

Fritz Obermeyer

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github.com/fritzo

Bellingham, WA, USA

Professional Experience

Founder Obermeyer Computing (2023 – present)

Developing human-centric apps built on LLMs and image generators.

Principal Machine Learning Architect Generate Biomedicines (2022 – 2023)

Developed a framework for multi-objective Bayesian optimization of proteins.

Organically led engineering cultural initiatives in testing, code review, code cleanup.

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

Continued developing the Pyro probabilistic programming language (<https://pyro.ai>).

Created a new method for viral genome wide association study, applying it to SARS-CoV-2.

Research Scientist Uber AI (2017 – 2020)

Led engineering of the Pyro probabilistic programming language (<https://pyro.ai>).

Created production sensor fusion solutions for product teams. Wrote research papers.

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.

Researched new probabilistic models and inference algorithms.

Developed scalable MCMC inference algorithms for nonparametric Bayes models.

Helped maintain and extend an engine and API for prediction-as-a-service.

Software Developer, Zenph Sound Innovations. (2011)

Developed Bayesian spectral analysis algorithms for gestural piano transcription.

Analyst, Toyon Research Corporation. (2009 – 2011)

Developed and implemented algorithms for tracking, classification, and image processing.

Invented scalable belief propagation algorithms for fast probabilistic matching.

Wrote successful proposals for DOD contracts.

Research Scientist, Numerica Corporation (2002 – 2005)

Developed a “Bayesian Network Tracking Database” for multi-target tracking.

Developed high-accuracy nonlinear batch filters for ballistic prediction.

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)

Published Papers <https://scholar.google.com/citations?user=gBhZfE0AAAAJ&hl=en>

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)

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)

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)

Short-term Ambiguity Assessment to Augment Tracking Data Association Information, S. Gadaleta, S. Herman, M. Levedahl, S. Miller, F. Obermeyer, B. Slocumb, and A. Poore, *Fusion* (2005)

A Bayesian Network Tracking Database, Fritz Obermeyer and Aubrey Poore, *Proceedings of SPIE Signal and Data Processing of Small Targets* (2004)

Batch maximum likelihood (ML) and maximum a posteriori (MAP) estimation with process noise for tracking applications, A. Poore, B. Slocumb, B. Suchomel, F. Obermeyer, S. Herman, S. Gadaleta, *Proceedings of SPIE Signal and Data Processing of Small Targets* (2003)

Published Software

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

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

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.