Sebastian Schmon, DPhil (Oxford)

Research Scientist

sebastian.schmon@gmail.com · +44 754 1095678 · @SeBayesian

https://schmons.github.io

I like ideas — I like to come up with algorithms and strategies, but I also like to learn from others and discuss concepts and thoughts. During my research career, I have published at leading machine learning conferences such as **Neurips**, **ICML**, and **AISTATS**, as well as highly regarded statistical publications such as Biometrika. In addition, my unpublished research formed the basis of new product offerings or significant enhancements. Now I am looking for an opportunity to have immediate real-world impact.

Professional Experience

2023 — today

Research Scientist Shift Lab Ltd., London, United Kingdom

- Founded by two ex-Deepmind co-founders, **bridge between academic AI research and real-world production software**.
- I have been working with **state-of-the-art generative models**, e.g. OpenAI's language models, and as **diffusion models** for image generation.
- Statistics and ML approaches to **learn representations** from **large language model** embeddings and combine them with expert opinions on the "tone of voice" of brands' communications.
- Use those representations to build a model maximising the value of brands' communication in terms of **user engagement based on actionable attributes**. Managed to get this **prototype ready 3 weeks** after my joining.

2021 — 2022

Assistant Professor in Statistics Department of Mathematics
University of Durham, Durham, United Kingdom

- Supervision / pastoral care of PhD, MSc and BSc projects, some of which have lead to papers that were accepted at **CVPR** and **ICLR** workshops.
- Updated the universities "unsupervised learning" module to now include *deep neural network based* approaches.
- Organized to set up a **new doctoral training center**.
- Served as **industry outreach** officer.

2020 — 2022

Research Scientist Improbable Worlds Ltd., London, United Kingdom

- Leverage new technologies for large scale networked simulations to build **generative models of complex systems** and **digital twins** modelling e.g. Covid-19 policies, cyberattacks.
- Making those synthetic environments as realistic as possible using **simulation-based inference** and to estimate the uncertainty associated with imperfect simulations.
- Building fast surrogate models that could reduce the model complexity without losing much of the predictive accuracy.
- Tools I used: agent-based models, probabilistic models, (deep) surrogate models such as neural ODEs, normalising flows, (deep) Bayesian inference, diffusion models and generalised Bayesian inference.

2018 — 2020

Head of Data Science Foresight Works, technology start-up, Oxford, United Kingdom

- AI to avoid large (and otherwise common) cost overruns and improve executive decision making.
- Second employee. Helped the company set up and brainstorm their core products, including appropriate metrics and statistical forecasting techniques to ensure adequate project progress as well as data driven estimates of potential cost overruns.
- To kickstart and validate the value proposition we consulted with clients (large international companies, >£5bn in revenue) on data science and analytics challenges.
- Compiled and delivered whole project, presented to the COO, providing recommendations on financial decisions for a new £1.2bn megaproject).

Teaching Experience

2015 — 2019 **Departmental Teaching Fellowship** University of Oxford, United Kingdom
Department of Statistics

- Teaching advanced courses in statistics and probability (3rd and 4th year), including *applied probability*, *advanced simulation*, *graphical models* and *Markov chain Monte Carlo*.

2016 – 2017 **College Lecturer** Hertford College, University of Oxford, United Kingdom

- Lecturer for probability and statistics.

2012 — 2015 **Teaching Assistant/Class Tutor** Free University of Berlin, Germany
Department of Business & Economics, Chair of Statistics

- Tutorials for undergraduate students at introductory or intermediate level as well as the development of exercises for homework and exams.

Education

2015 — 2020 **PhD Computational Statistics and Machine Learning** Magdalen College, University of Oxford, United Kingdom
Supervisors: Arnaud Doucet (`http://www.stats.ox.ac.uk/~doucet`),
George Deligiannidis (`http://www.stats.ox.ac.uk/~deligian`)

2014 — 2015 **Mathematics** Imperial College London, United Kingdom
(Erasmus Programme, non-degree)

2013 — 2016 **MSc Statistics** Humboldt University of Berlin, Germany
Specialisation in Statistical Modelling and Inference, Econometrics, Monte-Carlo Methods and Stochastic Simulation, Survey Methodology
With Distinction

2012 — 2015 **BSc Mathematics** Free University of Berlin, Germany
Specialisation in Probability Theory, Numerical Methods and Functional Analysis
Minor in Statistics

2009 — 2013 **BSc Economics** Free University of Berlin, Germany
Specialisation in Quantitative Methods (Econometrics, Time Series and Statistics) and Economic Theory

Programming

- Prototyping in **Python** or R.
- From **small** scripts to **large** industry code bases
- Favourite deep Learning library: **pytorch**.
- Passion for making my own LaTeX templates / functions etc

Selected Publications

A selection of recent publications that I am particularly proud of. (Ask me why! ☺)

Robust Neural Posterior Estimation and Statistical Model Criticism
with Daniel Ward, Patrick Cannon, Mark Beaumont and Matteo Fasiolo
NeuRIPS 2022

Learning Multimodal VAEs through Mutual Supervision
with Tom Joy, Yuge Shi, Philip H.S. Torr, Tom Rainforth, and N. Siddharth
ICLR 2022 (Spotlight)

Amortised Likelihood-free Inference for Expensive Time-series Simulators with Signatured Ratio Estimation
with Joel Dyer and Patrick Cannon
AISTATS 2022

Optimal scaling of random walk Metropolis algorithms using Bayesian large-sample asymptotics
with Philippe Gagnon
Statistics and Computing, 2022

Capturing Label Characteristics in VAEs
with Tom Joy, Philipp Torr, Siddharth Narayanaswamy and Tom Rainforth
ICLR 2021

Large Sample Asymptotics of the Pseudo-Marginal Method
with Arnaud Doucet, George Deligiannidis and Mike Pitt
Biometrika 2021

Workshop Paper

Denoising diffusion probabilistic models on SO(3) for rotational alignment
with Adam Leach, Matteo T. Degiacomi and Chris G. Willcocks
Workshop on Geometrical and Topological Representation Learning, ICLR 2022

AnoDDPM: Anomaly Detection with Denoising Diffusion Probabilistic Models using Simplex Noise
with Julian Wyatt, Adam Leach and Chris G. Willcocks
NTIRE, CVPR 2022

Calibrating Agent-based Models to Microdata with Graph Neural Networks
with Joel Dyer and Patrick Cannon
AI4ABM Workshop, ICML 2022 (Best Paper Award)

Unpublished

Neural ODEs for Multi-state Survival Analysis
with Stefan Groha and Alexander Gusev
`arxiv.org/abs/2006.04893`

Investigating the Impact of Model Misspecification in Neural Simulation-based Inference
with Patrick Cannon and Daniel Ward
`https://arxiv.org/abs/2209.01845`

Awards

- EPSRC DPhil scholarship, Oxford (out of 1 per year)
- Departmental teaching scholarship, Oxford, Department of Statistics
- Humboldt University Erasmus grant for an exchange year at Imperial College
- Magdalen College Oxford travel/research grant
- ISBA travel grant
- Best paper award, AI4ABM workshop, ICML 2022
- Best reviewer award, Neurips 2022
- Best reviewer award, UAI 2022
- Best reviewer award, UAI 2021