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

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## EXPERIENCE

### Senior Engineer (Engineer I–V)

HRL Laboratories | 2018–2026

- 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 **~10<sup>6</sup> unlabeled + 10<sup>4</sup> 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 fleets of dilution refrigerators, generating **~10<sup>7</sup> scientific datasets** (20TB) of novel experimental IP.
- Built **real-time streaming for datasets of > 10<sup>7</sup> 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 • Vue, Plotly, Grafana • **TS/SCI Security Clearance**

**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