Taylor Faucett

Senior Machine Learning Engineer / Physicist

Los Angeles, USA

taylorfaucett@gmail.com | +1 (801) 633-4509 | taylorfaucett.github.io | github.com/taylorfaucett | linkedin.com/in/taylorfaucett | orcid.org/0000-0003-3917-975X

Professional Summary

Senior Machine Learning Engineer and physicist with 3+ years leading ML development for 3D perception, scene understanding, and geometric reasoning in robotics and advanced manufacturing. Build production ML systems that create learned embeddings from CAD/mesh/point-cloud data, design dataset curation and labeling pipelines, and deploy real-time inference on edge hardware. Deep expertise in geometric deep learning (PointNet-style models, 3D CNNs, graph networks), physics-informed models for material behavior, and multimodal pipelines integrating geometry with LLM-driven agents.

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 on edge hardware for real-time inference. - Train real-time anomaly detection models deployed on edge devices, enabling in-process quality monitoring and early fault detection during robotic forming operations. - 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 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.
	- Held an active Secret security clearance.

Selected Open-Source & Personal Projects

2024 - Present	**Rust 3D Geometry & Robotics Data Stack**
	Private (active development; details available upon request)
	- Developing a Rust-native alternative to PCL/Open3D for performant, safe mesh/point-cloud processing and geometry utilities.
	- Designed for interoperability with robotics workflows and telemetry/visualization platforms (ROS2, Foxglove, Rerun), with a focus on clean APIs and production deployment.

Technical Skills

LANGUAGES	Python, Rust, SQL, C++, TypeScript/JavaScript, Bash/Shell
ML ENGINEERING	PyTorch, NumPy, Pandas/Polars, scikit-learn, ONNX, MLflow, Weights & Biases, Optuna, Ray, Torch Lightning
3D GEOMETRY/CAD	Mesh/Point Cloud Processing, Coordinate Frames & Kinematics, CAD Formats (STEP, STL, OBJ, PLY), SDFs/Occupancy Grids
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, OpenCV
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.