# DINA ABDELHADI

email: dinaabdelhadiquantum@gmail.com
phone: +41 76 456 43 48
website: dinaabdelhadi.com

## EDUCATION

*PhD Degree*

*2019–2025* EPFL

*School of computer & communication sciences, Advisor: Prof. Ruediger Urbanke*
Focus area: Theory of noisy quantum communication and computation and error correction.

*Master's degree*

*2016–2019* ETH Zurich

*Masters of Electrical Engineering and Information Technology.*

*Bachelor's degree*

*2011–2016* The German University in Cairo

*Communication Engineering B.Sc.* · GPA 0.7 (equivalent to A+) · First rank.

*High School Diploma*

*2009–2011* El Rowad College - Cairo

Nationwide fifth ranked student in Egyptian high school examinations.

---

## THESES & RESEARCH PROJECTS

*Internship & collaboration*

*Summer 2024, 2022-2025* Quantum Error Correction team, IBM Research Yorktown

*Two-way classical communication-assisted entanglement distillation.* Developed entanglement distillation protocols achieving state-of-the-art rates over the amplitude damping and depolarizing channels, by introducing a channel reshaping perspective and constant weight encodings. *In collaboration with V. Siddhu, T. Jochym-O'Connor, J. Smolin.*

*Master's Thesis*

*Winter 2018* Quantum Information Theory Group, ETH Zurich

*Bounds for Quantum Protocols using Partially Smoothed Entropies* · Grade: 5.75/6 · Advisor: Dr. Joseph M. Renes
Closed a gap in literature in quantum compression second order asymptotics through connection to quantum state merging.

*Semester thesis*

*Winter 2017* IBM Research Zurich

*Object and Movement Recognition in a Spiking Neural Network with Unsupervised Mixed Spike-rate- and timing-based Learning* · Grade: 5.75/6

*Semester thesis*

*Spring 2017* Signal and Information Processing Laboratory, ETH Zurich

*Finite-blocklength Analysis of the Poisson Channel* · Grade: 5.75/6

*Bachelor's thesis*

*Spring 2015* Technical University of Munich

*Information Theory of Multimode Optical Fiber* · Grade: A+

---

## LANGUAGES

*Programming*

Python · Used for simulating quantum circuits using the package qutip, as well as for semidefinite programming (PICOS).

MATLAB · Used in implementing projects in various areas: channel coding, image compression, adaptive antennas, and semidefinite programming (YALMIP).

Java · Undergrad. courses (A+), Competed in ACM-ECPC Egyptian collegiate programming contest (2012, 2013).

ResearchGate: /Dina_Abdelhadi2 LinkedIn: /DinaKSAbdelhadi

CST · Used for simulation of microwave structures such as antennas, filters, waveguides.

CUDA · Fundamentals of accelerated computing with CUDA C/C++ workshop.

*Natural* English · Fluent (TOEFL: 118/120) , German · Basic (Goethe B1 Zertifikat)
French · Basic (A2)

## ACADEMIC VISITS

*Simons Institute* *Jan-April 2024* Participated in the programs on error correction and quantum fault tolerance.

*ENS Lyon* *May 2022* Collaborated with Daniel Stilck Franca on research studying limitations imposed by dephasing noise on the performance of QAOA.

*IBM* *July 2022* IBM's summer school program on Quantum Error Correction in NY.

## TEACHING EXPERIENCE

*EPFL* *2023* Teaching Assistant for the course Principles of Digital Communication 0.5em 2020, 2021, 2022, 2023 Teaching Assistant for

*EPFL* the courses (Quantum computation, Quantum information processing) Assisted in teaching courses introducing quantum information concepts and QISKIT to undergraduate students.

*ETH Zurich* *Spring 2018* Information Theory Teaching Assistant

## AWARDS & CONTESTS

*NCCR QSIT* *2018* INSPIRE Potentials - QSIT Master Internship Award.

*IEEE APS design contest* *2015* Competed in semifinals in the IEEE Antenna Propagation Society Design Contest.

With my team, we implemented a power efficient wearable body area network system using inkjet-printed fractal antenna.

*German Univ. in Cairo* *2015* Award for top-ranked students to conduct Bachelor thesis research abroad.

## PUBLICATIONS


[1] D. Abdelhadi et al. "Adaptive Channel Reshaping for Improved Entanglement Distillation". In: *arXiv preprint arXiv:2410.22295* (2024, Presented at BIID 2025, TQC 2025.).

[2] D. Abdelhadi et al. "Reed-Muller Codes for Quantum Pauli and Multiple Access Channels". In: *Proceedings IEEE International Symposium on Information Theory*, 2025.

[3] Keita Hidaka, Dina Abdelhadi, and Ruediger Urbanke. "Interpolation of Quantum Polar Codes and Quantum Reed-Muller Codes". In: *arXiv preprint arXiv:2505.22142* (2025).

[4] Vikesh Siddhu et al. "Entanglement Sharing Across a Damping-Dephasing Channel". In: *2024 IEEE International Symposium on Information Theory*. July 2024. DOI: 10.1109/ISIT57864.2024.10619242.

[5] D. Abdelhadi. “SDP for Contraction of Coherence under Dephasing”. 2023. Poster presented at TQC, Aveiro, Portugal.

[6] D. Abdelhadi. “Limitations of QAOA quantum advantage under dephasing noise”. 2022. Poster presented at QIP, Pasadena, USA.

[7] D. Abdelhadi and Joseph M. Renes. “Second-order asymptotics of quantum data compression from partially-smoothed conditional entropy”. In: *IEEE International Symposium on Information Theory (ISIT)*. 2020, pp. 1846–1851.

[8] D. Abdelhadi and Hany F. Hammad. “Novel CPW-fed fractal Sierpinski Arrowhead inkjet-printed antenna design”. In: *33rd National Radio Science Conference (NRSC)*. IEEE. 2016, pp. 109–113.