

André L.G. Mudry

Switzerland | andre-mudry.com

Education

ETH Zurich — Master of Science in Applied Mathematics Spring 2025–Spring 2026

Final average: **6.0/6.0**; master's thesis: **6.0/6.0** (Swiss grading scale; 6.0 is the maximum).

Thesis: *Classification of Parafermionic Invertible Topological Phases of Matter in One-Dimensional Space*.

Supervisors: Xiao-Gang Wen (MIT), Gian Michele Graf (ETH Zurich), and Ömer Aksoy (MIT).

Exchange: Purdue University, Spring 2025; ETH-transferred average: 5.8/6.0.

ETH Zurich — Bachelor of Science in Mathematics Fall 2020–Spring 2025

Final average: **5.5/6.0**.

Exchange: École Polytechnique, France, Spring 2023; ETH-transferred average: 6.0/6.0.

Harvard Summer School Summer 2018

Courses in comparative politics and Java programming; GPA: 3.9/4.0.

ETH Zurich — Didactics certificate in mathematics In progress

Research Experience

Parafermionic phase stacking — independent research with MIT Completed Summer 2026

Collaborator: Ömer Aksoy (MIT).

- Derived stacking rules for one-dimensional parafermionic invertible and symmetry-protected topological phases, building on the classification established in the master's thesis.
- Research completed following the thesis; first-author manuscript in preparation with Ömer Aksoy.

Parafermionic topological phases — master's thesis hosted by MIT Oct. 2025–Apr. 2026

Supervisors: Xiao-Gang Wen (MIT), Gian Michele Graf (ETH Zurich), and Ömer Aksoy (MIT).

- Classified invertible and symmetry-protected topological phases of one-dimensional parafermionic systems.
- Completed a six-month research project; thesis available on personal website.

Quantum simulation via superconducting arrays — semester research project hosted by Boston University Spring 2025

Supervisors: Claudio Chamon (Boston University) and Manfred Sgrist (ETH Zurich).

- Contributed to the algorithmic and computational design of a quantum simulation platform using superconducting arrays.
- Coauthored *Graph-based emulation of d-dimensional curved spaces with superconducting arrays*; submitted to *Physical Review X*.

Clock-model / parafermion duality — semester research project hosted by MIT Spring 2025

Supervisors: Xiao-Gang Wen (MIT), Manfred Sgrist (ETH Zurich), and Ömer Aksoy (MIT).

- Studied the duality between one-dimensional bosonic clock models and parafermionic models via the Fradkin–Kadanoff transformation, focusing on $\mathbb{Z}_N \times \mathbb{Z}_N$ symmetries.

Invertible topological phases — bachelor's thesis, ETH Zurich / MIT Winter 2023–2024

Supervisors: Xiao-Gang Wen (MIT), Manfred Sgrist (ETH Zurich), and Ömer Aksoy (MIT).

- Studied the classification of one-dimensional bosonic and fermionic invertible topological phases.

Group testing algorithms — independent research 2020; publication 2022

- Designed an original algorithm for pooled mass testing during pandemics, including COVID-19, as a high-school graduation research project; sole-author publication.

Publications, Thesis, and Manuscript

1. Mehmet Dede, Guilherme Delfino, **André L.G. Mudry**, Junseok Oh, Andrew P. Higginbotham, Christopher Mudry, and Claudio Chamon. *Graph-based emulation of d -dimensional curved spaces with superconducting arrays*. 2026. arXiv:2605.28942. Submitted to *Physical Review X*; under review.
2. **André L.G. Mudry**. *Pooling to optimize mass testing: Group Testing Protocols in Higher Dimensions to Combat the COVID-19 Pandemic*. Physikalisch-Technische Bundesanstalt, 2022. doi:10.7795/320.202208.
3. **André L.G. Mudry**. *Classification of Parafermionic Invertible Topological Phases of Matter in One-Dimensional Space*. Master's thesis, ETH Zurich, 2026. Available via andre-mudry.com.
4. **André L.G. Mudry** and Ömer Aksoy. *Classification and stacking of invertible and symmetry protected topological phases in one dimension*. Working title; manuscript in preparation.

Talks and Presentations

MIT — Condensed Matter Theory seminar 17 November 2026 (scheduled)
Classification and stacking of invertible and symmetry protected topological phases in one dimension.

ETH Zurich — Gian Michele Graf's group seminar 2025–2026
Regular presentations on research work.

Purdue University — Topological Quantum Computing seminar Fall 2024
Invertible topological phases of matter in 1D.

Employment

Student Research Assistant — KOF Swiss Economic Institute, ETH Zurich April 2026–present
Supervisor: Hans Gersbach.
Develop and review mathematical models, simulations, and proofs for research in macroeconomics, political and institutional economics, banking, and finance.

Summer student position — Hoffmann-La Roche, Basel Summer 2017
Genetics and Genomics Laboratory; redesigned laboratory inventory and tracking.

Awards, Fellowships, and Scholarships

Research travel grant 2026
Swiss Study Foundation and Swiss State Secretariat for Education, Research and Innovation; upcoming MIT visit.

Fellow — Swiss Study Foundation Ongoing

Foreign exchange scholarships — France and United States 2023; 2024

Wolfram Research Prize — European Union Contest for Young Scientists 2021
Award for COVID-19 testing algorithms.

Swiss Youth in Science 2020
First national prize; selected as a Swiss representative to the European Union Contest for Young Scientists.

Service and Outreach

ETH Zurich student outreach to French-speaking Switzerland.
Additional activities: Team leader, International Swiss Talent Forum (Supply Chain Resilience), June 2022; European Youth Parliament, National Model United Nations (New York), and debate club, 2019–2024.

Technical Skills and Languages

Programming and scientific computing: Python, Mathematica, GAP, C++, MATLAB, Java; L^AT_EX.

Languages: English, French, German (native); Spanish (B2).