Taylor Faucett

Senior Machine Learning Engineer / Physicist

Los Angeles, USA

Previously held a U.S. Secret security clearance (inactive)

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Professional Summary

Senior Machine Learning Engineer and physicist with 8+ years developing and benchmarking ML algorithms across research and production, including 3D perception, scene understanding, and geometric reasoning. Build and ship Python/PyTorch systems end-to-end: dataset curation/labeling, training + evaluation, and real-time deployment in air-gapped/edge environments (e.g., ONNX, Rust `no_std`), with monitoring and regression benchmarks. Deep expertise in geometric deep learning (PointNet-style models, 3D CNNs, graph networks), physics-informed models for material behavior, and multimodal pipelines integrating 3D geometry with transformer/LLM-based agent interfaces under safety and latency constraints.

Education

2015 - 2021 | **University of California, Irvine**, Irvine, CA
Ph.D. in Physics

2011 - 2015 | **University of Hawaii, Manoa**, Honolulu, HI
M.S. in Physics

2005 - 2009 | **Westminster College**, Salt Lake City, UT
B.S. in Physics, Minor in Mathematics and Music

Professional Experience

06/2022 - Present | **Machina Labs**
Senior Machine Learning Engineer
- Lead end-to-end ML for industrial robotic sheet-metal forming, from dataset curation and labeling pipelines through model design, evaluation, and deployment for real-time inference in air-gapped robotic cells.
- Train real-time anomaly detection models deployed on edge devices, enabling in-process quality monitoring and early fault detection during robotic forming operations.
- Develop and maintain benchmark suites for model quality and edge inference performance (accuracy/latency), integrating regression tests and monitoring to catch data drift and performance degradation.
- Develop embedded-compatible inference components in Rust (`no_std`) to support constrained deployments; validate real-time inference on industrial PCs under latency budgets.
- Develop physics-informed ML models trained on material stamping literature to predict failure likelihood, incorporating material properties and forming parameters to prevent defects.
- Build mesh adjustment models for Double-Sided Incremental Forming (DSIF) that learn springback compensation—predicting geometry corrections so parts resolve to their final desired shape after elastic recovery.
- Create learned embeddings and representations from 3D geometry (meshes, point clouds, CAD) that encode spatial structure and physical constraints for downstream reasoning and path planning.
- Build multimodal pipelines combining geometric context with language-based interfaces for LLM-driven robot operation, focusing on tool use, constrained action spaces, and operational safety.
- Own data infrastructure (ETL, dataset versioning, metrics/dashboards, monitoring) and mentor junior engineers on ML best practices and geometric data pipelines.
- Partner with robotics, controls, and software teams to integrate ML into safety-critical systems, including CI/CD and infrastructure-as-code for deployed robotic cells.

06/2015 - 06/2022 | **University of California, Irvine**
Graduate Research Assistant & Postdoctoral Researcher
- Researched deep learning and computer vision methods for particle-physics detectors, focusing on robust classification, reconstruction, and anomaly detection under real-world constraints.

- Developed techniques for interpreting ML models and relating learned features to underlying physical mechanisms, improving trust and scientific insight.
- Built end-to-end ML pipelines for large simulated and experimental datasets, covering data generation, preprocessing, feature engineering, model design, hyperparameter optimization, and uncertainty-aware evaluation.
- Collaborated across international experimental collaborations and communicated ML results to both domain experts and non-specialists.

08/2011 - 05/2015 | **University of Hawaii, Manoa**
Graduate Research Assistant
- Designed and implemented numerical simulations of Bose–Einstein condensates for a DoD-funded lattice-gas quantum computing experiment, bridging physics models and high-performance code.
- Integrated analysis and trigger software with FPGA-based readout for a neutrino telescope, working across hardware, firmware, and scientific analysis teams.

09/2009 - 05/2011 | **Northrop Grumman Aerospace**
Systems Engineer
- Designed and deployed secure precision-time (PTP) radio networks for U.S. Air Force installations, focusing on reliability, timing accuracy, and security.
- Previously held a U.S. Secret security clearance (inactive).

Technical Skills

Languages	Python, Rust, SQL, C++, TypeScript/JavaScript, Bash/Shell
Edge & Embedded	Air-gapped deployments, Real-time inference systems, Rust `no_std`, Cross-compilation, Resource-constrained optimization
ML Engineering	PyTorch, Tensorflow, Burn, NumPy, Pandas/Polars, scikit-learn, Transformers, ONNX, MLflow, Weights & Biases, Optuna, Ray, Torch Lightning
Geometric Deep Learning	PointNet/PointNet++, 3D CNNs, Graph Networks, Flow Matching, 3D Transformers, Diffusion Models
Vision/Perception	3D Perception Pipelines, Scene Understanding, Sensor Fusion, Real-time Anomaly Detection
Robotics	ROS2, LLM-Assisted Robot Operation, Edge/Embedded ML
Physics/ Simulation	Material Forming Behavior, Physics-informed ML, Constraints-based Optimization
Data & Infrastructure	ETL Pipelines, Dataset Versioning, Azure/AWS, InfluxDB, Kafka/RabbitMQ
DevOps	Docker, Kubernetes, Terraform, CI/CD, Linux/Unix, Git

Publications

1. Faucett, T. Decoding Black Box Models to Find New Physics at the LHC. Ph.D. Dissertation, University of California, Irvine (2021). https://escholarship.org/uc/item/63x9r13b
2. Faucett, T., Hsu, SC. & Whiteson, D. Learning to identify semi-visible jets. J. High Energ. Phys. 2022, 132 (2022). https://doi.org/10.1007/JHEP12(2022)132
3. Faucett, T., Thaler, J., Whiteson, D. Mapping machine-learned physics into a human-readable space. Phys. Rev. D 103, 036020 (2021). https://doi.org/10.1103/PhysRevD.103.036020
4. Collado, J., Faucett, T., Witkowski, E. et al. Learning to isolate muons. J. High Energ. Phys. 2021, 200 (2021). https://doi.org/10.1007/JHEP10(2021)200
5. Collado, J., Faucett, T., Howard, J. et al. Learning to identify electrons. Phys. Rev. D 103, 116028 (2021). https://doi.org/10.1103/PhysRevD.103.116028
6. Baldi, P., Cranmer, K., Faucett, T. et al. Parameterized neural networks for high-energy physics. Eur. Phys. J. C 76, 235 (2016). https://doi.org/10.1140/epjc/s10052-016-4099-4

Honors & Awards

2020 | **Chateaubriand Fellowship**, Chateaubriand Fellowship
Prestigious fellowship awarded by the French Embassy to support research in machine learning and AI at a leading French institution.

2016-2018 | **NRT-DESE: Team Science for Integrative Graduate Training in Data Science and Physical Science**, National Science Foundation
2 year NSF research grant for work in the interdisciplinary field of machine learning and the physical sciences.