Benno Käch | Curriculum Vitae

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Professional Summary

A pragmatic and independent professional with a strong background in machine learning and data analysis. Excels in dynamic environments and thrives on challenging work. Seeking to apply expertise in industry to drive innovation and efficiency.

Experience

Simpego **Zurich, Switzerland**
Data Analyst *2017–2020*

- Gained initial experience with machine learning by helping to set up, optimize, and deploy a boosted decision tree-based pricing model in R.
- Developed monitoring tools to recognize market changes, based on quantile-based sampling that works with both categorical and numerical data.
- Replaced outsourced data mining with an in-house web scraper using Selenium and Beautiful Soup.
- Automated manual tasks for the service center, replacing the work of two people by scripting ETL tasks and web forms using Python and cron jobs.
- Contributed to data backend setup in AWS Glue, working with Scala and PySpark, gaining experience with cloud providers.

ETH Zurich, IWF **Zurich, Switzerland**
Research Assistant *2020–2021*

- Contributed to the implementation of ML-based process automation in the manufacturing industry.
- Supervised students on two different master's theses about head pose detection and emotion recognition.
- Communicated academic findings to industry partners and implemented them on machinery for deployment to production.

Deutsches Elektronen-Synchrotron (DESY) **Hamburg, Germany**
Researcher *2021–2024*

- Developed generative models for applications in high-energy physics.
- Worked with GANs, Flow Matching, and Normalizing Flows for point cloud generation competing with state-of-the-art.
- Developed signal-background classifiers in highly imbalanced datasets.
- Utilized generative models to produce synthetic data, supporting research aimed at discovering new physics theories beyond existing models.
- Worked with petabytes of data recorded by the CMS detector, conducting sophisticated statistical tests to relate observations to theoretical expectations.
- Managed version control and collaborative development using Git and GitHub, ensuring efficient team collaboration and code integrity.

Education

University of Hamburg — **Magna Cum Laude**
Ph.D. in Particle Physics — *2021–2024*

ETH Zurich
M.Sc. in Physics — *2019–2020*

ETH Zurich
B.Sc. in Physics — *2015–2018*

Selected Scientific Record

NeurIPS 2022, ML4PS: *Point Cloud Generation using Transformer Encoders and Normalizing Flows*, co-authored with Dirk Krücker and Isabell Melzer Pellmann

NeurIPS 2023, ML4PS: *Pay Attention to Mean-Fields for Point Cloud Generation*, co-authored with Dirk Krücker and Isabell Melzer Pellmann

PhD Thesis: *Generative Modelling in High-Energy Physics*

Technical Skills

Programming Languages: Python (expert), R, C++, MATLAB, Scala, SQL, Bash scripting, CSS, HTML, Markdown, LaTeX

Machine Learning : PyTorch, Lightning, scikit-learn, H2O, CatBoost, Weights & Biases

Cloud Computing: AWS Glue, S3

Data Analysis: pandas

Data Visualization: matplotlib, seaborn, scikit-learn

Web Scraping: Selenium, Beautiful Soup

Resource Managment: SLURM

Data Structure and Algorithms: LeetCode

Personal Information

Nationality: Switzerland

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Languages

German: Native

English: Fluent

French: Conversational

Italian: Basic