Ulf Aslak Lai

Data Scientist, PhD

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I am a data scientist with a Ph.D. in complex systems. I have a diverse career spanning academia and industry. Notably, I published my work in Nature, won a number of awards, and worked projects for industry leading companies. I enjoy solving high-value problems that require a deep mathematical understanding and engineering skill. I am good at explaining things. I have extensive experience communicating data science and machine learning through teaching, and leadership positions. I write clean and self-documenting code—particularly well in Python and JavaScript/TypeScript—and I like things that work and are true. I am married and have two children. In my spare time, I am with family and friends, I build things in my house, skateboard and lift weights.

Bio

Technical background
I studied physics engineering and later machine learning, and built a strong foundation in applied mathematics, numerical simulation, non-linear data modeling and statistics. I worked with some of the worlds best researchers in data science and became really good at finding complex patterns in data, developing algorithms from scratch, entering new knowledge domains and asking questions. I always loved explaining things, and by creating animations and data visualizations, I learned to build websites. By having to package, deploy, track, and maintain my models in production environments, I learned software engineering. Today, I am a well-rounded scientist and engineer with a deep knowledge of mathematical methods and the practical skills required to deliver solutions in production environments.

Tools
I use **Python** and basic data science tools like **NumPy**, **Pandas/polars**, **Xarray**, **SciPy**, and **scikit-learn** basically all the time. I also frequently use more powerful frameworks such as **PyTorch**, **XGBoost**, and **PyMC**. I know **Spark** and **SQL** for handling big data in cloud environments such as **Google Cloud** and **Azure**, and like **MLflow** for model tracking and deployment. I enjoy making data visualization with web technologies (**JavaScript**, **D3**, **canvas API**). I build web apps with frameworks preferably **SvelteKit** and **FastAPI**. I use **Git** for version control. I wrote this document with **LaTeX**. I leverage much of the great tooling in **VSCode** and code fast with **Cursor**. I work best on a **Unix**-based machine, preferably a Mac.

How I like to work
I thrive in ambitious, transparent, **high-trust** work environments, with high standards for quality. I ask many questions and get a lot of ideas. I select working on things that create **real value** for real people over things that are "interesting" (the reason why I left academia). I have opinions on everything from code factoring to business strategy, so I gravitate towards **leadership** roles. I like **mentoring** and explaining, and most of all helping others.

Personal life
I grew up in Esbønderup, Denmark, with a Danish father, an Icelandic mother, and two older brothers. I spent my early adulthood traveling a lot, and stayed for extended periods in Singapore, United States and Germany. When I met my wife we settled in Copenhagen, and during my PhD studies we had our first son. That changed my perspective on many things. We renovated an old home in Gilleleje and moved there in 2020. We had our second child (also a son) in 2022. As a person I am enormously curious, and interested in learning and understanding almost anything. I read books about science, spirituality, business, personal development, and fiction. I love building things, both on my computer and with my hands.

Industry experience

2024 – present **Principal Data Scientist**, PYMC LABS, Remote.
I work with clients, mainly on marketing analytics problems. I work on projects with Bain & Company, as well as Colgate Palmolive. TECHNOLOGIES: PYTHON, XARRAY, NETCDF, AZUREML, PYMC, MLFLOW, vLLM.

2022 – 2024 **Senior Data Scientist**, PRECIS DIGITAL, Copenhagen, Denmark.
Built an advanced Python package for Bayesian Marketing Mix Modeling. The package is currently in production and delivers weekly marketing insights for multiple major brands. TECHNOLOGIES: PYTHON, PYMC, GOOGLE CLOUD, DOCKER, KUBERNETES.

2021 – 2022 **Chief Data Scientist**, RODINIA GENERATION, Copenhagen, Denmark.
Wrote a nesting algorithm for waste minimization, and implemented it as a SaaS. Lead development of an ERP SaaS for automated textile print and cut micro factories. TECHNOLOGIES: PYTHON, TYPESCRIPT, SVELTEKIT, DJANGO.

2020 – 2021 **Senior Data Scientist**, DANSKE BANK, Høje-Taastrup, Denmark.
Worked on transaction classification between corporate bank customers. TECHNOLOGIES: PYSPARK, PYSPARK.ML

2016 – 2019 **Independent Consultant**, ASLAK MEDIA, Copenhagen, Denmark.
I consulted with multiple companies during my PhD, solving various data science problems, such as churn prediction, user behavior visualization and named entity recognition. Clients include Alfa Laval, Sterlitech, Popyoular, Peergrade.

2015 **Intern/student assistant**, TRUSTPILOT, Copenhagen, Denmark.
Trustpilot customers (businesses) want positive reviews, and some cheat by purchasing fake reviews. As an intern, I developed a probabilistic model for fraud detection that I further maintained and developed as a student assistant.

Academic experience

2019 – 2020 **Postdoc**, TECHNICAL UNIVERSITY OF DENMARK, Kongens Lyngby, Denmark.
Built `covid19.compute.dtu.dk` to monitor the state of human mobility throughout the world during COVID-19 lockdowns, as part of the HOPE project with Michael Bang Petersen. Research into the interplay between public information and collective behavior. TECHNOLOGIES: PYTHON, JAVASCRIPT, D3

2016–2019 **Ph.D.**, UNIVERSITY OF COPENHAGEN, Centre for Social Data Science (SODAS), Denmark.
Research in complex systems, machine learning and visualization. Focus on modeling tasks involving social data such as temporal community detection and location prediction. Developing and teaching machine learning, deep learning and complex network components of master's level course *Topics in Social Data Science*. Gave some 15 lectures and workshops on my work at conferences and invited talks. Advisors: Sune Lehmann, David Dreyer Lassen.

2018 **Visiting researcher**, ROBERT KOCH INSTITUTE, Brockmann Lab, Germany.
Worked with theoretical biologist and leading researcher in complex systems Dirk Brockmann.

2014–2016 **M.Sc.Eng.**, TECHNICAL UNIVERSITY OF DENMARK, Human Centered AI.
Dissertation: *Personality Archetypes Support Evolutionarily Important Behavioral Strategies*. Advisors: Uri Alon, Sune Lehmann (mark: 12/A)

2010–2014 **B.Sc.Eng.**, TECHNICAL UNIVERSITY OF DENMARK, Physics and Nanotechnology.
Dissertation: *Computational Fluid Dynamics Simulations of Forward Osmosis Membrane Modules*. Paper: *Open-source CFD model for optimization of forward osmosis and reverse osmosis membrane modules* (mark: 12/A). Advisors: Claus Helix-Nielsen, Mathias Felix Gruber.

2012 **Visiting student**, NATIONAL UNIVERSITY OF SINGAPORE, Physics and Nanotechnology.

2007 – 2009 **Gribskov Gymnasium, Denmark**, *Upper secondary programme*, Mathematics/Physics.

Publications

2023   **Rhythm of relationships in a social fish over the course of a full year in the wild**, Movement Ecology, Co-authors: CT Monk, D Brockmann, R Arlinghaus.

2020   **The Scales of Human Mobility**, Nature, Co-authors: L Alessandretti, S Lehmann.

       Infostop: Scalable stop-location detection in multi-user mobility data, arXiv, Co-author: L Alessandretti.

2019   **Netwulf: Interactive visualization of networks in Python**, Journal of Open Source Software, Co-authors: BF Maier.

       Temporally intermittent communities in brain fMRI correlation networks, Applied Network Science, Co-authors: SFV Nielsen, M Mørup, S Lehmann.

2018   **Constrained information flows in temporal networks reveal intermittent communities**, Physical Review E, Co-authors: M Rosvall, S Lehmann.

2017   **Optimal Allocation of Reviewers for Peer Feedback**, European Conference on e-Learning, Co-authors: DK Wind, RM Jørgensen, SL Hansen, O Winther.

2016   **Quantifying Feedback: Insights Into Peer Assessment Data**, International Conference on e-Learning, Co-author: DK Wind.

       Open-source CFD model for optimization of forward osmosis and reverse osmosis membrane modules, Separation and Purification Technology, Co-authors: MF Gruber, C Hélix-Nielsen.

Teaching

2016–2020   **External associate professor**, *20-30 student classes*, Danish Institute of Study Abroad, Copenhagen, Denmark.
Artificial Neural Networks and Deep Learning ($\times 2$)
Computational Analysis of Big Data ($\times 6$)

2016–2020   **Lecturer**, *60-80 student classes*, University of Copenhagen, Copenhagen, Denmark.
Digital Methods: From Facebook Ethnography to Computational Social Science ($\times 1$)
SDS: Text Data and Deep Learning ($\times 1$)
SDS: Machine Learning and Econometrics ($\times 1$)
Topics in Social Data Science ($\times 3$)

2012–2016   **Teaching assistant**, *60-80 student classes*, Technical University of Denmark, Lyngby, Denmark.
Computational Tools for Big Data ($\times 2$)
Physics 1 ($\times 4$)

Awards and stipends

2018   **1st place**, *Young Initiative for Best Talk Pitch*, NetSci Society.

2017   **Best paper**, *International Conference on e-Learning*, University of Central Florida.

2016   **1st place**, *Data Stories data visualization competition*, Science Magazine.

2014   **Finalist**, *Green Challenge environmental engineering competition*, Technical University of Denmark.

2013-2019   **Travel stipends**.
The Oticon Foundation; *Reinholdt W. Jorck and Wife's Foundation*; *The Danish Society of Engineers' Foundation*; *Berg-Nielsens Study and Support Foundation*; *Knud Højgaard's Foundation*; *Danish Tennis Foundation*; *Otto Mønsted's Foundation*; and the *Augustinus Foundation*.