Simon Daniel Eiriksson, M.Sc. machine learning

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Summary

Data Scientist / Machine learning researcher with a strong foundation in mathematical modelling and probabilistic methods, recently completing an M.Sc. in Mathematical Modelling and Computation with top grades.

My work focuses on generative modelling, Bayesian inference, uncertainty quantification, and stochastic processes, including research on variational diffusion models and Laplace-based Bayesian neural networks. I bring extensive experience working with large, complex real-world datasets from a prior career in quantitative public data analysis, where I designed data workflows, built analytical pipelines, and delivered data-driven insights at national and regional scale.

Employment History

2016 – 2023 **Independent Analyst & Consultant in Public Health Data**

In my role as consultant, I have worked with a wide range of data analytics projects. My clients come from the public health administration in Denmark.

- Designed and maintained ETL and data warehousing workflows for large health datasets, including cross-registry linkage and integration of multiple source systems.
- Led or contributed to operational analytics projects including 5- and 10-year hospital activity forecasts, KPI implementation, and dashboard/reporting solutions for regional stakeholders.
- Built ML model and data pipeline for preventive care of COPD patients, linking registry, patient-record, and wearable data to predict acute exacerbations.
- Worked as tech lead on selected projects involving radiology data integration, COVID data integration, and regional health survey analytics.
- Tools: Python, SAS, T-SQL, VBA.

2013 – 2015 **Executive Officer at the Department for Health Data, National Institute for Health Data and Disease Control**

- Data extraction and heavy data wrangling across Danish national health registries for research projects using SQL/SAS. Codebase QC and revision.
- Project manager of the department's data flow automation project
- Supervised researchers and delivered health statistics to international organizations (OECD, NOMESCO, EUROSTAT), media, and parliament.
- Contributed to development of the new National Patients Registry; managed international relations / chaired NOMESCO.

Education

2023 – 2025 **M.Sc. Engineering, Technical University of Denmark** Mathematical Modeling and Computation. Thesis title: *Iterative Variational and Time-consistent Diffusion Models*. GPA: 11.2.

Favourite courses:

- **Deep Learning**: deep learning, neural networks, backpropagation, CNNs, RNNs, PyTorch, generative models, reinforcement learning.
- **Advanced Machine Learning**: generative models, representation learning, graph neural networks, geometric learning, probabilistic modeling.
- **Bayesian Machine Learning**: Bayesian machine learning, probabilistic modeling, variational inference, sampling methods, uncertainty quantification, calibration, Bayesian decision theory, deep probabilistic models.
- **Dynamic Optimization**: dynamic optimization, optimal control, calculus of variations, Pontryagin maximum principle, dynamic programming, HJB equations, Markov decision processes, dynamic games.
- **Machine Learning for Signal Processing**: signal processing, STFT, Kalman filters, hidden Markov models, adaptive filtering, compressed sensing, sparse modeling, kernel methods.
- **Machine Learning Operations**: MLOps, reproducibility, version control, containerization, CI/CD, experiment tracking, cloud deployment, model monitoring.
- **Advanced Deep Learning in Computer Vision**: vision transformers, object detection, image segmentation, NeRF, differentiable rendering, video understanding, self-supervised learning, limited-label learning, explainable AI, Grad-CAM
- **Model-based Machine Learning**: probabilistic graphical models, Bayesian inference, probabilistic programming, Pyro, MCMC, variational inference, hierarchical models.

2009 – 2013 **M.Sc. Anthropology, University of Copenhagen, Denmark**

2005 – 2008 **B.Sc. Anthropology, University of Copenhagen, Denmark**

2007 **Exchange student, University of Havana, Cuba**

2001 – 2005 **B.Sc. Mathematics, University of Copenhagen, Denmark**

Projects

2025 **Master's thesis** supervised by Professor Ole Winther: *Iterative Variational and Time-consistent Diffusion Models*. Explores two novel ideas for Variational Diffusion Models: the iterative variational diffusion model that reinterprets hierarchical VAEs as diffusion processes and introduces a new class of variational processes that improve the performance of the generative model. Second, the time-consistent variational diffusion model that allows for inference in variable number of time steps. We are working on making a conference paper for ICML out of this project.

Minor independent research-based project: *Riemannian Laplace Approximation via Subspaces and Bayesian Quadrature*. The project presents a method for uncertainty estimation in machine learning models, exploiting the curvature of the loss function and Bayesian Quadrature, to make efficient parameter samples from the posterior distribution.

2024 Minor independent research-based project: *Improving Uncertainty Quantification via Bayesian Neural Networks*, which explores the use of subspace projection of the Laplace approximation of the posterior distribution in Bayesian neural networks.

Independent courses

2025 **Cambridge Ellis Unit Summer School on Probabilistic Machine Learning**

2024 **Nordic Probabilistic AI School (Nordic ProbAI), Copenhagen**

Education (continued)

2022 — **European Summer School of Logic Language and Computation, NUI, Galway**

2018 – 2020 — **Independent courses at Technical University of Denmark**
Courses: Time Series Analysis – Computer Architecture and Engineering – Introduction to Machine Learning and data modeling

2019 — **Visiting graduate student at University of St. Andrews, Scotland** in Mathematics.
Courses: Mathematical Statistics – Markov Chains and Processes – Bayesian Inference.

Skills

Coding stack

Expert	Python, SAS, Pytorch, T-SQL
Mastery	Scikit-learn, Numpy, Pyro, High Performance Computing, LaTeX, Git, GitHub
Good	Pandas, R, Matplotlib, C/C++, Linux, Bash
Knowledge	MATLAB, BUGS, Docker, VBA, JAX, Docker

Others

ML and stats Theory	Generative modeling, Uncertainty Quantification, Diffusion Models, Probabilistic Machine Learning, Bayesian Inference, Probabilistic Graphical Models, SDEs, Variational Autoencoders, Optimization, Deep Learning, MLOps, Computer Vision, Reinforcement Learning, Time series Analysis, Recurrent Neural Networks.
Natural Languages	Native Danish speaker, fluent in oral and written English (C_2), good Spanish mastery (B_2/C_1).
Misc.	Academic research, Teaching, Consultation, Writing & Reporting, Data Warehousing, ETL and dashboarding.