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Ahmed Mahmoud
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Ahmed Adel Mahmoud

Education

Jan 2024–Present **Doctor of Philosophy, Mathematics**, *University of Saskatchewan*, SK, Canada.
GPA: 99/100

Jun. 2024 **Summer Course: Near-term Quantum Algorithms**, *University of Sherbrooke*, QC, Canada.
GPA: Excellent (A-)

2021–2023 **Master of Science, Mathematics**, *University of Saskatchewan*, SK, Canada.
GPA: 95/100

2017–2021 **Bachelor of Science, Physics**, *Zewail City of Science and Technology*, Giza, Egypt.
GPA: 3.7/4

Research experience

Jan 2024–Present **PhD Researcher**, *Centre for Quantum Topology and Its Applications*, University of Saskatchewan.
- Currently working on benchmarking Floquet CSS codes on hyperbolic lattices.

July 2025–Aug 2025 **Visiting PhD Researcher**, *Institute for Quantum Computing*, University of Waterloo, ON, Canada.
- Research project done in collaboration with Xicheng Xu and others leading to the paper *A Scalable Circuit QED Platform for Simulating Hyperbolic Lattices*.

Jan 2025–April 2025 **Research Assistant**, *Centre for Quantum Topology and Its Applications*, University of Saskatchewan.
- Worked on developing a systematic way to benchmark quantum error correction codes on hyperbolic lattices.

Sep 2021–April 2023 **Research Assistant**, *Centre for Quantum Topology and Its Applications*, University of Saskatchewan.
- Investigated and analyzed the motion of shallow water waves arising in the CF integrable system using analytical and numerical methods. Link to Thesis.

Publications

2025 **A Scalable Circuit QED Platform for Simulating Hyperbolic Lattices**, Xicheng Xu*, **Ahmed Adel Mahmoud***, Noah Gorgichuk, Ronny Thomale, Steven Rayan & Matteo Mariantoni; arXiv: 2510.23827.

2025 **A Systematic Approach to Hyperbolic Quantum Error Correction Codes**, **Ahmed Adel Mahmoud**, Kamal Mohamed Ali, Steven Rayan; submitted to the *Journal of Quantum Information and Computation*, arXiv:2504.07800.

*Joint first authors.

Work Experience

Aug 2023–Jan 2024 **Data Analyst**, *TELUS International | AI Data Solutions*, Remote.
- Worked as a trainer for an LLM at the AI Data Solutions project.

July 2023 **M2PI Internship**, *Cenovus Energy / Pacific Institute for the Mathematical Sciences*, BC, Canada.
- Developed a feasibility study for sustainable aviation fuel production in BC; built a supply-chain model and provided recommendations for profitability.

Sep 2021–April 2023 **Teaching Assistant**, *University of Saskatchewan*.
- Courses include: Engineering Mathematics III & IV, Partial Differential Equations, Vector Calculus II, Linear Algebra.

Sep 2020–Jan 2021 **Junior Teaching Assistant**, *Zewail City of Science and Technology*.
- Partial Differential Equations (MATH 302).

Awards and Honors

May 2025 **University of Saskatchewan Teaching Fellowship (Doctoral)**.
- Granted for 4 years.

Sep 2021 **University of Saskatchewan Teaching Fellowship (Master's)**.
- Granted for 2 years.

Sep 2021 **Lehigh Dean's Select Scholarship**.
- Declined it in favor of University of Saskatchewan scholarship.

Sep 2017 **Zewail City of Science and Technology Scholarship**.
- Acceptance rate 6% .
- Granted for 4 years.

Aug 2016 **Dakahlia Governorate Thanaweya Amma (High School) Excellence Award**.
- Score: 408/410.
- Ranked 1st in my school, 2nd in Dakahlia, and 40th all over Egypt.

Poster Presentations

August, 2025 **Construction and Benchmarking of CSS Floquet Codes on Hyperbolic Lattices**, *7th International Conference on Quantum Error Correction (QEC25)*, Yale University ().

June, 2025 **A Systematic Approach to Topological Quantum Codes on Hyperbolic Lattices**, *Quantum Days Satellite Series*, University of Saskatchewan.

Talks

March, 2025 **Physics in Negative Curvature: Experiments on Hyperbolic Lattices with Superconducting Circuits**, *APS March Meeting*, Anaheim, California, (Co-first author; invited talk delivered by Xicheng).

March, 2025 **Classification of 2D Hyperbolic Quantum Error Correction Codes**, *Department of Mathematics Graduate Seminar*, University of Saskatchewan.

Dec, 2022 **Topological Insulators and the Z_2 invariant**, *Department of Mathematics Graduate Seminar*, University of Saskatchewan.

July, 2022 **The Calogero-Françoise Integrable Systems Through Higgs Bundles**, *Alberta Graduate Mathematics and Statistics Conference (AGMSC)*, University of Calgary.

March 18, 2022 **Integrable Systems, Riemann Surfaces, and Inverse Scattering**, *Graduate Seminar*, University of Saskatchewan.

Workshops & Training

Jun 2025 **IBM Quantum Computing Training Workshop**, *IBM Quantum*, Innovation Place, SK.

May 2024 **Math2PowerQuantum Workshop**, *Pacific Institute for the Mathematical Sciences (PIMS)*, University of Saskatchewan, SK.

Conference Funding

June 2023 **Oxford Travel Award**.
- Workshop on Complex Lagrangians, Integrable Systems, and Quantization.

March 2023 **PIMS Travel Award**.
- 2023 Canadian Western Algebraic Geometry Symposium.

July 2022 **PIMS Travel Award**.
- Séminaire de Mathématiques Supérieures 2022: Floer Homotopy Theory.

June 2022 **Fields Institute Travel Award**.
- Conference: Homotopy Theory with Applications to Arithmetic and Geometry.

June 2022 **Geometric Structures Reunited Travel Award**.
- A summer school based at the University of Illinois at Chicago.

Skills

Languages English (Fluent), Arabic (Native), French (Basic).

Programming Python (2 years), MATLAB (6 months), Wolfram Mathematica (2 years), Linux (4 months), Qiskit (2 years).