

CRYSTAL MARION

PLATFORM ARCHITECT & FOUNDING ENGINEER

Architect of agentic AI, algorithmic trading, computational biology, and additive manufacturing platforms

Multidisciplinary engineer and lifelong autodidact, looking for challenges that continually push the limits of expertise while contributing to meaningful, promising causes. Looking to maximize the globally uplifting effects of each unit of creative energy spent. Passionate about building tools to enable the creativity of others, thriving on complexity and building simple yet composable abstractions to enable nonlinear results. Having worked in multiple industries from small startups with seed funding to large hyper-scaling and highly profitable organizations, I enjoy taking a holistic systems-level, multidisciplinary approach to any project or roadmap I lead, which surfaces solution pathways that otherwise might not be noted.

PROFESSIONAL EXPERIENCE

Founder & Lead Engineer at Activated Human · March 2025 – Present

PRODUCTS

- Founded an AI product company and built its entire ecosystem as sole engineer: five product codebases on one platform pattern. A personal AI companion on web, iOS, Android, Mac, and Windows; a relationship companion on web, iOS, Android; a privacy-first teams product; a language-learning app on web, iOS, Android; and agent-native home automation systems spanning cloud, local hub, and embedded firmware. Managed App Store review + business operations.
- Each of the products runs a full production-grade platform: real-time streaming that survives deploys; zero-downtime deploys on autoscaling infra, durable execution, webhooks, billing & subscription entitlements; offline-first mobile clients with push, widgets, and on-device integrations; full-text and vector search; image, audio, video, and document pipelines; lifecycle emails; 12-language i18n; admin ops console, analytics; GDPR export / erasure, encryption & backup systems.
- Across the estate: 40+ deployed services, four mobile apps, 3,500+ tests, and 51 Helm charts under 55 Argo CD applications. The largest product runs nine services, 287 endpoints, 23 workflows, 81 tables, 36 integrations, six datastores.
- The products feed each other's evolution in compounding loops: every pattern proven in one becomes available to the rest, and improvements flow between codebases continuously. Data-driven roadmap & delivery using OTA updates / feature flags.

AI ENGINEERING

- LLM engineering at production depth: 8 agents and 24 chains across the products driving 240+ registered tools with execution budgets, multi-agent delegation with per-step cost accounting, multi-provider model routing with automatic failover, predictive prompt-cache warming, dynamic context budgets, hierarchical summarization, per-user semantic search, realtime state injection, realtime progress readouts, and user approval for write actions, enforced at the tool layer.
- A full voice stack: two-provider TTS with per-tier routing and spend budgets, zero-shot voice cloning from per-user reference audio, VAD trimming with chunked streaming synthesis, and speech that streams while the LLM is still generating.
- Adversarial LLM evals: simulated users and adversarial actors, run against production agents on real threads, covering injection resistance, capability honesty, and cost discipline; deterministic action checks run beside the LLM judge.

AGENT-RUN OPERATIONS & GROWTH

- Daily operations run on sixteen always-on AI agents in isolated containers with durable memory: 35 signed webhook routes map GitLab, Linear, Sentry, PagerDuty, Stripe, and Gmail events to agent activity through dedupe, debounce, and circuit breakers. Credential proxies keep secrets out of the containers. Agents manage shared state via custom MCP servers.
- Agentic CI/CD: every merge request spins up an ephemeral preview environment (namespaced, own datastores, public URL), pruned at merge. Agents branch, deploy, read traces, review each other's MRs, and actively improve their own runtime.
- The product improves itself in closed loops: production errors and pager incidents automatically become agent tasks that come back as reviewed merge requests, and eval findings ship as code countermeasures, not just prompt tweaks.
- An acquisition and conversion system as part of the product: first-touch UTM attribution end to end, onboarding flows, trials, referral and affiliate programs with monthly statement workflows, lifecycle emails, multi-tier Stripe billing plus Apple and Google IAP, funnel experiments held to pre-committed kill and scale lines, and a 240-page programmatic-SEO site.

PLATFORM & INFRASTRUCTURE

- Everything self-hosted on three bare-metal Kubernetes clusters: a nine-operator data plane, GPU inference workers, GitOps deploys via ArgoCD, zero-downtime rollouts, 99.99% uptime, distributed tracing, centralized logging, replicated storage, restore-verified backups, paging to a phone. Designed redundant WAN + battery backup systems with remote monitoring.
- Every meaningful action becomes a typed event: 18 schemas across user, agent, LLM, and worker families flow over Redpanda into ClickHouse, powering product analytics, LLM cost accounting to token and cache-hit level, and marketing automation.

Skills used: Python, FastAPI, LangChain/LangGraph, Claude Agent SDK, MCP, React, React Native/Expo, TypeScript/Node, Kubernetes, Helm, ArgoCD, PostgreSQL, Redis, Temporal, Kafka/Redpanda, ClickHouse, Weaviate, MinIO, Longhorn, Grafana/Loki/Tempo, Stripe, GPU Computing

Senior Software Engineer, AI at North, *Remote-first; New York, NY* · November 2025 – April 2026

- Led development of Noros (noros.ai), North's AI FinOps copilot for cloud operators: conversational cost intelligence over AWS, GCP, and Azure. Owned architecture, infrastructure deployment, operational systems, full-stack product development.
- Built the recursive tool-calling and context management layer for aggregating dozens of billing and usage data sources, allowing operators to investigate cost changes conversationally instead of digging through consoles and spreadsheets.
- Delivered account-level features: onboarding, external messaging integrations, user memory, and permissions systems.
- Shipped proactive product features on a durable workflow engine: continuous and event-driven monitoring with contextual alerts, scheduled recurring analyses, and stakeholder-ready email reporting.
- Established internal observability surfaces, feedback loops, adversarial evals, and self-improvement patterns: enabling rapid development and data-driven product decisions.
- Optimized product UX: responsive streaming, interactive event-driven UI components, reporting and visualization interfaces.

Skills used: AWS, EKS/Kubernetes, Terraform, GCP, Cloudflare, Agentic AI Systems, LLM Tool-Calling, Context Engineering, Cloud FinOps, Workflow Engines, Observability, Full-Stack Product Engineering, Streaming UI, Agentic Coding Practices

Senior Software Engineer, Email D&C at Klaviyo, *Remote* · April 2022 – March 2025

- Led refactoring of mission-critical event ingestion and processing pipelines and data lake models.
- Led an initiative for statistical analysis of global metrics for proactive anomaly detection and alerting.
- Led an abuse-detection project combining engineering and data science, producing core abstractions to deliver a behavior-matching framework alongside data-driven optimization.
- Led unification of compliance checks into a core event-driven extensible framework.
- Produced actionable research on using NLP/ML models for low-FPR spam detection.
- Held direct technical and on-call responsibility for production systems driving billions in revenue.
- Facilitated technical interview rounds for candidates ranging from intern to manager.
- Led a hackathon team to develop LLM-based multi-agent conversational product workflows.

Skills used: Python, Django, Celery, AWS, Kubernetes, Terraform, Postgres, SQL, Spark, Redis, Kafka, Pulsar, Event-driven Systems, Distributed Ops/Monitoring, Domain Decomposition, Project Planning

Senior Software Engineer at Paradigm, *Remote* · May 2021 – February 2022

- Developed mission-critical, highly performant algorithmic trading features from scratch for institutional customers. Was responsible for designing, building, and maintaining scalable, secure production web services and distributed systems infrastructure.
- Led development of a platform-wide authentication-as-a-service system securing access to exposed API endpoints across Python and Go microservices at scale within a Kubernetes service mesh.
- Handled refactoring of a Django monolith into a gRPC/HTTP microservices architecture, and created Helm charts deploying 14 services over six target environments across multiple clusters.

Skills used: Python, Django, Celery, AWS, Kubernetes/EKS, Docker, Helm, Istio, Envoy, Kafka, Postgres, Redis, SQLAlchemy, FastAPI, Websockets, gRPC, Microservices, Systems Integration

Senior Data Engineer at Special Projects Group, *Remote* · January 2020 – February 2021

- Led development of a digital currency algorithmic trading platform and optimization of strategies.
- Developed a system for real-time continuous optimization of ensemble world models from diverse data feeds using evolutionary/genetic algorithm techniques in a simulated environment.
- Implemented graph-structured data modeling of financial ecosystems for feature engineering.
- Created a secure web application, visualizations, and chatbot interfaces to control the internal platform and user accounts for new-product MVPs.

Skills used: Python, PostgreSQL, Data Modeling, Genetic/Evolutionary Algorithms, Neural Networks, Graph Theory, Pandas, PyTorch, Plotly, Django, AWS, Microservices, REST APIs, Real-Time Systems

Senior Computational Engineer at Supermassive, *Remote* · June 2019 – December 2019

- Led design and development of a global digital currency algorithmic trading platform.
- Created and shipped reliable event-driven ecosystem observation and modeling systems, indicator computation and signal generation pipelines, and trade execution backends. Managed platform operations through varying market regimes.
- Developed a nanosecond-precision time-bucketing data API backed by TSDB to power high-throughput back-testing.
- Implemented strategy back-testers, evolutionary/gridsearch optimizers, and a walk-forward trading simulator.

- Provided the ability to combine technical analysis, fundamental analysis, and machine learning into implementations computed on heterogeneous data feeds at multiple timescales, and to build results from arbitrarily defined chains.
- Developed a continuous optimization pipeline deploying updated dynamic parameters to live-running strategies.
- Deployed production systems and infrastructure enabling secure instantiation of live and paper trading agents for users.

Skills used: Python, AWS, PostgreSQL, Data Modeling, Pandas, Redis, TimescaleDB, RabbitMQ, Celery, Real-Time Systems, Backend Engineering, REST APIs, ChatOps, Microservices, CI/CD

Data Scientist at Evol Science, *Remote; Philadelphia, PA* · May 2016 – February 2019

- Created and executed on a prioritized technical development roadmap to deliver computational biology and bioinformatic capabilities for data-driven combination therapy discovery and development.
- Architected, developed, and maintained an internal data analysis software suite: a cross-platform native GUI application with integrated cloud computing on automated infrastructure.
- Developed workflows for genomic and transcriptomic sequence mapping, transcript quantitation, variant calling, and variant effect prediction, with graphical dataset QC reporting at each stage.
- Implemented statistical analysis of multi-replicate proteomic, transcriptomic, and genomic datasets to compute normalized differentials and enable cross-experimental comparison and plotting.
- Developed techniques for mapping multi-omic experimental datapoints onto prior-knowledge interaction networks, and implemented an optimized Prize-Collecting Steiner Forest greedy algorithm workflow to discover key metabolic response pathways of any given sample.
- Developed a functional enrichment analysis technique for generating interactome-mapped metabolic response signatures using pathway annotations from multiple public scientific reference databases.
- Implemented a Graph-Sparse Logistic Regression workflow for classification of metabolic response signatures.
- Developed inline interactive metabolic network visualizations based on cytoscape.js.
- Delivered technical presentations for investors, board members, legal, and due diligence efforts.

Skills used: Python, Data Modeling, Graph Theory, Optimization, PyQt, Computational Biology, NGS Bioinformatics, Visualization, Desktop Application Development, Data Analysis, Data Warehousing, AWS, Infrastructure Automation, Scientific Computing

Chief Technology Officer at Orange Maker, *Thousand Oaks, CA; Philadelphia, PA* · June 2013 – April 2016

- Oversaw technical development of proprietary Heliolithography (HL) additive manufacturing technology, engineering of HL 3D printer hardware, development of all software, and product design.
- Led the design and development of multiple machine prototypes across discrete form factors and photonic technologies.
- Designed and iterated electromechanical systems, optical systems, control systems and firmware, hardware testing software interfaces, end-user GUIs, backend servers, and network services.
- Created machine prototypes capable of synchronizing laser projection with precise physical movement to respect photopolymerization cure process dynamics, producing solidified geometries with tolerances of 50 microns over 18-inch build areas in multiple materials.
- Created a GPU-accelerated geometric data processing pipeline (slicing, voxelization, streaming) designed to enable networked industrial-scale printing services.

Skills used: Embedded Systems, Electrical/Electronic Engineering, Photonics, Hardware Integration, FPGA SoCs, C, Python, Computational Geometry, Mechatronics, Process Engineering, Robotics

Engineering Technician at Thorlabs, *Newton, NJ* · November 2012 – July 2013

- Developed custom software tools using the SolidWorks COM API to fully automate document and component re-referencing procedures, eliminating tedious manual work for updating drawings.
- Created custom opto-electro-mechanical fixtures and GUI software to accelerate the QC efforts of glass fabrication and characterization technicians.

Skills used: Python, Electrical and Electronics Engineering, Machine Vision, Process Control, Process Improvement, Data Analysis, Manufacturing, SolidWorks, Mechanical Engineering

PEER-REVIEWED RESEARCH PUBLICATIONS

AACR JOURNALS – MOLECULAR CANCER THERAPEUTICS

Identification of the Serine Biosynthesis Pathway as a Critical Component of BRAF Inhibitor Resistance of Melanoma, Pancreatic, and Non-Small Cell Lung Cancer Cells

Published online May 12, 2017. DOI: 10.1158/1535-7163.MCT-16-0798. Featured in AACR MCT Journal August 2017 Highlights.

IMPACT JOURNALS – ONCOTARGET

Methotrexate sensitizes drug-resistant metastatic melanoma cells to BRAF V600E inhibitors Dabrafenib and Encorafenib

Published online January 29, 2018. DOI: 10.18632/oncotarget.24341