

# Maurice D. Hanisch

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## Education

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### M.Sc. Physics

09/2022 – Present

*ETH Zurich, Switzerland*

- Current GPA: 5.61/6.00 (CH)
- Focus: Q. Error Correction, Q. Information Processing, Machine Learning
- Selected past & current coursework: Advanced Q. Algorithms, Probabilistic Artificial Intelligence, Q. Error Correction, Q. Information Processing 1 & 2, Trapped Ions.
- *Partly financed by the Rayer scholarship — Dr. Mas-Fraissinet, France.*

### B.Sc. Physics

10/2018 – 09/2022

*LMU Munich, Germany*

- GPA: 1.28/1.00 (DE).
- Theoretical physics electives.
- *Mainly financed by the Rayer scholarship — Dr. Mas-Fraissinet, France.*

### Medical Degree

10/2017 – 02/2018

*LMU Munich, Germany*

- GPA: N/A. Not completed.

### Baccalauréat

09/2014 – 07/2017

*Lycée Sud des Landes, St-Vincent-de-Tyrosse, France*

- GPA 16.00/20.00 (FR). Graduated with the highest possible honors at the age of 16.

## Research Experience

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### Master's Thesis

09/2023 – Present

*IBM Quantum, Zurich, Switzerland*

🔒 [Project Repo \(still private\)](#)

- "Quantum error correction with analog measurement information decoders."
- Writing soft information decoders in C++ & Python. Analyzing performance on real hardware.
- Future work: Analyzing performance-information trade-off of soft-information decoders. Working on decoders for ArcCircuits.
- Skills: C++, Python, IBM Quantum hardware.
- Supervisors: Dr. James Wootton, Dr. Joseph Renes, Prof. Renato Renner.

### Semester Project

06/2023 – 08/2022

*ETH Zurich, Switzerland*

🔗 [Report Link](#)

- "Towards a tunable beamsplitter interaction between two GKP-encoded qubits."
- Experimental project on the motional interaction of GKP-encoded qubits in trapped ions.
- Designed and simulated trapping potentials and experimental testing of the found potentials.
- Skills: Python, ion trapping hardware.
- Supervisor: Moritz Fontboté-Schmidt, Martin Wagener, Dr. Stephan Welte, Prof. Jonathan Home.

## Bachelor's Thesis

04/2022 – 09/2022

Max-Planck-Institute for Quantum Optics, Munich, Germany

 [Report Link](#)

- “Space-efficient quantum computation of fermionic and bosonic Gaussian systems.”
- Introduction to various theoretical research areas (entanglement simulation with Python, entropic uncertainty principles, tensor networks) by Dr. Adrian Rubio.
- Investigated the time and space complexity of fermionic and bosonic Gaussian circuits.
- Skills: Python, complexity theory, bosonic quantum computation.
- Supervisors: Dr. Adrian Rubio, Prof. Ignacio Cirac.

## Teaching

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### Teaching Assistant in Linear Algebra I

09/2023 – Present

ETH Zurich, Switzerland

- Taught Linear Algebra for 1<sup>st</sup> year B.Sc. CS students in a weekly in-person class.
- Lecturer: Prof. Bernd Gärtner, Prof. Afonso Bandeira.

### Teaching Assistant in Physics II

02/2023 – 07/2023

ETH Zurich, Switzerland

- Taught Continuum Mechanics and Thermodynamics for 1<sup>st</sup> year B.Sc. EE students in a weekly in-person class.
- Lecturer: Prof. Atac Imamoglu.

### Laboratory Supervisor

10/2021 – 02/2022

LMU Munich, Germany

- Supervised the physics electrodynamic laboratory course for five groups of 20 medicine students.

## Work Experience

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### IP Law Intern

04/2022

Bardehle Pagenberg, Munich, Germany

- Drafted argumentations for ongoing patent lawsuits. Familiarized with litigation examples.
- Supervisor: Sebastian H.-E. Müller.

### Assistance Coordinator

02/2018 – 10/2018

IMA, Munich, Germany

- Accident and breakdown assistance coordinator in regions including DE, CH, FR, and UK.

## Competitions

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### Quandela Hackathon: LOQCathon 2.0

11/2023

Sorbonne Université, Paris, France

 [Project Repo](#)

- Won overall 1<sup>st</sup> Prize of the competition with my team (3000€).
- Topic: Quantum reservoir computing using only linear optical elements.

### Qiskit Hackathon

06/2023

World of Photonics, Munich, Germany

- Topic: Graph theory-based approach to encode highly entangled states on IBM hardware.

### ETH Quantum Hackathon

05/2023

ETH Zurich, Switzerland

- Won 2<sup>nd</sup> Prize of the IQM challenge with my team.
- Topic: Using symmetry-informed quantum machine learning.

## Extracurricular Activities

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### Student Mentor

09/2023 – 02/2024

*ETH Physics Department Student Mentoring*

- Mentor for a group of seven first-year BSc students. Monthly meetings to discuss the student's progress and problems.

### Residence House Speaker

10/2021 – 09/2022

*Studentenwerk Munich, Germany*

- Coordinated administrative tasks for a 300-student residence house.
- Organized student events; mediated disputes and conflicts; responsible for sensible issues.

### Student Mentor

10/2021

*LMU Physics Department*

- Mentor 40 new LMU physics students to assist them in commencing their studies in the first months of their studies.

## Technical Skills and Interests

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### Technical:

- Python: qiskit, pymatching, stim, scikit-learn.
- C++: pybind11, eigen.
- Docker
- LaTeX

**Languages:** German (native), French (native), English (C1: IELTS 8/9)

**Interests:** Calisthenics, Weightlifting, Volleyball, Chess.