Derek P. Horkel

dhorkel@gmail.com

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, C, C++, R, Perl, SQL, Shell/Bash scripting, NodeJS, SAS, Wolfram Language, TeX

Software and Frameworks
PyTorch, ZenML, Kubernetes, Docker, PySpark, Pandas, Scikit-learn, Numpy, Scipy, XGBoost, Jupyter, Presto, PostgreSQL, MySQL, AWS (S3, EMR, EC2, Sagemaker, Batch, Dynamo DB, RDS, Redshift, Lambda, Cloudformation, IAM), Mathematica, LaTeX, Microsoft Office, Windows, macOS, Linux

Employment

Lead Machine Learning Software Engineer, Digital Diagnostics — Jan 2024 – Present

Senior Machine Learning Software Engineer, Digital Diagnostics — Nov 2022 – Dec 2023

- Worked to modernize and modularize monolith C++ code base
- Maintained deep learning computer vision models as part of medical device
- Helped lead transition of deep learning pipeline from on-prem to cloud
- End to end model development, word to establish requirements with product, annotating images, training and testing classifiers, and deployment to production kubernetes cluster
- Developed coding best practices including enforcement as part of CI process

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
- Created dashboard for backend team to monitor data pipeline and models
- Developed testing criteria for models with quality assurance team

Principle Machine Learning Engineer, Sapient Industries — June 2021 – Aug 2021

Senior Software Engineer, Sapient Industries — June 2019 – June 2021

- End-to-end data collection, development and production deployment of ML models
- Iterated and retrained production models, both improving accuracy and streamlining data ETL

- Managed production, integration test and development database hosted in AWS RDS
- Wrote Cloudformation templates to deploy AWS stack in multiple environment deployment
- Brought AWS accounts into CIS benchmark compliance, developing best practices
- Set up automated alerts for security compliance, data pipeline, and system functionality
- Developed pipeline to migrate clients from legacy MySQL database to PostgreSQL
- Wrangled and cleansed data for delivery to clients and use in reporting and analytics
- Managed and led seasonal teams of college interns

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
- Lead migration of legacy SAS models to run in 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