Max Möbus (Moebus)

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Education

SIPLAB, ETH Zurich — *Zurich, CH*

PhD in Computer Science at the Sensing, Interaction & Perception Lab with Prof. Christian Holz — *April 2022 - present*

- **Research focus:** (Statistical) Machine Learning for (Bio-)Medical Time Series in Mobile and Predictive Health

University of Oxford, Lincoln College — *Oxford, UK*

M.Sc. in Statistical Science — Final Result: Pass with Merit — *Oct 2020 - Sept 2021*

- **Thesis:** Model comparison for option pricing in Lévy stochastic volatility via markets simulation of Stochastic Differential Equations (Result: Distinction)

University College London (UCL) — *London, UK*

B.Sc. in Statistical Science — Final Result: First Class Honours (79%), Undergraduate Project Prize — *Sept 2017 - July 2020*

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

Research Experience

SIPLAB, ETH Zurich — *Zurich, CH*

Research Assistant & PhD Student at the Sensing, Interaction & Perception Lab with Prof. Christian Holz — *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 (accelerometer, PPG, EDA) via interpretable forecasting
  Part II : Modeling disease and mortality risk from multimodal biomedical time series (motion, ECG, GP records) on the UK Biobank (500k participants)
  Part III: Enhancing (statistical) machine learning methods for irregular and multimodal time series with a focus on interpretability

Saïd Business School, University of Oxford — *Oxford, UK*

Graduate Research Assistant with Prof. Mari Sako and Dr Matthias Qian — *March 2021 - Aug. 2021*

- Constructed customizable NLP models for the Oxford Sentence Annotator: a smart text annotator built in collaboration with OpenOcean VC

Industry Experience

Amazon — *London, UK*

Intern, Business Analyst: European Transportation Team — *June 2020 - Sept 2020*

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

Auto1 Group — *Berlin, DE*

Intern, Business Analytics — *June 2019 - Sept 2019*

- Constructed predictive models that forecast claim rates to adjust country-wide budgets (logistic & kNN-regression)
- Developed KPI-dashboards and R Shiny web application to redefine sales strategy for 26 European countries — worth £2.5bn of annual revenue

Kienbaum Consultants International — *Düsseldorf, DE*

Intern, Management Consulting — Process Excellence Division — *Jan 2017 - March 2017*

- Evaluated customer data (£400m in annual revenue) to identify the most lucrative customer clusters for a world-leading metal fittings producer

Skills & Interests

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