

Maximilian Cope

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Summary

Computer Science graduate and research software developer with experience building **reproducible genomics workflows**, backend/platform systems, and distributed data pipelines. Built **PacBio HiFi whole-genome analysis software** using Python, TypeScript/React, FastAPI, Docker, Linux, and REST APIs, with additional commercial experience with Java and event-driven systems.

Experience

Western University, Hill Lab – Research Software Developer

May 2026 - Aug 2026

- Developed and tested HiFi-Runner, a reproducible genomics workflow platform for configuring, launching, monitoring, and reviewing long-read DNA analysis runs.
- Developed a React/FastAPI web platform for delivering HiFi-Runner to research users, including authenticated access, role-based application controls, API integration, and deployment on Linux research-compute infrastructure.

Incognito Software – Software Engineering Intern | Service Activation Center (SAC) Platform

May 2025 - Aug 2025

- Replaced vendor-hardcoded SNMP trap handlers with a config-driven framework (JSON + validation: required fields, acceptance patterns), shifting new-vendor onboarding from multi-day code edits to **~20-40 min** of config + tests across several device manufacturers.
- Extracted a **protocol-agnostic pattern-matching parser** into a reusable module; integrated with **SNMP + Kafka** consumers and documented the interface for additional handlers, reducing duplicate parsing and standardizing normalization across the event pipeline.
- Built JSON schemas, key-presence checks, and filters for analytics logs; debugged malformed payloads; prepared staging docs/fixtures and smoke tests (Docker, k6).

Projects

HiFi-Runner — Reproducible Genomics Pipeline and Web GUI

- Built a React/FastAPI platform for configuring, launching, monitoring, and reviewing **PacBio HiFi WGS workflows from BAM inputs**.
- Replaced ad hoc manual orchestration with one validated run configuration, reducing estimated workflow burden from **~66 CLI invocations, 40+ file/path handoffs, and 20+ stage interventions**.
- Implemented **manifest-driven reproducibility, deterministic DAG execution, Dockerized module execution**, persistent run state, logs, reports, and standardized per-sample/cohort outputs.
- Added within-mouse and **pedigree-aware comparison workflows**; validated on a reduced cohort run covering **3 mice, 4 samples, 9 modules, and 61 executed tasks**.

Juris Engine – AI-powered Canadian legal research platform (web app + RAG backend)

- Scraped and normalized **~3M legal documents** from CanLII using **20+ Dockerized Selenium workers** coordinated via a **Redis job queue**.
- Implemented a Pinecone RAG pipeline with semantic retrieval, fuzzy scoring, and citation-grounded LLM summaries.
- Built the web app and backend pipeline connecting document ingestion, vector retrieval, and LLM-generated legal research outputs.

Skills

- **Languages:** Python, Java, TypeScript, JavaScript, C++, C, SQL, Bash, HTML/CSS
- **Backend/Systems:** FastAPI, Node.js, Express, REST APIs, MySQL, AWS RDS, Kafka, SNMP, Redis
- **Frontend/Mobile:** React, React Native, Vite
- **Cloud/DevOps:** Docker, AWS EC2/S3/Route 53/SNS, Git, GitHub, Linux, Jira
- **Testing/Automation:** Unit, integration, and system testing; Selenium; k6
- **AI/LLM Workflows:** RAG, vector search, prompt engineering, structured JSON outputs, LLM-assisted debugging/testing

Education

Western University — Bachelor of Science, Honours Specialization in Computer Science | 2026

- **Relevant Coursework:** Algorithms, Databases, Operating Systems, Machine Learning & AI

Awards

Marie Smibert Writing Prize – Distinguished award for top final grade in Persuasive Writing, Western University | 2026

National ACE Competition – 1st Place Winner (Advertising Marketing Campaign)

Software Engineering Project – Leadership role with near-perfect peer evaluations