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 the private sector. Notably, I worked in multiple impactful labs, published an article in Nature and won multiple awards. I enjoy solving high-value problems that require deep mathematical understanding and domain knowledge. Above all, though, I strive for meaning and I love to help people. I have extensive experience teaching data science and machine learning courses, as well as speaking in public. I am good at explaining things. 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 (recently scarce) spare time I either build things in my house or go skateboarding.

Experience

2022 – present **Senior Data Scientist**, Precis Digital, Copenhagen, Denmark.
Building probabilistic regression based attribution models, to measure the incremental value of various marketing activities for clients Technologies: Python, Google Cloud, PyMC.

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, Svelte, Django.

2020 – 2021 **Senior Data Scientist**, Danske Bank, Høje-Taastrup, Denmark.
Worked on transaction classification between corporate bank customers. Technologies: pyspark, pyspark.ml

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

2017 – 2020 **External associate professor**, DIS - Study abroad in Scandinavia, Copenhagen, Denmark.
Part time. Created and taught undergraduate level courses *Computational Analysis of Big Data* and *Artificial Neural Networks and Deep Learning* for US exchange students. Led study tours abroad.

2016 – 2019 **Freelance Data Scientist**, Aslak Media, Copenhagen, Denmark.
Project consultant with companies to solve data-related and technical problems. 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.

2013–2016 **Teaching assistant**, Technical University of Denmark.
Courses: Physics 1 (4 times), Computational Tools for Big Data (2 times).

Education

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)

2016 **Visiting researcher**, Weizmann Institute of Science, Uri Alon Lab, Israel.
Worked with renowned systems biologist, Uri Alon, on the research component of my master's degree.

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

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 (×2)
Computational Analysis of Big Data (×6)

2016–2020 **Lecturer**, *60-80 student classes*, University of Copenhagen, Copenhagen, Denmark.
Digital Methods: From Facebook Ethnography to Computational Social Science (×1)
SDS: Text Data and Deep Learning (×1)
SDS: Machine Learning and Econometrics (×1)
Social Data Science (×1)
Topics in Social Data Science (×2)

2012–2016 **Teaching assistant**, *60-80 student classes*, Technical University of Denmark, Lyngby, Denmark.
Computational Tools for Big Data (×2)
Physics 1 (×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*; *Danish-Israeli Study Foundation* and the *Augustinus Foundation*.

Bio

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, Israel 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 '20. 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 and personal development (and the occasional novel). I love building things, both on my computer and with my hands.

Technical background I studied physics engineering and later machine learning, and earned a strong foundation in applied mathematics, numerical simulation, non-linear data modelling 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 and entering new knowledge domains. I always loved explaining things, so I learned to create animations and data visualizations, thus becoming somewhat of a designer and web developer.

Tools I use **Python** and solve the vast majority of problems with basic data science tools like **NumPy**, **Pandas**, **SciPy**, and **scikit-learn**. I may use powerful frameworks such as **PyTorch**, **XGBoost**, or **PyMC**. I know **PySpark** and **BigQuery** for handling big data in cloud environments. I like data visualization on the web (**JavaScript**, **D3**). I build apps with frameworks preferably **Svelte** 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 **Copilot** + **LLM support**. I work best on a **Unix**-based machine, preferably a Mac.

Working style I thrive in warm, honest, **high-trust** work environments where I am seen for my qualities and accepted for my flaws, given critical responsibility and expected to deliver. I need **creating value**, to be top-of-mind for everyone. I always select working on things that create real value for real people, over things that are "interesting" (I'd rather mop the floors than learn another JS framework). I prefer **autonomy** and to work on large problems with **well defined goals,** only employing team members when there are meaningful discussions to be had and subproblems that can be factored out. I am an excellent **mentor** and I gain energy from serving others. I ask many questions. I have a lot of ideas, all the time. I have opinions about nearly everything between my code and the bottom line, and I deeply appreciate having my mind changed.