OUMA JOAN AKELLO

Robotics & IoT Engineer | Full-Stack Developer Architecting Scalable Edge & Cloud Systems

Nairobi, Kenya |+254 114 333 909| Email: joanouma48@gmail.com | Portfolio|

LinkedIn | GitHub | X | Medium: Medium

TECHNICAL SKILLS

- **Languages**: Python, Golang (Go), JavaScript (ES6+), C/C++ (IoT Firmware), SQL.
- **Frontend Stack:** React.js (Hooks/Context), Next.js 14, Tailwind CSS, HTML5, CSS3.
- **Backend & Architecture:** Django, Flask, RESTful API Design, Nginx (API Gateway), Microservices Architecture.
- **Database & Event Streaming:** PostgreSQL, Supabase, MongoDB, Relational Database Design, Apache Kafka, MQTT Brokers.
- **Robotics & Middleware:** ROS 2 (Jazzy Jalisco), DDS, Sensor Latency Profiling, Autonomous Navigation Algorithms.
- **IoT Hardware:** Fusion 360, AutoCAD, KiCAD (Hardware/Component Design), ESP32/ESP8266 Microcontrollers.
- **DevOps & Tools:** Docker (Containerization), Kubernetes (Orchestration), GitHub Actions, TerraForm, Linux/Terminal.
- **Testing & Security:** API Testing (Postman), System Debugging, Security Best Practices (User Authentication, Data Privacy).
- **Core Competencies:** Hardware-to-Cloud Integration, Mobile-First Design, SEO Optimization, Al Chatbot Integration, Performance Optimization (Core Web Vitals).

EDUCATION

Jomo Kenyatta University of Agriculture and Technology (JKUAT)

Bachelor of Science in Electronics and Computer Engineering

- **Current Status:** Final Year Student
- **Focus:** Embedded Systems & Software Development.

PROFESSIONAL EXPERIENCE

Robotics Dojo | Robotics Engineering Intern

Nairobi, Kenya | June 2026 – Present

- **Designing** and **deploying** containerized robotic simulation environments using Docker and Minikube to validate real-time navigation and skid-steering control algorithms prior to physical deployment.
- **Middleware & Simulation:** Architecting and deploying autonomous robotic software stacks utilizing **ROS 2 (Jazzy Jalisco)** within an **Ubuntu Linux** environment; designing high-fidelity 3D simulation worlds and kinematics verification pipelines using **Gazebo** and **RViz**.
- **Hardware & Sensor Interfacing:** Interfacing embedded **microcontrollers** (ESP32) and **Raspberry Pi** edge computers with real-time sensor payloads including **LiDAR**, IMUs, and optical cameras to optimize message transport layers and minimize latency for autonomous navigation.
- **CAD Design & Prototyping:** Designing custom 3D mechanical components, chassis assemblies, and sensor brackets using **Fusion 360** and **SolidWorks**, ensuring seamless electromechanical integration and rapid hardware prototyping.
- **Control & Containerization:** Deploying containerized robotic software using **Docker** and **Minikube** to validate real-time path-planning, obstacle avoidance, and skid-steering algorithms prior to physical deployment.

KamiLimu Cohort 10 Mentee | Cloud Computing Trainee

Nairobi, Kenya | May 2026 - Present

- **Selected** as one of 40 mentees out of 220 applicants from 43 universities for an intensive 8-month technical mentorship program, with an intended focus on cloud architecture, Linux environments, and scalable backend systems.
- **Participating** in rigorous peer-to-peer mentorship, focusing on emotional intelligence, collaborative development, and high-impact execution.

YouthInAi Organization - Research and Development Engineer (Backend)

Remote | April 2026 – Present

- **Designing** and **implementing** a platform that leverages high-frequency data from Google Flood Hub, GloFAS/Copernicus, and Sentinel-1 SAR to provide predictive flood analytics.
- **Architecting** a multi-channel dissemination system using Africa's Talking to deliver critical alerts via SMS, USSD, and IVR across major Ghanaian telecommunications networks.

Wecncode | Open Source Software Engineer (Incoming)

Remote | Expected Start: May 2026

- **Selected** to architect a RAG-powered telemedicine chatbot for verified, hallucination-free medical guidance.
- **Developing** a local-first, zero-cloud backend using Python (LlamaIndex) and Node.js (LangChain) to maximize patient data security.
- **Participating** in an open-source community to engineer secure React API integrations implementing strict input sanitization and medical safety filters.

Power Learn Project (PLP) Academy | Software Development Trainee

Nairobi, Kenya | July 2025 – December 2025

- **Completed** intensive coursework in core software engineering principles, full-stack web development (JavaScript, HTML/CSS), and relational database design (SQL).
- **Developed** functional web applications utilizing the Python Django MVC framework to deliver collaborative, team-based capstone projects.
- **Gained** practical insights into developer-focused startup building and Minimum Viable Product (MVP) strategy, utilizing agile methodologies, peer code reviews, and Git/GitHub version control.

South Nyanza Sugar Company | ICT Intern

Migori, Kenya | June 2025 - August 2025

- **Reduced** factory operational downtime by ~15% by proactively troubleshooting enterprise network infrastructure and configuring network switches across multiple departments.
- **Designed** custom SQL-driven dashboards to monitor real-time network bandwidth usage and track company-wide IT asset inventories extracted from Hyper-V virtualization data for over 250 users across 14 organizational departments.
- **Improved** the reliability of technical reporting by digitizing daily error logs and maintenance records for enterprise IT hardware (computers, UPS systems, printers) alongside industrial SCADA telemetry into a centralized database.
- **Enhanced** facility security operations by deploying CCTV surveillance systems across various organizational zones, while analyzing the configuration of entry-point RFID scanners used for automated tractor fleet tracking.

TECHNICAL PROJECTS

Team Vulcan Mars Rover | Networking Co-Lead & Documentation Lead Engineer

Cars4Mars African Rover Challenge (Targeting South Africa Finals, Sep 2026)

- **Telemetry & Networking Architecture:** Architecting the real-time telemetry and wireless networking communications pipeline between the Mars rover prototype and the remote Ground Control Station (GCS) utilizing ROS 2 (Jazzy Jalisco) and DDS transport layers.

- **Circuit Design & Hardware Interfacing:** Designing custom embedded circuit schematics and PCB layouts using Proteus to interface low-level sensors, RF communication modules, and power distribution systems with the central edge microcontrollers.
- **IoT & Cloud Integration:** Developing C/C++ embedded firmware for edge microcontrollers to stream low-latency vehicle diagnostics, sensor payloads, and environmental telemetry over secure MQTT/Kafka event pipelines to a localized Golang backend.
- **Cross-Functional Leadership:** Collaborating within a multidisciplinary engineering team to ensure seamless hardware-software boundaries and containerizing simulation environments using Docker and Minikube in an Ubuntu Linux environment.

NduthiPulse | Co-Lead IoT & Software Engineer
Active Collaborative Development (Team Project)

- **System Architecture:** Co-engineering a hardware-to-cloud motorcycle telemetry and remote ignition control platform designed for real-time fleet management and automated financial workflows.
- **Hardware & Firmware Layer:** Developing embedded C/C++ firmware for ESP32 microcontrollers to capture real-time vehicle diagnostics and GPS tracking, implementing secure digital relay control for remote ignition locking.
- **Cloud & Fintech Integration:** Architecting a high-throughput Golang microservices backend paired with a PostgreSQL database; integrating mobile money APIs (M-Pesa) to execute automated, payment-driven hardware state overrides.
- **Collaborative DevOps:** Utilizing Git/GitHub workflows and Docker containerization to coordinate asynchronous development, ensuring seamless data ingestion across MQTT and Apache Kafka event streams.

CareerPilot | Full-Stack Developer | [https://careerpilot-mwn3.onrender.com]
Personal Project

- **Description:** Architected and deployed an interactive career guidance web application designed to align recent high school graduates with optimal university pathways.
- **Technology:** Engineered a dynamic RIASEC personality assessment using a React.js frontend, powered by a high-performance Golang backend for rapid data processing.

Campus Support | Full-Stack Developer | [https://feedback-system-wgmf.onrender.com]
Personal Project

- **Description:** Developed a secure web platform providing university students with anonymous mental health feedback and psychological support channels.
- **Technology:** Engineered the end-to-end application utilizing the MERN stack (MongoDB, Express.js, React, Node.js), implementing strict data handling protocols to guarantee user privacy.

Agri-Node | Lead IoT Engineer | Active Development (Month 4 of 4)

- **Description:** A distributed, cloud-native IoT platform engineered for precision agriculture and automated pest deterrence. The system captures environmental telemetry via edge microcontrollers and integrates machine learning for intelligent, non-deterministic deterrence.
- **Technology:** Developing C++ firmware for ESP32 edge nodes and a decoupled Golang microservices backend following Clean Architecture principles. Integrating Apache Kafka as an asynchronous event bus and PostgreSQL for data persistence, currently orchestrated via Docker for local environment testing.

Localized Smart Building Management System | Full-Stack IoT Developer Active Coursework, JKUAT

- **Description:** A centralized, "closed-loop" 3-zone smart building architecture that connects physical sensors and security actuators to a robust backend infrastructure. Features a real-time **Human-Machine Interface (HMI)** web dashboard allowing operators to actively monitor building status and execute manual hardware overrides.

- **Technology:** Hardware edge layer built with an ESP8266 NodeMCU and an MCP23017 I2C expander to manage pin exhaustion. Backend architecture is powered by Go-based microservices, utilizing MQTT and Kafka event-streaming pipelines for data ingestion, and PostgreSQL for database management.

LEADERSHIP

She-Tech Nexus Africa | Chairperson
JKUAT, Kenya | April 2026 – Present

- **Executive Leadership & Strategy:** Spearheading the strategic direction and operations of a vibrant women-in-tech community, establishing initiatives that empower female engineering students in software development and embedded systems.
- **Technical Program Management:** Organizing and directing technical bootcamps, coding hackathons, and peer-mentorship programs to accelerate practical skill acquisition among members.
- **Stakeholder & Committee Direction:** Managing a cross-functional executive committee and driving strategic partnerships with industry professionals to facilitate student mentorship and networking opportunities.

GDG Women-In-Tech | Co-lead
JKUAT, Kenya | September 2025 - Present

- **Community Growth:** Bridged the gender gap in the local tech community by organizing peer learning sessions on Cloud Computing and Web Development for female students.
- **Career Development:** Empowered junior students to navigate the tech ecosystem by organizing mentorship talks and networking sessions with established industry professionals to share career insights.

IEEE Computer Society, JKUAT Student Branch | Vice-Chairperson
Nairobi, Kenya | September 2024 – May 2026

- **Engagement:** Increased student participation in coding activities by 40% by organizing and spearheading 3+ technical hackathons and workshops.
- **Mentorship:** Connected 50+ students with industry professionals by coordinating guest speaker sessions and tech talks.

She-Tech Nexus Africa | Secretary
JKUAT, Kenya | October 2023 – April 2026

- **Event Coordination & Logistics:** Successfully managed logistics, member registration, and daily scheduling for large-scale industry immersions, including a 3-day tech industrial visit to Safaricom PLC Headquarters.
- **Administrative Leadership:** Streamlined club operations by maintaining accurate member databases, facilitating official communications and coordinating the annual committee nomination and transition process.

CERTIFICATIONS

Kubernetes Fundamentals | Andela Training Institute

- Deep-dive into container orchestration, cluster management, and deploying scalable microservices skills critical for cloud-native infrastructure.

Introduction to Linux (LFS101) | The Linux Foundation & Andela

- Mastery of Linux command-line operations, filesystem hierarchy, and system administration essentials for high-uptime server environments.

Introduction to SQL | Simplilearn

- Certified proficiency in relational database management, complex querying, and data integrity for enterprise-level applications.

Software Development Certification | Power Learn Project (PLP) Academy

- Intensive 6-month certification covering full-stack development, software engineering ethics, and agile project delivery.

REFEREES

Available on request.