Derek P. Horkel

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Professional Summary

Hands-on Machine Learning Architect guiding algorithmic data infrastructure and regulated medical AI deployments. Expert in scalable ML operations, cross-functional delivery, and translating research innovations into resilient production systems built on ONNX Runtime and cloud-native platforms.

Education

University of Washington, Seattle, Washington USA

PhD in Physics, 2016
M.S. in Physics, 2012

University of Connecticut, Storrs, Connecticut USA

B.S. in Physics with Honors with minor in Mathematics, 2011
B.S. in Biological Sciences with minor in Ecology and Evolutionary Biology, 2011

Technical skills

Programming Languages: Python (static typing), C, C++, R, SQL, Bash, Node.js, Perl, SAS, Wolfram Language, TEX

ML & Data Science: PyTorch, Scikit-learn, XGBoost, Pandas, NumPy, SciPy, PySpark, Jupyter, OpenCV, Peewee

MLOps & Platforms: ONNX Runtime, ZenML, Kubernetes, Docker, CI/CD tooling, JFrog

Data & Cloud: AWS (S3, EMR, EC2, SageMaker, EKS, ECS, ECR, Batch, DynamoDB, RDS, Redshift, Lambda, CloudFormation, IAM, Rekognition), PostgreSQL, MySQL

Productivity: Mathematica, LATEX, Microsoft Office, macOS, Linux, Windows

Languages: Spanish (elementary), Mandarin Chinese (elementary)

Employment

Machine Learning Architect, Digital Diagnostics Jan 2026 – Present

- Lead algorithmic data infrastructure spanning training data pipelines and compliance-ready datasets for regulated medical AI
- Deliver production-grade preprocessing and ONNX Runtime inference framework that shrinks model release integration time from weeks to days
- Partner with compliance and product stakeholders to align ML roadmap with clinical and business requirements and audit expectations

Lead & Senior Machine Learning Software Engineer, Digital Diagnostics Nov 2022 – Dec 2025

- Promoted in Jan 2024 to lead ML software engineer after modernizing the modular C++ platform underpinning regulated diagnostic algorithms
- Built image and annotation governance services on Kubernetes and PostgreSQL, enabling traceable datasets across hundreds of thousands of patient submissions
- Introduced CI guardrails and automated reviews that decreased regression-related hotfixes across the ML stack

- Maintained FDA-cleared computer vision models for medical devices, coordinating field monitoring and retraining cadence with compliance teams
- Directed labeling, training, and validation cycles across cross-functional teams to harden classifier performance before regulatory releases
- Designed, deployed, and maintained a dataset registry backed by PostgreSQL and Kubernetes ingestion jobs to track submissions from dataset to exam
- Built reusable tooling for machine learning engineers, accelerating experimentation and deployment handoffs

Senior Machine Learning Engineer, Happy Health Aug 2021 – Nov 2022

- Developed, trained, and deployed numerous production ML models
- Developed models using time series classification, regression, and Markov chain methods
- Ported Python ML models to C to run in iOS app
- Developed experiments to collect data for new models with research team
- Coordinated with firmware team to balance sensor data collection with battery demands
- Worked with iOS mobile team to coordinate model updates and specify metadata collection
- Developed testing criteria for models with quality assurance team

Principal Machine Learning Engineer / Senior Software Engineer, Sapient Industries Jun 2019 – Aug 2021

- Promoted in 2021 to principal ML engineer after leading end-to-end data collection, model development, and production deployment efforts
- Iterated and retrained production models, improving accuracy while streamlining data ETL workflows
- Managed production, integration test, and development databases hosted in AWS RDS
- Wrote CloudFormation templates to deploy AWS stacks across multiple environments
- Brought AWS accounts into CIS benchmark compliance and implemented automated security, pipeline, and system alerts
- Developed migration pipeline moving clients from legacy MySQL to PostgreSQL
- Wrangled and cleansed data for client delivery and analytics use cases

Senior Machine Learning Engineer, Vanguard March 2019 – May 2019
Machine Learning Engineer, Vanguard Dec 2017 – March 2019

- Deployed, maintained and automated machine learning models and engineered features
- Handled data cleansing, wrangling, and staging for use in models
- Consulted on use of models in marketing campaigns, advising clients, and operations
- Led migration of legacy SAS models to Python automated in AWS

Postdoctoral Fellow, Temple University Oct 2016 – Oct 2017

Advisor Prof. Martha Constantinou

- Research focused on studying hadron structure using lattice quantum chromodynamics
- Worked with international collaboration coordinating and using computing resources

Research Assistant, University of Washington June 2013 – Aug 2016

Advisor Prof. Stephen Sharpe

- Research focused on studying lattice quantum chromodynamics and effective field theories using statistical and numerical methods
- Used group theory along with numerical solvers to map out phase diagram of twisted mass lattice chiral perturbation theory
- Ran large scale Monte Carlo lattice simulation on the Hyak supercomputing cluster
- Designed and taught undergraduate section using Mathematica software for mathematical physics

Teaching Assistant, University of Washington Sept 2011 – May 2016

- Taught introductory physics labs, tutorials, and exam grading
- Assistant for undergraduate and graduate quantum mechanics courses

Patents

Powered device electrical data modeling and intelligence, US11681345B2 (2023)

Journal Publications

Topological susceptibility from twisted mass fermions using spectral projectors and the gradient flow, *Phys. Rev. D97* (2018) 7, 074503

Phase structure with nonzero Θ_{QCD} and twisted mass fermions, *Phys. Rev. D92* (2015) 9, 094514

Impact of electromagnetism on phase structure for Wilson and twisted-mass fermions including isospin breaking, *Phys. Rev. D92* (2015) 7, 074501

Phase diagram of non-degenerate Wilson and twisted mass fermions, *PoS LATTICE2014* (2014) 066

Phase diagram of nondegenerate twisted mass fermions, *Phys. Rev. D90* (2014) 9, 094508