Nathaniel Tornow

nate.tornow@gmail.com nathanieltornow.github.io nathanieltornow nathanieltornow

Education

Technical University of Munich *Nov 2025 – present*
PhD in Computer Science
- Topic: Compilers and Software Systems for Quantum Computing
- Group: Systems Research Group (dse.in.tum.de)

Technical University of Munich *Oct 2022 – Mar 2025*
MSc in Computer Science
- GPA: 3.7/4.0

Technical University of Munich *Oct 2018 – Sept 2022*
BSc in Computer Science

Experience

Software Engineer Intern *Munich*
PlanQC *Apr 2025 – present*
- Development of a compiler for quantum circuits to PlanQC's native Neutral-Atom qubit instructions.

Student Research Assistant *Munich*
Quantum Computing and Technologies (QCT), Leibniz Supercomputing Centre *Oct 2022 – Mar 2025*
- Research on compilers and runtime systems for the integration of quantum computers into HPC *(LLVM, C++)*

Student Research Assistant *Munich*
Systems Research Group, Technical University of Munich *July 2021 – Mar 2025*
- Research and implementation of scalable quantum-classical software systems *(Python, CUDA-Quantum)*

Teaching Assistant *Munich*
Technical University of Munich *Oct 2019 – Sept 2023*
- Lectures: Discrete Probability Theory, Distributed Systems
- Labs: Introduction to Programming, Systems Programming Lab, Distributed Systems Lab

Software Developer *Munich*
TUfast Racing Team *Nov 2020 – May 2021*
- Responsible for the trajectory planning algorithm of an autonomous race car *(Python, ROS)*
- TUfast is TU Munich's interdisciplinary Formula Student team, winning multiple Formula Student competitions, sponsored by Porsche and Audi (TUfast)

Software Developer Working Stundent *Munich*
Leibniz Supercomputing Centre *Sept 2020 – Apr 2021*
- Full stack web development for the citizen-science portal Baysics *(Django, JavaScript)*

Publications

QVM: Quantum Gate Virtualization Machine PLDI'25
Nathaniel Tornow, Emmanouil Giortamis, Pramod Bhatotia
10.48550/arXiv.2406.18410

QOS: Quantum Operating System OSDI'25
Emmanouil Giortamis, Francisco Romao, Nathaniel Tornow, Pramod Bhatotia
10.48550/arXiv.2406.19120

Quantum-Classical Computing via Tensor Networks Arxiv'24
Nathaniel Tornow, Christian B. Mendl, Pramod Bhatotia
10.48550/arXiv.2410.15080

Orchestrating Quantum Cloud Environments with Qonductor Arxiv'24
Emmanouil Giortamis, Francisco Romao, Nathaniel Tornow, Dmitry Lugovoy, Pramod Bhatotia
10.48550/arXiv.2408.04312

FlexLog: A Shared Log for Stateful Serverless Computing HPDC'23
Dimitra Giantsidi, Emmanouil Giortamis, Nathaniel Tornow, Florin Dinu, Pramod Bhatotia
10.1145/3588195.3592993

Talks

QVM: Quantum Virtual Machine *May 2023*
Site visit of the Munich Quantum Valley (MQV) at Leibniz Supercomputing Centre

Extending vHive: Support for gVisor Sandboxes *Aug 2021*
Ease-Lab at the University of Edinburgh

Academic Experience

Thesis Advisor
- "CompTN: A Compiler Infrastructure for High-Performance Tensor Network Computing" (BSc, link)

External Reviewer
- ASPLOS'24

Conference Student Volunteer
- IEEE Quantum Week 2024

Awards and Extracurriculars

1st price (Optiver challenge) – HackZurich Hackathon *2021*
- Developed a trading-bot to liquidate a market of sustainable goods *(Python)*

Open Source Contributor and Maintainer – vHive *2021 - 2022*
- Adding functionality for experimentation with gVisor sandboxes *(Go, Kubernetes)*

2nd price (Microsoft challenge) – HackaTUM Hackathon *2020*
- Built a social productivity application *(Vue.js, Python)*

Skills

Programming Languages and Frameworks: Python, C++, Go, C, Java, SQL, Qiskit, Django, JavaScript

Languages: German, English (C1), Italian (A1), Hebrew (A1), ancient Greek (Graecum), Latin (Latinum)

Interests: Cello (for 18 years), chamber orchestra, soccer, photography