

Taylor Faucett

Senior Machine Learning Engineer / Physicist

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Professional Summary

Senior Machine Learning Engineer and physicist specializing in 3D perception and geometric representations for robotics and advanced manufacturing. Build production ML systems that ingest CAD/mesh/point-cloud data for computational geometry, create datasets and labeling workflows, and deploy low-latency inference on robotic hardware. Experienced with geometry/physics constraints (material behavior in forming), geometric deep learning (PointNet-style models, 3D CNNs, graph networks), and LLM-driven robot operation.

Education

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|-------------|---|
| 2015 - 2021 | University of California, Irvine , Irvine, CA
<i>Ph.D. in Physics</i> |
| 2011 - 2015 | University of Hawaii, Manoa , Honolulu, HI
<i>M.S. in Physics</i> |
| 2005 - 2009 | Westminster College , Salt Lake City, UT
<i>B.S. in Physics, Minor in Mathematics and Music</i> |

Professional Experience

- | | |
|-------------------|---|
| 06/2022 - Present | Machina Labs
<i>Senior Machine Learning Engineer</i> <ul style="list-style-type: none">- Lead end-to-end ML for industrial robotic sheet-metal forming, from 3D data capture/labeling through model design, evaluation, and deployment on on-prem/edge hardware.- Build geometry tooling (CAD/mesh/point cloud manipulation, coordinate-frame transforms, kinematics-aware features) used across perception, mesh prep and path planning.- Develop models that reason about geometry, physics, and constraints for forming processes; incorporate material behavior and simulation/measurement signals to train and validate models for double-sided incremental forming.- Create multimodal pipelines that combine geometric context with language-based interfaces for LLM-driven robot operation, focusing on constrained action spaces and operational safety.- Own data and experimentation infrastructure (ETL, dataset versioning, metrics/dashboards, monitoring) to support rapid iteration and reliable inference in production.- Partner with robotics, controls, and software teams to integrate ML into safety-critical systems, including CI/CD and infrastructure-as-code for deployed cells. |
| 06/2015 - 06/2022 | University of California, Irvine
<i>Graduate Research Assistant & Postdoctoral Researcher</i> <ul style="list-style-type: none">- 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
<i>Graduate Research Assistant</i> <ul style="list-style-type: none">- 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.

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](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](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>

Technical Skills

LANGUAGES	Python	●●●	Rust	●●○
	JS/TS	●●○	SQL	●●○
	Bash/Shell	●●○	C++	●○○
ML ENGINEERING	PyTorch	●●●	NumPy	●●●
	Pandas/Polars	●●●	scikit-learn	●●●
	TensorFlow/Keras	●●○	ONNX	●●○
	MLflow	●●○	TensorBoard	●●○
	Weights & Biases	●●○	Optuna	●●○
	Torch Lightning	●●○	Ray	●○○
3D GEOMETRY & CAD	Meshes & Point Clouds	●●●	Coordinate Frames & Kinematics	●●●
	CAD / 3D Formats (STEP, STL, OBJ, PLY)	●●○		
GEOMETRIC DEEP LEARNING	PointNet / PointNet++	●●○	3D CNNs	●●○
	Graph Neural Networks	●●○	3D Transformers	●○○
	Diffusion Models (3D)	●○○		
VISION & PERCEPTION	3D Perception Pipelines	●●●	Sensor Fusion (3D + time-series)	●●○
	Anomaly Detection	●●○	OpenCV	●●○

ROBOTICS	ROS2	●●●	LLM-Assisted Operation	Robot	●●○
	Edge/Embedded ML	●●○	Real-time Systems		●●○
PHYSICS/ SIMULATION	Material behavior in forming Constraints & optimization	●●○	Physics-informed ML		●●○
DATA & CLOUD	ETL Pipelines	●●●	Kafka/RabbitMQ		●●●
	Databricks	●●●	Azure/AWS		●●○
	PySpark	●●○	InfluxDB		●●○
DEVOPS	Docker	●●●	Kubernetes		●●○
	Terraform	●●○	CI/CD		●●●
	Linux/Unix	●●●	Git		●●●

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.