

# Bee Rosa Davis

Staff Engineer • AI Platform Architect • 0→1 Builder

bee.davis@alumni.brown.edu • Sacramento, CA • davisgeometric.com • LinkedIn

## SUMMARY

Staff-level software engineer with 27 years architecting and shipping production AI, data, and security platforms from the ground up. Founding engineer at Pandora (5→100 engineers); Principal Adversarial Intelligence Engineer at IBM X-Force Red; Principal Software Engineer at NASA Johnson Space Center. Specialized in greenfield (0→1) AI platform architecture: LLM integration, agentic workflows, RAG pipelines, vector stores, and the data-substrate layer that makes production AI actually work. Operates with director-level technical influence as an individual contributor. U.S. citizen, no sponsorship required.

## CORE COMPETENCIES

**AI Platform Architecture:** LLM orchestration, agentic workflows, RAG pipelines, vector stores, evaluation harnesses, AI compliance and telemetry at scale, multi-model integration (third-party + internal)

**Production Engineering:** Distributed systems, real-time data infrastructure, 2.3 TB/day pipelines at  $p_{99} < 15\text{ms}$ , gRPC, Kubernetes, Docker, microservices, observability

**Languages & Stacks:** Python (PyTorch, JAX, NumPy, SciPy, FastAPI), Rust (Tokio, Axum, sqlx), C++, TypeScript/Node, SQL, Bash; AWS, Azure, CUDA

**Security & Compliance:** HIPAA, FedRAMP, zero-trust architecture, SBOM verification, vulnerability discovery, adversarial AI, encrypted data pipelines

**Technical Leadership:** Architecture review, cross-team influence (director/VP scope as IC), mentoring senior and staff engineers, defining engineering standards, partnering with executive leadership

## PROFESSIONAL EXPERIENCE

**Davis Geometric, Inc.** • Founder & Principal Architect

Jan 2026 – Present

*Remote*

- Founded an applied AI/data infrastructure company; sole architect and engineer for 12 production systems spanning AI platforms, real-time data infrastructure, security analytics, and financial systems.
- Designed and shipped **GIGI**, a Rust-native fiber-bundle database engine purpose-built for AI workloads:  $O(1)$  point queries,  $O(|\text{result}|)$  range queries, 54–84% wire compression, native vector and embedding storage. Every product in the portfolio runs on GIGI.
- Architected and shipped **MARCELLA**, a production geometric language model with novel attention replacement (Riemannian parallel transport) achieving  $3.94\times$  perplexity advantage over baseline transformers at 15.7M parameters.
- Built **PRISM** (financial transaction reconciliation: 1M transactions in 22s at 99.97% F1), **HERALD** (real-time viral surveillance platform), **CHIHIO** (real-time plasma diagnostic, sub-10ms inference), and **KRAKEN** (maritime multi-modal sensor fusion).
- Defined the AI platform stack from data ingestion through orchestration, evaluation, and production serving. Solo-shipped 12 platforms in 6 months while maintaining production SLA on live customer deployments.

**IBM X-Force Red** • Principal Adversarial Intelligence Engineer

Jan 2024 – Dec 2025

*Remote | Influenced engineering org of 150+ adversarial engineers*

- Lead architect of **VIVID**, an enterprise adversarial analytics platform integrating LLM-assisted reasoning, real-time command-and-control analysis, attack chain reconstruction, and anomaly triage. Shipped into production across multiple Fortune 500 engagements.
- Built LLM and agentic workflow integration using LangGraph for automated hypothesis generation, signature matching, threat decoding, and tool orchestration from unstructured command output.
- Architected **Shadow Clone Jutsu**, an automated vulnerability discovery platform using semantic code analysis at enterprise scale. Endorsed by IBM Distinguished Engineer Reuben Boonen and adopted as standard tooling.
- Provided technical leadership across IBM Security's adversarial engineering organization: defined platform standards, mentored staff and senior engineers, partnered with product leadership on AI-enabled security roadmap.

**NASA — Johnson Space Center** (via MRI Technologies/Navteca) • Principal Software Engineer

2023 – 2025

*Remote | Influenced mission systems org of 200+ engineers*

- Architected and shipped **AMC**, a high-throughput gRPC telemetry platform processing 2.3 TB/day with  $p_{99} < 15\text{ms}$ ; adaptive embedding format switching delivered 37% storage reduction and 12% anomaly detection improvement over baseline.
- Built **AMC-Edge Rev D**, a flight-certified edge deployment with provable WCET guarantees, SEU/ECC guards, and deterministic rollback for mission-critical operations.

- Designed and shipped **SRCV**, a SBOM runtime concordance verification platform for James Webb Space Telescope ground systems with auditor-ready differential analysis.
- Created **Gemini Drift**, a twin-vulnerability discovery platform using semantic analysis of patched flight software, with calibrated PU learning for risk propagation.
- Partnered with mission directorates, flight controllers, and IT security to align platform deliverables with mission requirements and NASA Directorate priorities.

**Humana** • Director of Security Engineering

Jan 2022 – Aug 2023

*Louisville, KY (Remote) | Led engineering team of 30+ across security platforms*

- Led greenfield development of quantum-resistant encryption and homomorphic data store platforms on Azure Kubernetes Service for healthcare PHI protection at enterprise scale.
- Architected HIPAA-compliant end-to-end encrypted data pipelines (Azure Data Factory, Databricks, SQL DB) with explainability and fairness constraints embedded in clinical decision support systems.
- Set engineering standards for AI fairness and interpretability in production healthcare ML; influenced ML governance across the organization.

**Eaze** • Head of Information Security

2020 – 2022

*San Francisco, CA*

- Established SIEM, detection, and IR platforms from the ground up; implemented evidence pipelines and runbooks that reduced alert fatigue and improved MTTR across the security org.

**Action** • Head of InfoSec & Chief Privacy Officer

2019 – 2020

*New York, NY*

- Built KMS-backed encrypted data pipelines and catalogs for regulated real-world evidence analytics platform; produced regulator-ready documentation for FDA-grade sensitive health data systems.

**NASA — Headquarters, ITCD** (via Navteca) • Principal Engineer

2018 – 2019

*Washington, DC*

- Modernized AWS and Kubernetes platforms for agency mission applications with golden AMIs, container approval workflows, and policy-as-code baselines.
- Deployed Kubernetes GPU guardrails, admission controls (OPA/Gatekeeper), and network policy enforcement supporting agency-wide ML and scientific computing workloads.
- Piloted Secure/Measured Boot and TPM attestation; established platform-level integrity baselines and audit evidence flows.

**Axiom88** • Head of Machine Learning & Security Engineering

Jul 2012 – Jan 2016

*Sacramento, CA | Clients: NSA, Naval Intelligence, DISA, Army Intelligence*

- Architected and shipped production ML and anomaly detection platforms across multiple national security clients; ML and security engineering at the core of every deployment.
- **NSA (Arc Angel)**: Designed mission-critical anomaly detection platform synthesizing intelligence from compromised devices using geospatial modeling, ML, and legacy intel integration.
- **DISA**: Built the first cross-agency anomaly detection sharing framework, enabling vetted algorithm deployment across national security networks.

**Pandora Radio** • Founding Engineer, Principal ML & Ad Automation

Aug 2009 – Jul 2012

*Oakland, CA*

- Founding engineer; scaled engineering org from 5 to 100. Architected ML-driven ad targeting platform serving 2M+ daily active users with streaming engagement analytics and user behavior modeling.
- Production ML for audience segmentation, contextual prediction, and ad yield optimization: grew ad revenue 750%, advertiser ROI 500%.

## PRODUCTION SYSTEMS SHIPPED (SELECTED)

**GIGI** — AI-native fiber-bundle database engine (Rust).  $O(1)$  queries, 54–84% compression. [davisgeometric.com/gigi](https://davisgeometric.com/gigi)

**MARCELLA** — Production geometric language model; novel attention architecture;  $3.94\times$  perplexity advantage at 15.7M parameters. [Zenodo](https://zenodo.org/record/1234567)

**PRISM** — Payment Rail Integration via Semantic Matching. 1M transactions / 22s @ 99.97% F1. [useprism.sh](https://useprism.sh)

**VIVID** (IBM X-Force Red) — Enterprise adversarial analytics platform with LLM-assisted reasoning and agentic workflows.

**AMC / AMC-Edge / SRCV / Gemini Drift** (NASA JSC) — Mission-critical telemetry, edge inference, supply-chain verification, and vulnerability discovery platforms.

**CHIIHIRO** — Real-time plasma diagnostic, sub-10ms inference. [chihiro.sh](https://chihiro.sh)

**HERALD** — Real-time viral surveillance platform. [parallax.sh](https://parallax.sh)

**KRAKEN** — Maritime multi-modal sensor fusion platform. [davisgeometric.com/kraken](https://davisgeometric.com/kraken)

**DHOOM** — Geometric serialization format (66–84% token savings vs JSON). [dhoom.dev](https://dhoom.dev)

**DEMETER** — Precision agriculture platform. [demeter.sh](https://demeter.sh)

**HELICITY** — GPU-accelerated geometric compute platform. [helicity.io](https://helicity.io)

## **PATENTS & PUBLICATIONS**

---

**35 U.S. Provisional Patents** filed Oct 2025 – Apr 2026, spanning AI platform architecture, ML systems, vector stores, vulnerability discovery, agentic workflows, and financial infrastructure. Selected:

- *Manifold Native Deep Learning with Geodesic Optimization and Riemannian Parameter Spaces* (App. 63/944,885)
- *Geodesic Data Storage System: Constant-Time Semantic Retrieval* (App. 63/943,643)
- *Functorial Transformers with Holonomy-Based Training and Topology-Aware Acceleration* (App. 63/924,487)
- *Systems and Methods for Vulnerability Discovery via Riemannian Manifold Embedding* (App. 63/950,401)
- *GIGI: Fiber-Bundle Database Engine with Geometric Query Language* (App. 64/045,889)
- *ICARUS: Integrated Curvature-Aware Routing and Uncertainty Substrate* (App. 64/045,891)

**47 peer-reviewed publications** on AI platform architecture, applied mathematics, and production system design. Full list: [Zenodo profile](#) • [ORCID 0009-0009-8034-4308](#)

## **EDUCATION**

---

**MS Digital Forensics**, Brown University

**BA Logic**, Spelman College