481. https://doi.org/10.1016/j.heliyon.2021.e08481.
7. **Aina, A**., Garcia-Oliveira, A.L., Ilori, C. *et al*. Predictive genotype-phenotype relations using genetic diversity in African Yam Bean (*Sphenostylis stenocarpa* (Hochst. ex. A. Rich) Harms). *BMC Plant Biol* 21, 547 (2021). https://doi.org/10.1186/s12870-021-03302-0.
8. **Aina, A.I**., Ilori, C.O., Ekanem, U.O. *et al*. Morphological Characterisation and Variability Analysis of African Yam Bean (Sphenostylis stenocarpa Hochst. ex. A. Rich) Harms. *International Journal of Plant Research*. 2020; doi:10.5923/j.plant.20201003.01.
9. **A. Aina**, C. Ilori, D. Potter, N. Carrasquilla-Garcia, P. Chang, M. Abberton. (2017). Next generation sequencing of African yam bean accessions: *In the proceeding of the book of abstracts of the 3rd International Conference on Global Food Security*. Cape Town, South Africa.
10. **A. Aina**, C. Ilori, M. Abberton, D. Potter, O. Oyatomi, N.S. Shitta. (2018). Genetic diversity study of African yam bean using Cowpea-derived SSR markers. *In the book of proceedings of the Society for underutilized legumes, Covenant University and International Institute of Tropical Agriculture*. Ogun, Nigeria.

REFERENCES : Available upon request