

Abdelrahman Gohar

Mathematician & Theoretical Physicist

Alexandria, Egypt

aamg504@york.ac.uk | +20 1037131272

ResearchGate | Google Scholar

Education

PhD: Applied Mathematics

(Feb 2026 — Expected June 2027)

Alexandria University, Faculty of Science — Egypt

MSc: Theoretical Physics

(Sept 2024 — Sept 2025)

University of York, Department of Mathematics — United Kingdom

MSc: Applied Mathematics

(Oct 2023 — Jan 2026)

Alexandria University, Faculty of Science — Egypt

BSc: Pure & Applied Mathematics

(Sept 2017 — Aug 2021)

Alexandria University, Faculty of Science — Egypt

Teaching Experience

Lecturer (Part time)

(Oct 2021 — Present)

Arab Academy of Science, Faculty of Engineering (Department of Basic & Applied Sciences)

Lecturer (Part time)

(Oct 2023 — Present)

Alexandria University, Faculty of Science (SIM Department)

Lecturer (Part time)

(Oct 2025 — Present)

Alexandria National University (SIM Department)

Teaching Responsibilities:

- Delivered lectures in **undergraduate Mathematics and Physics courses**.
- Designed quizzes, assignments, and assessments to evaluate student performance, and recorded coursework and examination grades through online reporting systems.
- Delivered online lectures through Google Classroom, using a teaching tablet and presentation software to prepare and present instructional materials.

Awards

- **Chevening Scholarship Awardee (2024/2025)** — Awarded the fully funded Chevening Scholarship from the UK Government to pursue a Master's degree in Theoretical Physics at University of York, UK. Selected among the top 30 scholars in Egypt out of 65,000 applicants.

Research Interests

My research interests lie at the intersection of general relativity and quantum field theory. I am highly motivated to advance my research toward QFT in curved spacetime, quantum gravity, and semiclassical gravity. My recent work focuses on:

- Spacetime singularity theorems and quantum resolution of spacetime singularities
- Classical and quantum aspects of black holes
- Spectral theory and quantum thermodynamics

Research Experience

MSc Thesis: Spacetime Singularity Theorems & Black Holes (June 2025 — Sept 2025)
University of York, Department of Mathematics — United Kingdom
Supervisor: **Dr. Benito A. Juárez Aubry**

MSc Research Project: QFT in Curved Spacetime (February 2025 — June 2025)
University of York, Department of Mathematics — United Kingdom
Supervisor: **Prof. Kasia Rejzner**

MSc Thesis: Ro-vibrational Energy Spectra & Thermodynamic Modeling of Diatomic Molecules in Higher Dimensions (Oct 2023 — Jan 2026)
Alexandria University, Faculty of Science — Egypt
Supervisor: **Prof. Dr. Salah B. Doma**

Publications

- Analytical Solutions of the Molecular Kratzer-Feus Potential by means of the Nikiforov-Uvarov Method (2023)
- Gohar Fractional Derivative: Theory & Applications (2023)
- On Gohar Fractional Calculus (2024)
- Gohar Fractional Effect on the Diatomic Structure and Ro-vibrational Spectroscopy in the Molecular Kratzer Model (2024)
- Thermodynamic Modeling of Diatomic Molecules Via Exact Quantization in Arbitrary Dimensions (Accepted for publication, 2026)

Conferences, Schools & Workshops

- EMS-IAMP Spring School: Symmetries and Measurement in Quantum Field Theory, University of York, UK, 7–11 April 2025.
- 74th North British Mathematical Physics Seminar, University of York, UK, 27 June 2025.
- CaLISTA WG2 Workshop: Recent Advances in Classical and Quantum Integrability, University of Leeds, UK, 2–6 June 2025.
- AQFTUK 9: Algebraic Quantum Field Theory UK Meeting, Lancaster University, UK, 22 January 2025.
- YTF 24: Young Theorists' Forum, Durham University, UK, 18–19 December 2024.
- PASCOS 2025: Particles, Strings and Cosmology, Durham University, UK, 21–25 July 2025.

Academic Presentations

QFT in Curved Spacetime 9 May 2025
Oral presentation delivered as part of the MSc Preparatory Research Project, Department of Mathematics, University of York, UK.

Software Skills

- MS Office (Excel, Word, PowerPoint)
- Python
- Wolfram Mathematica
- MATLAB
- LaTeX