

## WASHINGTON JUMA ADUNDO

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### EDUCATION

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Sep. 2020 – **BSc.Medical Biochemistry**, Jomo Kenyatta University of Agriculture and Technology (Kenya)

Dec. 2025 Final Award: First Class Honors in Medical Biochemistry.

Related courses: Molecular biology, Microbial ecology, Principles of bacteriology, Biochemical Techniques, Pharmacology, Pharmacognosy.

Feb. 2016 – **Kenya Certificate of Secondary Education. KCSE**, Barkowino Sec.School, (Kenya), Grade B+

Nov. 2019

### RESEARCH EXPERIENCE

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Sep 2024 – **Research Trainee**

Feb 2025 Walter Reed Army Institute of Research – Africa (WRAIR)

Malaria Drug Resistance Lab-Kenya

*Research Activity:* Contributed to investigating multiple drug resistance mechanisms in *Plasmodium falciparum* field Isolates in malaria endemic regions in Kenya.

- Genotyped drug resistance of malaria parasites using multi-sequencing approaches (deep amplicon sequencing and chain-termination method) using Illumina MiSeq and iSeq 100, and Sanger sequencing technologies.
- Designed and implemented variant calling pipelines (GATK, BCFTools, SeekDeep) to call variants in the propeller domain of the *Kelch13* gene in large-scale *Plasmodium* genomic datasets using UNIX, R, and Python.
- Led detailed analysis of *kelch13* new mutations associated with target site insensitivity using protein structure and protein-protein interaction predictions.
- Identified a highly frequent A675V allele (>2%) associated with the delayed parasite clearance phenotype
- Contributed to determining and recommending molecular and genomic laboratory needs and effective frameworks for *Plasmodium* genomics data to complement current malaria research.

Nov. 2023 – **Research Trainee**

March 2024 Institute for Biotechnology (Kenya)

*Center for molecular and biotechnology research Research*

*Research activity:* Identified genes and biological pathways associated with sickle cell anaemia vasoocclusive crisis.

- Collaborated with the lab team to conduct molecular modeling and identify drug targets using cheminformatics and drug databases (PubChem Cultured plant tissues, producing over 200 viable plantlets for research and agricultural purposes.
- Extracted DNA with 90% success rates for molecular analyses.
- Performed gel electrophoresis and PCR, contributing to over five key research projects.
- Developed techniques for medicinal mushroom production, increasing yield by 30% in pilot trials.
- Trained peers in molecular methods, enhancing lab team competency.
- Ensured quality control by calibrating and maintaining precision instruments.
- Conducted safety audits, reducing lab hazards by 25%.

May 2024 – **Research Trainee**

August 2024 Kombewa County Hospital, Biochemistry and Microbiology Lab, *Center for Parasitic and Infectious Diseases, Kisumu, Kenya*

- Conducted blood cultures, stool cultures, and drug sensitivity testing for accurate disease diagnosis.
- Processed >500 clinical dry blood spot samples from adults for HIV testing using the RealTime HIV-1 Viral Load Assay, ensuring accurate and timely results.
- Collaborated with lab personnel to implement the weekly plan and prepare monthly progress reports for the laboratory. Streamlined laboratory care and management, enhancing efficiency by 20% through meticulous record-keeping and workflow tracking.
- Maintained equipment through regular cleaning and preventive maintenance, ensuring 95% operational readiness.
- Prepared and inoculated over 300 microbiological media samples for accurate diagnostics.
- Performed hematological tests, including sickle cell testing and ESR determination, processing over 100 samples weekly.

- Conducted serological rapid strip tests, achieving a 98% accuracy rate in diagnosing conditions like syphilis and H. pylori.

## CONFERENCES AND WORKSHOP PROCEEDINGS

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- Biostruct-Africa Workshop, International Livestock Research Institute (ILRI) in Kenya, 11<sup>th</sup> -15<sup>th</sup> 2025.
- Google DeepMind AlphaFold workshop, African Center of Excellence in Bioinformatics and Data Intensive Sciences in Uganda, 16<sup>th</sup> - 20<sup>th</sup> June 2025..
- Bioinformatics Hackathon Workshop, Kenyatta University, 28<sup>th</sup> -30<sup>th</sup> March 2025
- Cancer Awareness Biochemistry Society Workshop, Jomo Kenyatta University of Agriculture and Technology, in collaboration with the National Cancer Institute, Kenya, 5th April 2025
- Bioinformatics and Open Science Skills workshop, Bioinformatics Hub of Kenya Initiative, 3<sup>rd</sup> November 2021
- Multilateral Initiative on Malaria the 8th edition of the Pan-African Malaria Conference in Rwanda; 21<sup>st</sup> -27<sup>th</sup> April 2024 - **Poster Presentation**
- **Training Workshop on Parasite Single-Cell OMICS** scheduled to take place from 29th September to 1st October 2025. Sponsored by Kisii University Medical Biochemistry Department at ICIPE-Duduvile campus
- **AlphaFold Contest Uganda 2025**, supported by Google DeepMind. Award won to participate in ACEIDI, Makerere University, Uganda
- National Empowerment Program held at Nairobi focused on capacity building and entry-level jobs for youths in Kenya

## SELECTED COURSES AND TRAINING

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- **NITheCS Coding Summer School**, National Institute for Theoretical and Computational Sciences (2023)
- **Postgraduate certificate** in Data Analysis in Drug Development, focusing on HIV research, University of Wisconsin-Madison- **July 2024-November 2024 (Online)**
- **Global Health Mentorship Program** on Drug Discovery and development, July 2024-July 2025

- **Co-facilitator in EMT-CADDA Fellowship Program** focused on Structural biology, Drug discovery, modelling and visualization, and insights in lead identification, preclinical trials, and clinical trials.

## SCHOLARSHIPS AND AWARDS

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- 2024 **MATRIX CaSE Fellowship** – Competitively awarded to pursue a postgraduate certificate in Data Analysis in Drug Development, University of Wisconsin-Madison, USA(Online)
- 2024 **Stanford Data Ocean Scholarship** – A single award to pursue a bioinformatics certificate course in precision medicine, Stanford University, USA (Online)
- 2024 **Jomo Kenyatta University of Agriculture and Technology** – 1/62 Best cohort graduate with First Class Honors with a high GPA of 78
- 2025 **Google DeepMind Travel Award** – Competitively selected to attend Google DeepMind’s AlphaFold workshop at the Infectious Diseases Institute- Makerere University, Uganda
- 2025 **Biostruct-Africa Workshop, sponsored** by the Swedish Government and Google Deep Mind- Competitively selected for training at ILRI, Kenya
- 2025 **Training Workshop on Parasite Single-Cell OMICS** scheduled to take place from 29th September to 1st October 2025. Sponsored by Kisii University Medical Biochemistry Department, Competitively selected to attend, providing Transport, meals, and accommodation at ICIPE
- 2025 **AlphaFold Contest Uganda 2025**, supported by Google DeepMind. A round trip, including accommodation, awarded to participate at ACE-IDI, Makerere University, Uganda
- 2025 **Competitive selected as a Co-facilitator** in EMT-CADDA Fellowship Program focused on Structural biology, Drug discovery, modelling, and visualization
- 2025 **Cambridge mentorship program** on courses and postgraduate programs for graduates, organized by the African Society CAMP

## SKILLS

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- **Sequencing:** Next-Gen (DNA sequence analysis, exome sequencing, and gene expression datasets), Sanger sequencing.
- **Molecular laboratory techniques:** isolation and analysis of DNA and RNA from cells/tissues, design of primers and probes, PCR, qPCR, gel electrophoresis analysis.

- **Data Analytics:** Data Inference (ggplot, tidyverse), Visualization (R, Tableau, Excel)
- **Bioinformatics:** Technical software for DNA analyses; use of online genome browsers (e.g., UCSC, Galaxy); ClusterProfiler, DAVID, KEGG for gene ontology and pathway analyses.
- **In vivo techniques:** *Plasmodium* parasite culture, bacterial culture, generation of pure cultures, and drug sensitivity testing.
- **Languages:** Python, R, UNIX.
- **Gene expression analysis:** Transcriptomics & quantal-time PCR
- **Computational Structural Biology & Drug Discovery:** AI-based structure prediction (AlphaFold), molecular modeling and docking (Schrödinger), target/lead identification, and structural visualization (PyMOL, ChimeraX)
- **X-ray Crystallography:** Protein crystallization and crystal structure determination in the wet lab
- **Genetic Manipulation and Molecular Cloning Skills:** Demonstrated ability to design and construct plasmids, perform gene deletions or insertions, and apply molecular tools such as PCR, restriction digestion, and CRISPR-based editing for precise genome modifications.
- **Microbial Cultivation and Analytical Techniques:** Skilled in cultivating bacterial or fungal strains under controlled conditions and experienced in using analytical instruments like **HPLC** and **LC-MS** to quantify metabolites and assess production efficiency.

## REFERENCES

### 1. **Dr. Hosea Akala, PhD**

Director, Malaria Drug Resistance Lab, Walter Reed Institute of Research

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### 2. **Dr. Steven Ger, PhD**

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