Johannes S. Otterbach, Ph.D.

67 Glen Ave #308, Oakland, CA 94611 • (857) 756-2022 • johannesotterbach@gmail.com
linkedin.com/in/jotterbach • jotterbach.github.io • github.com/jotterbach

PROFILE

Self-motivated Ph.D.-level Physicist with a curious, analytical mind and a passion for all things AI, quantum & data. Experience managing and analyzing data using Python (NumPy, SciPy, pandas, scikit-learn), Apache Spark (SparkSQL, MLlib), TensorFlow, Postgres, MATLAB, MATHEMATICA and developing algorithms and software for near-term quantum hardware. Extensive experience with advanced mathematics, statistics and applied machine learning, as well as presenting and visualizing complex concepts to diverse audiences.

PROFESSIONAL DEVELOPMENT

Machine Learning Researcher 06/2018 - present
OpenAI, San Francisco, CA

- Basic research in the area of Unsupervised and Generative Models with focus on Energy-Based Models and Normalizing Flows.

Research Scientist and Software Engineer 04/2017 - 05/2018
Rigetti Quantum Computing, Berkeley, CA

- Prototyping and demonstrating applications for near-term quantum devices, such as Quantum Machine Learning and Combinatorial Optimization Problems.
- Developing and maintaining an OCaml-based simulator of a quantum processing unit.
- Managing, coordinating and actively participating in a small research team for near-term applications.
- Engaging with customers; estimating benefits using quantum computations and translating problems to quantum algorithms.

Senior Data Scientist 12/2016 - 03/2017
Data Scientist 08/2015 - 11/2016
LendUp, San Francisco, CA

- Architect of new machine learning model scoring service with ability to serve models developed in several different languages and frameworks.
- Implemented Python variants of various learning algorithms, such as Generalized Additive Models and Constrained Linear Models.
- Contributed to key algorithms to generate model insights and auditability for regulatory compliance.
- Supported Data Scientists with ad-hoc and production algorithms for feature analysis and selection. Provided dashboards and automated reports for business stakeholders.
- Developed and deployed several models for credit underwriting, including models for new products.
- Analysed and integrated new data sources into production systems to increase data redundancy.

Infrastructure Quality Engineer (Machine Learning) 4/2014 - 7/2015
Palantir Technologies, London, UK (until 1/2015) and Palo Alto, CA

- Analyzed TB-sized, disparate customer-dataset and implemented new propensity model pipeline using Apache Spark, surfacing previously unknown churn indicators.
- Solidified and scaled end-to-end PySpark ETL-machine learning pipeline, resulting in a ∼5x increase in handled data-scale and ∼5x decrease of training time.
- Reduced feature engineering development times by 3x through creating new featurization prototypes in quick iterations with product and data-science teams.
- Deployed, debugged and maintained complex, distributed software stacks, containing Apache Spark, Hadoop HDFS and IPython Notebook servers, on cloud-based AWS systems. Optimized the stacks for best computational performance and stability.

- Developed CometD-based user-scale testing and analytics framework resulting in a ∼10x improvement in handled users.

Postdoctoral Research Fellow (Theoretical Quantum Physics) 9/2011 - 3/2014
Harvard Quantum Optics Center, Cambridge, MA

- Studied phase diagrams of strongly interaction 1D cold atom systems with numeric and analytic tools.
- Simulated the time-evolution of models with spatial and temporal randomness using Markov processes and ensemble theory, creating insights into highly correlated states of matter.
- Explained and matched experimental observations to theoretical models using fitted statistical simulations and analytic solutions.
- Presented research results to general as well as expert audiences through invited seminars, conferences, talks and posters.
- Collaborated, influenced and contributed to research projects with international teams.

EDUCATION

Ph.D. in Physics, *GPA: 4.0 with distinction*, 10/2011
Theoretical Quantum Optics Group of Prof. Dr. M. Fleischhauer
University of Kaiserslautern, Germany

B.S./M.S. in Physics, *GPA: 3.93*, 5/2008
University of Kaiserslautern, Germany

TECHNICAL SKILLS

- Programming languages: Python, Java, Apache Spark, Scala, JavaScript, SQL and Shell scripting. Familiarity with OCaml, Cyton/C, Hadoop HDFS, AWS S3, R as well as ReactJS, Redux and Gatsby.
- Experience with mathematical and statistical Python libraries such as pandas, scikit-learn, NumPy and SciPy, PyTorch, TensorFlow, Owl, and software such as MATLAB and MATHEMATICA.
- Advanced mathematics and physics toolset paired knowledge of software best practices and applied machine learning ideally suited to tackle bleeding-edge challenges in AI and Deep Learning.

SELECTED SCHOLARSHIPS AND AWARDS

Prize Fellowship of the Harvard Quantum Optics Center 2011-2013
2011 Award of the Friends of the University of Kaiserslautern for an outstanding scientific performance as a Ph.D. student in physics 6/2012
Foundation of German Business scholarship 2005-2008

SELECTED PUBLICATIONS

20 in total with 200+ citations. Complete list available upon request.

1. J. S. Otterbach et. al., *Unsupervised Machine Learning on a Hybrid Quantum Computer*, arxiv:1712.05771.
2. A. V. Gorshkov, J. Otterbach, E. Demler, M. Fleischhauer, M. D. Lukin, *Photonic Phase Gate via an Exchange of Fermionic Spin Waves in a Spin Chain*, Phys. Rev. Lett. 105, 060502 (2010)
3. J. Otterbach, M. Moos, D. Muth, M. Fleischhauer, *Wigner Crystallization of Single Photons in Cold Rydberg Ensemble*, Phys. Rev. Lett. 111, 113001 (2013).

LANGUAGE SKILLS

German: Native speaker. English: Fluent. Swedish and French: Basic

ACTIVITIES

Avid boulderer and climber. Enjoys slacklining and a good game of Ultimate Frisbee with friends. Good food or an outdoor trip are always welcome.