

HaoCheng Xie

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LANGUAGES

Rust, Python, TypeScript, C

WORK EXPERIENCE

Software Engineer, *Respiree* (3-person software team) Feb 2025 – present

- Designed and built zero-downtime key rotation for ISO 27001 compliance using a dual-key, two-phase commit protocol across 6 services on AWS Secrets Manager (TypeScript, Python, NestJS).
- Rewrote Python MQTT pipeline in Rust; **11x throughput, p99 latency from 650ms to 80ms** at 500 concurrent connections.
- Built **internal CI dashboard** spanning 8 repositories for the product team to track deployment and integration test states across all environments, set up code scanning across all repositories, and convinced senior stakeholders to adopt DAG-based inter-service dependency monitoring (TypeScript, Jenkins, SonarQube).
- Extended custom IoT functionality to support blood pressure monitors: implemented BLE connectivity on ESP32, and added type-validation to consumers (Python, C, NimBLE, ActiveMQ).
- **Owned mobile app development** end to end: Google SSO, BLE connections to 4 external IoT sensors, and network-aware write routing with local DB fallback for patient data submissions (TypeScript, React Native, Kotlin, Java).
- Containerised 7 services and instrumented cross-service request tracing with **OpenTelemetry** (Grafana/Loki).
- Built a real-time transcription feature for video consultations: JWT auth, collision-proof UID generation, and REST-based bot lifecycle management (TypeScript, PostgreSQL, React).

Consultant, *Zero-knowledge prover infrastructure provider* (concurrent) Oct 2025 – Mar 2026

- **Architected GPU server infrastructure** for ZK rollup prover with over \$65K USD spend, advised on physical deployments in Hong Kong, and deployed containerised proof generation pipeline for initial benchmarking (Groth16, PLONK).

PROJECTS

- Built an **eBPF/XDP firewall** in the kernel to extract TLS 1.2 handshakes from TCP payloads for certificate-based network connection enforcement (Rust, Aya). git.noml.ch/packet_ebpf
- Built a local multi-agent research tool using PyTorch, Sentence Transformers, and ChromaDB, with web search API integration (Python). git.noml.ch/llm_search
- Built and **maintained homelab infrastructure over 6 years**: automated KVM provisioning, Kubernetes cluster (RKE2, kind, OpenTofu, Helm), 160TB ZFS array, IPv6 networking, self-hosted LLM inference (vLLM, Prometheus).

EDUCATION

BSc (Hons) Computer Science 2021 – 2024

University of Liverpool

Focus: Optimisation, Game Theory & Mechanism Design, Algorithms, Formal Methods, Distributed Systems.

Dissertation: Neural Cryptography – Key Exchange using Neural Networks. Ran genetic and geometric attacks on Tree Parity Machines and found non-monotonic settling behaviour in synchronisation curves for certain parameter configurations, complicating reward estimation in known attacks.