

# Max Möbus (Moebus)

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## Education & Research Experience

### ETH Zurich, SIPLAB

Research Intern & PhD Student at the Sensing, Interaction & Perception Lab (SIPLAB) with Prof. Christian Holz

Zurich, CH  
Oct 2021 - present

- **Research focus:** (Statistical) Machine Learning for (Bio-)Medical Time Series in Mobile and Predictive Health
  - Part I : Identifying drivers of subjective health (e.g., fatigue ratings) from wearable sensor data via interpretable forecasting
    - ↳ I modeled incomplete and messy data with a low signal-to-noise ratio using generalized linear regression based on carefully engineered features
  - Part II : Modeling disease and mortality risk from biomedical time series on the UK Biobank (500k participants) using Cox-regression models
    - ↳ I developed novel signal processing and deep learning algorithms (e.g., for heart rate monitoring) to detect risk factors for stroke
  - Part III: Enhancing learning algorithms for irregular time series (Neural CDEs and Multi-Time Attention Networks) with a focus on interpretability
    - ↳ I developed a new technique for irregular time series saliency maps that also uncovers the effect of missing data (e.g., for GP & hospital records)
- **Teaching:** Designing lectures, exercises and exam as Head TA (100+ student course); mentored 17 student theses (6 contributed to paper submissions)

### University of Oxford, Lincoln College

M.Sc. in Statistical Science — Final Result: Pass with Merit

Oxford, UK  
Oct 2020 - Sept 2021

- **Thesis:** Model Comparison for Option Pricing in Lévy Stochastic Volatility Markets via Simulation of Stochastic Differential Equations (Result: Distinction)

### University of Oxford, Saïd Business School

Graduate Research Assistant with Prof. Mari Sako and Prof. Matthias Qian

Oxford, UK  
March 2021 - Aug. 2021

- Built BERT-based embedding and classification models to automate outsourced text annotation: collab. with OpenOcean VC led to a (short-lived) spin-off

### University College London (UCL)

B.Sc. in Statistical Science — Final Result: First Class Honours (79%), Undergraduate Project Prize

London, UK  
Sept 2017 - July 2020

- **Thesis:** Applications of Optimal Transport Theory in Machine Learning (e.g., Wasserstein GANs)

## Industry Experience

### Goldman Sachs

Summer Associate, Quantitative Strategist: Counterparty Credit Risk

London, UK  
June 2025 - Aug 2025

- Utilized Bayesian statistics to develop new probability of default (PD) model for capital calculations: lowered PDs for high-risk counterparties by 60%
- Integrated external credit rating data: built ETL pipeline, cleaned data, imputed missing values, and quantified data representativeness

### Amazon

Intern, Business Analyst: European Transportation Team

Hemel Hempstead, UK  
June 2020 - Sept 2020

- Built fully automated analysis pipeline to tackle regularly low-performing routes responsible for 3 bn packages a year (ETL data pipeline in SQL, root-cause analysis in PowerBI with integrated R scripts, data validation & upload using Python, tailored statistical tests in R, automated communication via VBA)

### Auto1 Group

Intern, Business Analytics

Berlin, DE  
June 2019 - Sept 2019

- Developed KPI-dashboards and R Shiny web application to identify underrepresented but lucrative product groups (analysis was picked up by COO)
- Constructed logistic & k-NN regression models to forecast claim rates and severity to adjust country-wide budgets needed for future reimbursements

## Skills & Interests

<b>Statistics</b>	(generalized) linear & non-linear models, statistical ML, stochastic processes, simulation methods (MCMC), Bayesian methods
<b>Data Science</b>	<b>Time Series</b> [supervised learning, forecasting, regular & irregular], <b>Tabular</b> [interpretable modeling, causality, feature engineering],
<b>&amp; ML</b>	<b>Text</b> [NLP, classification, sentiment analysis, Huggingface], <b>Big Data</b> [resource efficient processing & modeling, local or in the cloud]
<b>Wearables</b>	<b>Time Series</b> [extracting health metrics such as heart rate, physical activity & sleep stages from IMU, PPG, EDA, temperature, ECG,...]
<b>Programming</b>	<b>Python</b> [Pandas, Polars, PyTorch, TensorFlow, Keras, NumPy, SciPy, Scikit-learn, etc.], <b>R</b> [data.table, MGCV, ggplot2], <b>SQL</b> , <b>VBA</b>
<b>Languages</b>	<b>German</b> [native], <b>English</b> [fluent]
<b>Interests</b>	<b>Football</b> [central defender, Team Captain & Social Secretary at UCL Football Club, UCL Sports Colours Award], <b>skiing</b> [basically compulsory in Switzerland], <b>water sports</b> [sailing, windsurfing], <b>reading</b> [Weapons of Math Destruction, Algorithms to Live By]

## Selected Publications

- [1] **Max Moebus**, Lars Hauptmann, Nicolas Kopp, Berken Utku Demirel, Björn Braun, and Christian Holz. “Nightbeat: Heart Rate Estimation From a Wrist-Worn Accelerometer During Sleep”. In: *IEEE JBHI*. **Accepted as Oral at BHI (18%)**. 2025.
- [2] **Max Moebus**, Marc Hilty, Pietro Oldrati, Liliana Barrios, PHRT Author Consortium, and Christian Holz. “Assessing the Role of the Autonomic Nervous System as a Driver of Sleep Quality in Patients With Multiple Sclerosis: Observation Study”. In: *JMIR Neurotechnology* (2024).
- [3] **Max Moebus**, Julien Wolfensberger, and Christian Holz. “Predicting sleep quality via unsupervised learning of cardiac activity”. In: *IEEE EMBC*. 2024.
- [4] **Max Moebus**, Shkurta Gashi, Marc Hilty, Pietro Oldrati, and Christian Holz. “Meaningful Digital Biomarkers Derived From Wearable Sensors to Predict Daily Fatigue in Multiple Sclerosis Patients and Healthy Controls”. In: *iScience* (2024).