DAVID OKELLO

Curriculum Vitae

Nairobi, Kenya | +254 700 030 911 | okellodavid002@gmail.com | github.com/David-Okello | linkedin.com/in/david-okello-3599b51a0

RESEARCH INTERESTS

Data systems for agricultural and livestock research: how the data is modelled, how records move off legacy systems, and how they are captured in the field. Close to this sits IoT sensing and the machine learning that turns a raw sensor stream into something a person can act on, which is what my final-year project was built around.

I am also interested in software written for low-connectivity areas, including the optimisation work that keeps application bundles small enough to install and update over a weak connection. Having built M-Pesa and Paystack integrations, I want to understand payment rails more deeply, Web3 settlement models included. I have not built on Web3 yet, so I hold it as something to learn rather than something I can speak to from experience.

EDUCATION

BSc, Computer Science — Expected September 2026

University of Nairobi — *Nairobi, Kenya*

- Current standing: Second Class Honours (Upper Division)

RESEARCH PROJECT

MajiGuard: An IoT-Based Water Quality Monitoring System — Sept 2025 - May 2026

BSc dissertation, University of Nairobi. Supervisor: Prof. Elisha Odira Abade — *Nairobi, Kenya*

- Designed and built a low-cost water quality monitor for rural and peri-urban sources, where monitoring today is centralised, expensive, and gives communities no real-time warning. The sensor node runs on an ESP32 reading pH, turbidity, total dissolved solids and temperature every 30 seconds into Firebase. A whole unit comes in under KES 15,000.
- Blended Isolation Forest with River HalfSpaceTrees so the pipeline learns online as well as from a batch model, and separated genuine contamination from sensor drift. Reached 82% precision, 100% recall and an F1 of 0.90 on a 1,373-reading labelled set.
- Validated detection against four controlled contamination experiments and two real river samples. Ridge Regression for short horizons and Prophet for 6 to 24 hours held RMSE under 0.15 pH units, 8 NTU and 12 ppm TDS at one hour.
- Built the advisory engine as retrieval-augmented generation (RAG): a FAISS index over WHO and Kenya Bureau of Standards guidelines grounds LLaMA 3.3 70B, so advisories rest on real standards rather than model recall. Surfaced in a React Native app.

  Technologies: ESP32, C/C++, Python, scikit-learn, River, Prophet, FAISS, RAG, LLaMA 3.3 70B, Firebase, React Native

RESEARCH EXPERIENCE

Both roles below were at the International Livestock Research Institute (ILRI), a CGIAR research centre in Nairobi.

Software Engineering Intern, TDGG Livestock Data System — Aug 2026 - Present

International Livestock Research Institute (ILRI) — *Nairobi, Kenya*

- Working on ILRI's TDGG livestock data system, part of the Africa-Asia Dairy Genetic Gains programme, to extend it from dairy cattle to small ruminants (sheep and goats).
- Mapped the old MISTRO system against the current TDGG database and wrote up which parts of the schema already handle multiple species and which need rebuilding.
- Helping plan the data migration and the design of a mobile data-capture tool for pastoral farming systems.

  Technologies: SQL, PostgreSQL

Software Engineer Intern, eKapiti Platform — Jul 2025 - Mar 2026

International Livestock Research Institute (ILRI) — *Nairobi, Kenya*

- Led development of eKapiti, a booking and visitor platform for ILRI's Kapiti Wildlife Conservancy, from first prototype through to production on iOS, Android and web.
- Built the booking flows for game drives, guesthouse stays and conservancy events, including dynamic pricing, availability checks and automatic confirmations.
- Integrated M-Pesa STK Push and Paystack, with webhook verification, retries and reconciliation so payment state stayed correct when a transaction failed midway.
- Built an offline-first conservancy map with routes, live GPS and geofencing, for use in places with no signal.
- Added passwordless login over email links, transactional messaging through SendGrid and Twilio, and an admin dashboard showing bookings and revenue as they came in. Wrote the backend as Supabase Edge Functions in Deno over a relational PostgreSQL schema.

Technologies: React Native, Expo, TypeScript, Supabase (PostgreSQL, Auth, Edge Functions), M-Pesa API, Paystack API, Google Maps API

PROFESSIONAL EXPERIENCE

Technical Consultant, Infrastructure & Software Development Jun 2023 - Jul 2026
Kilimo Hakika Limited (Contract) *Nairobi, Kenya*

- Built and ran the company's cloud setup across several VPS instances and object storage, keeping public services separate from internal tools behind a self-hosted VPN. Costs roughly $1,400 a year less than the managed options we priced.
- Shipped two production sites on Next.js and PostgreSQL, both with custom admin panels for staff to manage content: staging.kilimohakika.com, which also carries a quote-request workflow and M-Pesa payments through Safaricom's Daraja API, and fctnetwork.org for their Food & Climate Tech Network work.
- Built an internal project management tool in Django for a team of 15 to 20 people, locked to the company's private network.
- Took hosting from ad hoc to maintainable: SSH key access only, firewalls, Git-based deploys and automated backups.

Technologies: Next.js, PostgreSQL, Django, Docker, Caddy, Git, M-Pesa Daraja API

Full-Stack Developer Jan 2026 - Mar 2026
Bedefast Consultancy (Freelance, for CPHRM Group Limited) *Remote, Nairobi, Kenya*

- Built a pan-African advisory firm's website and content platform from scratch in Next.js 13 and TypeScript: twelve industry and service pages, a blog, case studies and site-wide search. Preview at cphrm-mu.vercel.app.
- Added a role-based admin dashboard so their staff could edit content and handle contact forms, job applications and newsletter signups without going through a developer.
- Moved the backend off Supabase onto PostgreSQL, Prisma, Auth0 and Docker so the client could host it themselves after handover.
- Ran the engagement solo: scoping, delivery milestones, client demos and documentation.

Technologies: Next.js, TypeScript, PostgreSQL, Prisma, Auth0, Docker, S3-compatible storage

Data Science Intern Jul 2023 - Sep 2023
Pathways Technologies Limited *Nairobi, Kenya*

- Analysed customer data in Python and Power BI to support decision-making, and built machine-learning models for churn prediction. Churn dropped 15% over the retention work that followed.

Technologies: Python, Power BI, scikit-learn

SERVICE AND VOLUNTEER WORK

Website Developer (Volunteer) Apr 2026 - Aug 2026
Episcopal Diocese of Wanyjok *Remote*

- Built and maintain dow-anglican.org in Next.js with a Git-backed CMS (Decap) on Cloudflare Pages, so staff can update content without a developer.

SELECTED SYSTEMS AND PROJECTS

- **eKapiti:** Booking and visitor platform for ILRI's Kapiti Wildlife Conservancy on iOS, Android and web. Booking engine, two payment gateways, and a map that works offline in the field. React Native, Expo, TypeScript, Supabase.
- **CPHRM Group platform:** Website, content platform and role-based admin dashboard for a pan-African advisory firm, on a stack the client can host themselves. Preview at cphrm-mu.vercel.app. Next.js 13, TypeScript, PostgreSQL, Prisma, Auth0.
- **kilimohakika.com and fctnetwork.org:** Two production sites for Kilimo Hakika Limited, each with an admin panel for staff. The first also carries a quote-request workflow and M-Pesa payments. Next.js, PostgreSQL.
- **dow-anglican.org:** Git-backed CMS site for the Episcopal Diocese of Wanyjok that lets staff publish directly. Next.js, Decap CMS, Cloudflare Pages.

TECHNICAL SKILLS

Languages: TypeScript / JavaScript, Python, SQL, C/C++ (Arduino), HTML / CSS
Frontend: React, React Native, Expo, Next.js, Tailwind CSS
Backend: Node.js, Django, Flask, PostgreSQL, Supabase, Firebase, Prisma
Infrastructure: Docker, Linux / VPS administration, Nginx, Caddy, Git, Cloudflare
ML and data: scikit-learn, River, Prophet, pandas, FAISS, RAG, LLM prompting, Power BI
Integrations: M-Pesa Daraja API, Paystack, Twilio, SendGrid, Auth0, Google Maps API, Mapbox

SPOKEN LANGUAGES

English (fluent), Kiswahili (fluent), Mandarin Chinese (HSK 1)

REFEREES

Available on request.