

CAROLINE NYAKIO MAINA

Blockchain Engineer & Founder

carolinenyakio21@gmail.com • LinkedIn • github.com/nyakiomaina • nyakiomaina.github.io

PROFILE

Rust-first blockchain and systems engineer with 2+ years of deep Rust expertise and 5+ years across software development. Cofounder of Directionally, building engineering judgment for AI coding agents. Specialised in reproducible Linux/RISC-V toolchains, Cartesi coprocessors, and deterministic build pipelines, with a strong quality-assurance foundation spanning coverage analysis, property-based testing, and CI quality gates. Currently deepening expertise in cryptography and zero-knowledge proof systems, and creating technical content to make this work accessible to a wider engineering community.

CORE COMPETENCIES

Languages Rust (primary), TypeScript, Solidity

Blockchain & Web3 Cartesi Rollups, Ethereum JSON-RPC, Smart Contract Development, Cryptography, Zero-Knowledge Proofs

Systems & Infrastructure Docker/Buildx, QEMU, LinuxKit, SquashFS, RISC-V Cross-Compilation, GitHub Actions CI/CD

Quality & Testing Automated Test Design, Coverage Analysis, CI Quality Gates, Issue Triage, Debugging

PROFESSIONAL EXPERIENCE

Cofounder & Engineer | Directionally

January 2026 – Present

- Cofounded Directionally (directionally.ai), a product that brings engineering judgment to AI coding agents, running the relevant check before an agent's next move and surfacing what changed.
- Write and maintain core product code across the stack, shaping product direction at the intersection of autonomous AI agents and developer tooling.

Technologies: Rust, TypeScript, AI Agents, Developer Tooling

Blockchain Engineer | LaneLayer

July 2025 – January 2026

- Developed Rust backend services for a Bitcoin-native application platform, enabling real-world payment flows powered by Bitcoin.
- Built and maintained gRPC and REST API layers for service communication and client integration.
- Integrated agentic AI capabilities into the platform to automate workflows and enhance application intelligence.

Technologies: Rust, Bitcoin, gRPC, REST APIs, Agentic AI

Rust Developer | Inlay

March 2025 – June 2025

- Architected a RISC-V cross-compilation toolchain with container orchestration for Cartesi workloads, achieving byte-for-byte deterministic SquashFS artifacts and reducing CI variance by 95%.
- Integrated the Cartesi Machine with a QEMU-based RISC-V execution environment, standardising SSH debug tunnels and health monitoring, cutting MTTR by 60%.
- Established deterministic build pipelines with content-addressed artifacts and provenance documentation.

Technologies: Rust, Docker/Buildx, QEMU, LinuxKit, SquashFS, GitHub Actions, RISC-V

Rust Developer | Zippie

January 2024 – February 2025

- Core contributor to Cartesi coprocessor development, enabling on-chain smart contracts to offload complex Linux computations to RISC-V virtual machines.
- Designed an HTTP bridge for coprocessor I/O, translating JSON-RPC requests to rollup inputs, achieving 1,000+ req/s with p95 latency under 50ms.
- Built a riscv64 cross-compilation system using Docker/Buildx, reducing CI execution time by 40%.

Technologies: Rust, Docker/Buildx, QEMU, LinuxKit, Cartesi Rollups, JSON-RPC, CI/CD

Software Quality Assurance Engineer | Zippie*May 2020 – April 2025*

- Led multi-product testing coverage and CI gating, increasing test coverage by 25 percentage points while reducing flaky test failures by 70%.
- Managed defect triage across complex multi-repo codebases, reducing time-to-find and time-to-detect by 50%.
- Developed TypeScript-based test automation harnesses for large-scale continuous integration.

*Technologies: TypeScript, GitHub Actions, Coverage Analysis Tools, CI Frameworks***Community Manager | Wengi Web Ltd***December 2021 – February 2023*

- Organised 12+ developer workshops and technical training sessions engaging 200+ participants.
- Coordinated developer community initiatives focused on engagement and knowledge sharing.

CONTENT CREATION & ONGOING LEARNING

Technical Content & Cryptography Study | Independent*August 2025 – Present*

- Create technical content on Rust, blockchain engineering, and systems development, published across social platforms.
- Actively study cryptography and zero-knowledge proof systems to deepen expertise in privacy-preserving blockchain technologies.