

Research engineer between probabilistic machine learning and high-performance systems. I build Bayesian models and the compilers and inference engines that run them. Core developer of Pyro; two decades across industrial research labs (Uber AI, Google, Broad) and deep-tech startups.

Professional Experience

Principal Software Engineer Positron AI (2024 – 2025)

Performance engineering of LLM inference across software and custom hardware.
Built an E-graph based PyTorch optimizing compiler targeting a proprietary accelerator.

Founder Obermeyer Computing (dba Social Cognitive Machines) (2023 – 2024)

Built generative-AI products: a writing coach for Google Docs and a children's book generator.

Principal Machine Learning Architect Generate Biomedicines (2022 – 2023)

Built a framework for multi-objective Bayesian optimization of protein designs.
Drove engineering-rigor initiatives (testing, code review, refactoring) in a research org.

Machine Learning Fellow Broad Institute of MIT and Harvard (2020 – 2022)

Continued developing the Pyro probabilistic programming language (<https://pyro.ai>).
Created a method for viral genome-wide association study and applied it to SARS-CoV-2, identifying fitness-associated mutations (*Science*, 2022).

Research Scientist Uber AI (2017 – 2020)

Led engineering of the Pyro probabilistic programming language (<https://pyro.ai>).
Built production sensor-fusion systems for product teams; published research.

Associate Specialist University of California, Berkeley (2017)

Brought professional software development practices to a team developing a probabilistic programming package in R (<http://R-nimble.org>).

Software Engineer Google, Inc. (2015 – 2017)

Maintained, developed, and internally consulted around a machine learning platform.
Developed scalable active learning algorithms for large graph datasets.

Lead Predictive Scientist Salesforce.com (2013 – 2014)

Senior Software Engineer Prior Knowledge, Inc. (acquired) (2012 – 2013)

Extended, tested, and optimized a parallel distributed machine learning engine.
Developed scalable MCMC inference algorithms for nonparametric Bayes models.
Helped maintain and extend an engine and API for prediction-as-a-service.

Analyst, Toyon Research Corporation. (2009 – 2011)

Developed and implemented algorithms for tracking, classification, and image processing.
Wrote successful proposals for DOD contracts.

Research Scientist, Numerica Corporation (2002 – 2005)

Developed a “Bayesian Network Tracking Database” for multi-target tracking.
Worked on ambiguity assessment in data association problems.

Education

Ph.D. in Pure and Applied Logic, Carnegie Mellon University (Aug. 2005 – June 2009)

Thesis topic: Automated equational reasoning in untyped lambda-calculi.

M.S. in Mathematics, Colorado State University (Jan. 2002 – May 2004)

Thesis topic: Bayesian Networks for data association in multiple target tracking.

B.S. in Physics+Applied Math, Colorado State University (Aug. 1997 – Dec. 2001)

Selected Publications

4,400+ citations, h-index 18 <https://scholar.google.com/citations?user=gBhZfEOAAAAJ&hl=en>

Pyro: Deep Universal Probabilistic Programming, E. Bingham, JP Chen, M. Jankowiak, F. Obermeyer, N. Pradhan, T. Karaletsos, R. Singh, P. Szerlip, P. Horsfall, N. Goodman, JMLR (2019)

Analysis of 6.4 million SARS-CoV-2 genomes identifies mutations associated with fitness F. Obermeyer, M. Jankowiak, N. Barkas, S. Schaffner, ..., P. Sabeti, K. Lemieux, Science (2022)

Tensor variable elimination for plated factor graphs F. Obermeyer, E. Bingham, M. Jankowiak, J. Chiu, N. Pradhan, S. Rush, ICML (2019)

Pathwise derivatives beyond the reparameterization trick, M Jankowiak, F. Obermeyer, ICML (2018)

Scaling Nonparametric Bayesian Inference via Subsample Annealing, F. Obermeyer, J. Glidden, E. Jonas, JMLR via AISTATS (2014)

Published Software

Pyro (Python/C++, <http://github.com/pyro-ppl/pyro>, (2017-present))
A deep probabilistic programming language built on PyTorch.

Funsor (Python, <http://github.com/pyro-ppl/funsor>, (2018-present))
A library for dynamic programming with distributions, built on PyTorch/JAX.

Pomagma (C++/Python, <http://github.com/fritzo/pomagma>, (2005-present))
High-performance deductive database and E-graph engine for extensional untyped λ -calculus.

Loom (C++/Python, <http://github.com/posterior/loom>, (2012-2014))
A parallelized inference engine for cross categorization.

The Rational Keyboard (Javascript/HTML5, <http://fritzo.org/keys>, (2012))
A browser-based musical instrument with Bayesian auto accompaniment.

Jenn 3D (C++/OpenGL, <http://jenn3d.org>, (2001 – 2006))
A tool for visualizing 4-dimensional Coxeter polytopes in 3D.

Patents

US Application 16536869 (filed in 2018) With JP Chen, V. Lyapunov, L. Guegen, N. Goodman, B. Kadlec, D. Bemis,
Concerning a scalable sensor fusion pipeline based on probabilistic programming.

US9349132 (filed in 2013) With B Cronin, C Petschulat, E. Jonas,
Concerning a predictive database querying system for a machine learning API.

US8816962 B2 (filed in 2013) With Henry Obermeyer,
Concerning optically instrumented multi-axis input devices for computer interface.

US 6956670 B1 (filed in 2000) With Joan Mitchell of IBM, *et al.*,
Concerning the combination of multiple linescreens of different resolution in color printing.