Gamal Mograby

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SUMMARY

Applied mathematician and physicist with seven years of research experience in quantum computing, numerical modeling, and graph analysis. Currently pursuing an MSc in Financial Engineering at WorldQuant University, with a focus on mathematical finance and statistics.

WORK EXPERIENCE

Visiting Assistant Professor: University of Cincinnati, USA **Aug 2023 - Present**

- *Army Research Office Grant:* Developed quantum search algorithms on graphs and demonstrated their potential to surpass classical methods and advance quantum computing applications.

Postdoctoral Research Associate: Tufts University, USA **Sep 2022 - June 2023**

- *Army Research Office Grant:* Investigated spectral properties of Laplacians and Hamiltonian operators, such as almost Mathieu operators, on fractal-type graphs, conducting detailed spectral analyses and exploring connections to quantum information theory.

Postdoctoral Research Associate: University of Maryland, USA **Sep 2020 - Aug 2022**

- *National Science Foundation Grant:* Developed numerical discretization methods for differential equations on Koch snowflake fractal domains, studying the influence of fractal geometry on spectral properties.

EDUCATION

MSc in Financial Engineering: WorldQuant University, USA **Jul 2024 – Present**

- Courses: Introduction to Financial Markets, Financial Data, and Econometrics, Derivative Pricing and Stochastic Modeling.

PhD in Mathematics (GPA = 3.978): University of Connecticut, USA **Aug 2016 – Aug 2020**

- PhD Thesis: Quantum Information on Fractals and Graphs

Diplom in Physics: Berlin Institute of Technology, Germany **Oct 2010 – Jul 2016**

Note: German Diplom degree is a five-year program equivalent to having earned both Bachelor's and Master's degrees.

SELECTED PUBLICATIONS

Numerical Analysis:

- "Discretization of the Koch Snowflake Domain with Boundary and Interior Energies", G. Mograby et al., *"Fractals in Engineering: Theoretical Aspects and Numerical Approximations", Springer International Publishing (2021).*

Quantum Computing:

- "Quantitative approach to Grover's quantum walk on graphs", G. Mograby et al., *Quantum Information Processing, Volume 23, article number 27, (2024).*
- "Perfect quantum state transfer on diamond fractal graphs", G. Mograby et al., *Quantum Information Processing 19, 328 (2020).*

Analysis on Networks and Graphs:

- "Hamiltonian systems, Toda lattices, solitons, Lax pairs on weighted Z-graded graphs", G. Mograby et al., *Journal of Mathematical Physics 62, 042204 (2021).*

SKILLS

Python, mathematical statistics, machine learning, finite-difference methods, and quantum search algorithms.