

Maurice Weber

AI Researcher

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EXPERIENCE

Together AI | AI Researcher

January 2024 - present | Zurich, Switzerland

- Leading the construction of large-scale datasets, as well as training and evaluating LLMs with up to tens of billions of parameters, covering the full model development pipeline.
- The resulting models and datasets are used throughout the company and are central building blocks of Together AI's inference platform.

Xanadu Quantum Technologies | Research Intern

May 2022 - August 2022 | Toronto, Canada

- Central contributions to a research project on using transformer-based generative models for quantum state tomography. This led to a research paper which we submit to one of the top Physics journals.
- Contributed code and code reviews to the PennyLane software library.

Pictet Asset Management | Intern Multi-Asset Investments (part-time)

May 2016 - May 2018 | Zurich, Switzerland

- Assisted the multi asset teams in Geneva and Zurich in their daily investment process and developed tools for analysis of portfolio exposure to currencies, regions and industries.

UBS Investment Bank | Intern Equity Derivatives Trading

May 2015 - April 2016 | Zurich, Switzerland

- Assisted the derivatives trading teams in their daily routines.
- Developed trade supporting tools using MS Visual Basic, including a tool for real-time monitoring of competitor prices.

EDUCATION

ETH Zurich | Ph.D. in Computer Science

February 2020 - December 2023 | Zurich, Switzerland

Exploring robustness guarantees for machine learning systems and quantum algorithms, in the context of adversarial attacks, naturally occurring noise and distribution shifts.

Supervisors: Prof. Ce Zhang & Prof. Martin Vechev

ETH Zurich | MSc Mathematics (graduated with distinction)

September 2016 - May 2019 | Zurich, Switzerland

Coursework with focus on machine learning and mathematical statistics. Master thesis on lossy image compression with recurrent neural networks.

Supervisors: Prof. Ce Zhang & Prof. Nicolai Meinshausen.

GPA: 5.77 / 6.0

ETH Zurich | BSc Mathematics

September 2011 - June 2015 | Zurich, Switzerland

Courses covered wide areas of Mathematics including Linear Algebra, Functional Analysis, Topology, Probability Theory, Brownian Motion & Stochastic Calculus.

Bachelor thesis on value at risk with defaultable securities.

GPA: 4.85 / 6.0

PROFILE

I am an AI researcher working on modeling and data with a focus on inference efficiency and architecture modifications. Prior to my role at Together AI, I obtained a Ph.D. in Computer Science from ETH Zurich where I have published scientific research in the area of reliable and trustworthy ML at top conferences and journals.

SKILLS

Programming Languages Python, Bash, Mathematica, SQL, R

Deep Learning Frameworks PyTorch, PyTorch FSDP, DeepSpeed, HuggingFace Transformers, vllm

Data Pipelines Ray, Daft, Polars, Pandas, NumPy

Tools Git, Docker, wandb, k8s, AWS

EXPERTISE

- Scientific Research
- Software Development
- Machine Learning
- Large Language Models

LANGUAGES

German: ●●●● Native
English: ●●●○ Fluent
Spanish: ●●●○ Fluent
French: ●●●○ Intermediate

SERVICE

Open Source Led the development of the RedPajama datasets, which are among the most popular, largest, open LLM pretraining datasets.

Reviewer Served as a reviewer for NeurIPS, Physical Review A, Physical Review Research, PRX Quantum, npj Quantum Information, IEEE Transactions on Neural Networks and Learning Systems.

SELECT PUBLICATIONS

(* DENOTES EQUAL CONTRIBUTION)

- 2024 **Maurice Weber**, Dan Y. Fu, Quentin Anthony, Yonatan Oren, Shane Adams, Anton Alexandrov, Xiaozhong Lyu, Huu Nguyen, Xiaozhe Yao, Virginia Adams, Ben Athiwaratkun, Rahul Chalamala, Kezhen Chen, Max Ryabinin, Tri Dao, Percy S Liang, Christopher Ré, Irina Rish, and Ce Zhang. Redpajama: an open dataset for training large language models. In Advances in Neural Information Processing Systems, 2024
- 2023 **Maurice Weber***, Carlo Siebenschuh*, Rory Marshall Butler*, Anton Alexandrov, Valdemar Ragnar Thanner, Georgios Tsolakis, Haris Jabbar, Ian Foster, Bo Li, Rick Stevens, and Ce Zhang. Wordscape: a pipeline to extract multilingual, visually rich documents with layout annotations from web crawl data. In Advances in Neural Information Processing Systems, 2023
- 2023 **Maurice Weber***, Xiaojun Xu*, Bojan Karlaš, Ce Zhang, and Bo Li. Rab: Provable robustness against backdoor attacks. In 2023 IEEE Symposium on Security and Privacy (SP), 2023
- 2022 Haoxiang Wang*, **Maurice Weber***, Josh Izaac, and Cedric Yen-Yu Lin. Predicting properties of quantum systems with conditional generative models. arXiv preprint arXiv:2211.16943, 2022
- 2022 **Maurice Weber**, Linyi Li, Boxin Wang, Zhikuan Zhao, Bo Li, and Ce Zhang. Certifying out-of-domain generalization for blackbox functions. In 39th International Conference on Machine Learning, 2022
- 2022 **Maurice Weber**, Abhinav Anand, Alba Cervera-Lierta, Jakob S Kottmann, Thi Ha Kyaw, Bo Li, Alán Aspuru-Guzik, Ce Zhang, and Zhikuan Zhao. Toward reliability in the nisq era: Robust interval guarantee for quantum measurements on approximate states. Physical Review Research, 4(3):033217, 2022
- 2022 Mintong Kang*, Linyi Li*, **Maurice Weber**, Yang Liu, Ce Zhang, and Bo Li. Certifying some distributional fairness with subpopulation decomposition. In Advances in Neural Information Processing Systems 35 (NeurIPS 2022), 2022
- 2021 **Maurice Weber**, Nana Liu, Bo Li, Ce Zhang, and Zhikuan Zhao. Optimal provable robustness of quantum classification via quantum hypothesis testing. npj Quantum Information, 7(1):1–12, 2021
- 2021 Linyi Li*, **Maurice Weber***, Xiaojun Xu, Luka Rimanic, Bhavya Kailkhura, Tao Xie, Ce Zhang, and Bo Li. Tss: Transformation-specific smoothing for robustness certification. In 2021 ACM SIGSAC Conference on Computer and Communications Security (CCS '21), 2021
- 2020 **Maurice Weber**, Cedric Renggli, Helmut Grabner, and Ce Zhang. Observer dependent lossy image compression. In 42nd German Conference on Pattern Recognition, 2020
- 2019 Filipe Barata, Kevin Kipfer, **Maurice Weber**, Peter Tinschert, Elgar Fleisch, and Tobias Kowatsch. Towards device-agnostic mobile cough detection with convolutional neural networks. In 2019 IEEE International Conference on Healthcare Informatics (ICHI), pages 1–11. IEEE, 2019

CONFERENCES & WORKSHOPS

- Dec 2024 **Advances in Neural Information Processing Systems 37, 2024** | Vancouver, B.C., Canada
Spotlight Poster: RedPajama: an Open Dataset for Training Large Language Models
- Dec 2023 **Advances in Neural Information Processing Systems 36, 2023** | New Orleans, LA, US
Poster: WordScape: a Pipeline to extract multilingual, visually rich Documents with Layout Annotations from Web Crawl Data
- May 2023 **IEEE Symposium on Security and Privacy (SP) 2023** | San Francisco CA, US
Talk: RAB: Provable Robustness against Backdoor Attacks
- July 2022 **39th International Conference on Machine Learning (ICML) 2022** | Baltimore MD, US
Spotlight Talk: Certifying Out-of-Domain Generalization for Blackbox Functions
- Mar 2022 **26th Conference on Quantum Information Processing (QIP) 2022** | Los Angeles CA, US
Poster: Toward Reliability in the NISQ Era: Robust Interval Guarantee for Quantum Measurements on Approximate States
- Feb 2021 **25th Conference on Quantum Information Processing (QIP) 2021** | Virtual
Poster: Optimal Provable Robustness of Quantum Classification via Quantum Hypothesis Testing
Talk: Optimal Provable Robustness of Quantum Classification via Quantum Hypothesis Testing
- Sep 2020 **42nd German Conference on Pattern Recognition (GCPR) 2020** | Virtual
Poster: Provable Robust Learning Based on Transformation-Specific Smoothing

TEACHING

- Fall 2022 **Computer Science (D-MATH/D-PHYS ETH Zurich)** | Teaching Assistant
- Spring 2022 **Data Modelling and Databases (D-INFK ETH Zurich)** | Teaching Assistant
- Fall 2020 **Information Systems for Engineers (D-INFK ETH Zurich)** | Teaching Assistant
- Spring 2017 **Linear Algebra II (D-MATH ETH Zurich)** | Teaching Assistant
- Spring 2015 **Calculus II (D-MATH ETH Zurich)** | Teaching Assistant

REFERENCES

Available upon request.