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Senior Machine Learning & Scientific Software Engineer, System Architect, and Lifelong Learner

EXPERIENCE

Senior Engineer (Engineer I–V)

HRL Laboratories | 2018–2026 (7+ years)

- Led development of a **production ML-driven automation platform** that increased qubit testing throughput **10×** and enabled non-experts to outperform domain specialists.
- Architected and deployed a production continual-learning computer vision system (Semi-DETR, keypoint detection) leveraging **1M+ unlabeled** and **10k+ labeled images**, **achieving superhuman performance** with **1–2 week retraining cycles**.
- Designed **ML A/B tests and canary deployments**, quantitatively measuring model impact and guiding iteration in production systems.
- Developed Python-based control software and automation framework used daily on dozens of dilution refrigerators, generating **10M+ scientific datasets** (20TB) of novel experimental IP.
- Built **real-time streaming for datasets of 10M+ points** across heterogeneous systems.
- Migrated ML inference to centralized server-side services, **saving ~$1M** in anticipated GPU hardware costs and improving automation scalability and reliability.
- Created **scientist-facing GUIs** (Vue/JavaScript) for experiment debugging and ML data annotation, enabling large-scale data labeling and faster root-cause analysis.
- Implemented **CI/CD**, **unit testing**, **logging**, and **monitoring**, reducing downtime and accelerating deployment of critical ML and automation systems.
- Invented **novel neural network architectures and loss functions** for pixel-level pattern recognition, resulting in a **granted US patent**.

EXPERTISE & EDUCATION

Systems integration • Real-time data processing • Interface Development • Visualization

Python (multi-threaded, typed), Javascript/TypeScript, C#, HTML • SQL, REST APIs, Docker, CI/CD, Git, MLOps, Parallelization • Unity, Photoshop • Vue, Vite, PyTorch, Plotly, Grafana

Columbia University — **M.S. Applied Physics**, **GPA: 4.0**
Focus: Machine Learning, Deep Learning, AI, Algorithms, Numerical Methods, Quantum

University of California, Santa Barbara — **B.S. Physics**, Highest Honors, GPA: 3.93

PUBLICATIONS & PATENTS

Full-Permutation Dynamical Decoupling in Triple-Quantum-Dot Spin Qubits, PRX Quantum | 2024
Quiver: Quantum Dot Device Control Software, APS March Meeting | 2023
System and Method for Pattern Recognition & Graph Extraction, US Patent 12347180 | 2023
Solving Families in the Wild Kinship Verification by Program Synthesis, IEEE FG | 2021