Justin Poehnelt

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SUMMARY

Software engineer and Founder/CTO with a decade of experience across applied machine learning, distributed systems, and developer enablement. Built continental-scale cropland ML pipelines at USGS and petabyte-scale Kubernetes DAG engines over billions of satellite images at Descartes Labs. At Google, grew the Maps and Workspace open-source ecosystems to 29M+ weekly npm downloads and built the open-source Google Workspace CLI with AI agents (Rust, MCP, 32,000+ GitHub stars, #1 on Hacker News). Now lead Helen's Foundry, building the strategic intent layer for AI agents with a bitemporal graph, verification engine, and MCP integrations that tie each agent PR to a ratified decision.

EXPERIENCE

Helen's Foundry · Founder & CTO — 05/2026 – Present

- Lead engineering at an org where AI coding agents write the code. Direct the agent fleet, run the PR merge queue, and own the verification engine and MCP integrations.
- Designed grounded spec-driven development, using specs as contracts that constrain coding agents with independent verifier attestation and separation of duties.
- Designed the bitemporal graph that records what the org believed when it decided and what changed since.
- Built the 86-package Effect TypeScript monorepo with Alchemy infrastructure as code, structured for coding agents with typed package boundaries, generated catalogs, and machine-checkable specs.

Google · Senior Developer Relations Engineer — 08/2019 – 04/2026

- Built **googleworkspace/cli**, an open-source Rust CLI and MCP server with 700+ runtime-generated API methods and structured agent skills, written entirely by AI agents. Reached 32,000+ GitHub stars and #1 on Hacker News in two weeks.
- Engineered security controls for the Google Workspace CLI and MCP server, including prompt injection defense, path traversal prevention, multi-account credential isolation, and TOCTOU mitigation.
- Published "You Need to Rewrite Your CLI for AI Agents" and "The MCP Abstraction Tax" on schema introspection, context-window efficiency, and agent-first CLI design.
- Drove **29M+ combined weekly npm downloads** across 77 Google Maps and Workspace repositories. Authored the auto-generated TypeScript typings (13M+/wk), JavaScript API loader (~8.3M/wk), and Drive Picker web component (~220k/wk), and maintained marker clustering (~3.9M/wk) and core Node.js SDKs.

Descartes Labs · Lead Software Engineer, Workflows & Platform — 07/2016 – 07/2019

- Built a Python workflow engine that compiled imperative code into directed acyclic graphs (DAGs) to run petabyte-scale satellite imagery analysis through a location-aware cache across multiple Kubernetes clusters (1,000+ nodes).
- Engineered the Kubernetes cluster, backend server, and Bigtable hash index for CNN-based GeoVisual search over **2+ billion satellite imagery tiles** at ~0.1s query latency (published in *CVIU*).
- Led the team building the satellite imagery analysis product for DoD and enterprise customers at a Los Alamos National Laboratory spinoff. Authored the PRD and system design to launch the workflows product with a 3-engineer team.
- Migrated the codebase to a Bazel monorepo, built a distributed CI/CD pipeline with Drone.io on Kubernetes, and replaced managed instance groups with high-availability Kubernetes deployments.

United States Geological Survey (USGS) · Computer Scientist & Software Engineer Intern — 04/2014 – 08/2016

- Co-developed and scaled a machine learning pipeline for automated cropland classification across continental Africa on Google Earth Engine, including feature extraction and noise reduction over global satellite imagery (published in *ISPRS Journal*).
- Built the full stack for a NASA-funded (MEaSUREs) food security project as its sole developer: a Python REST API, PostgreSQL database with JWT auth, Celery/Redis task queues on AWS EC2, a satellite labeling web app, and a mobile field-data app.

PERSONAL PROJECTS

- Built **nogml**, an open-source headless Rust email server for AI agents and Gmail API clients. The single binary runs on SQLite FTS5 or PostgreSQL and serves MCP, JSON REST with SSE, Gmail REST v1, and IMAP4rev1 with human-in-the-loop send approvals.
- Built **IronProse**, a native Rust prose editor (GPUI) and custom AST toolchain with ~120 craft analyzers and an end-to-end NER pipeline (LLM distillation, GLiNER fine-tuning, ONNX CPU inference), with models and datasets hosted on Hugging Face.
- Building **Tracios**, an off-grid LoRa mesh tracking system for ultra-endurance events with nRF52840 Rust firmware, a 13-byte Elastic Linear Protocol (ELP v3) over SX1262 TDMA, a Flutter phone relay, a TAK/CoT gateway, and an Effect Cluster and ElectricSQL backend.

PUBLICATIONS

- "Visual search over billions of aerial and satellite images," *Computer Vision and Image Understanding* (2019). Describes a CNN feature and Bigtable hash-search system for real-time visual search over ~2 billion images.
- "Automated cropland mapping of continental Africa using Google Earth Engine cloud computing," *ISPRS Journal of Photogrammetry and Remote Sensing*, Vol. 126, pp. 225–244 (2017). DOI: 10.1016/j.isprsjprs.2017.01.019.

EDUCATION

Northern Arizona University, B.S. Computer Science

University of Wisconsin–La Crosse, B.S. Finance & Economics

TECHNICAL SKILLS

Languages	Rust, TypeScript, JavaScript, Python, Go, Dart, Lua, SQL, Cypher
AI / ML	Model Context Protocol (MCP), Multi-agent systems, Agentic workflows, Context engineering, Tool use / function calling, Structured outputs, Agent evals, AI security & guardrails, Fine-tuning, LLM distillation, PyTorch, Embeddings, Vector & similarity search, Knowledge graphs, Computer vision, CNNs, NER, GLiNER, ONNX Runtime, Hugging Face, Claude Code, OpenAI API, Gemini, Vertex AI, Vercel AI SDK
Platforms	Cloudflare Workers, Durable Objects, Google Cloud (GCP), Kubernetes, AWS, PostgreSQL, SQLite, Neo4j, Inngest, BigQuery, Bazel, MQTT, Google Earth Engine
Frameworks	Effect, SvelteKit, React, Svelte, Flutter, Astro, Angular, Eleventy, Tailwind CSS
Tools	API design, Alchemy, Terraform, ArgoCD, GitHub Actions, pnpm, Turborepo, Vitest, Playwright, Storybook, ast-grep, Drizzle ORM, Wrangler, Observability (OpenTelemetry, Sentry), semantic-release, Drone.io, Docker, Celery, Redis