

Mahmoud Khaled Abdelkader

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Summary

Dynamic Mathematics graduate with a Bachelor's degree in Mathematics and a Master's degree in Applied Mathematics. Skilled in Optimization and Operational Research, with a focus on strategic algorithms and decision-making processes. Experienced in teaching, mentoring, and academic presentations. Committed to community service and volunteer work.

Education

Apr. 2024 - Jun. 2024 **Fully-funded internship**, *Heidelberg University*, Heidelberg, Germany. [Invited to Heidelberg University's HGS MathComp visiting program for a research project.](#) Supervised by Dr. Michael Winckler. Stay scheduled for 6 weeks starting from April 21, 2024.

Sep. 2023 - Jul. 2024 **Master's degree**, *University of Cape Town, AIMS*, Cape Town, South Africa (**Fully Funded Scholarship**)

Sep. 2022 - May 2023 **Pre Master**, *Helwan University*, Helwan, Egypt

Sep. 2016 - Jul. 2020 **Bachelor of Science in Mathematics**, *Helwan University*, Helwan, Egypt

Research Interests

Optimization and Operational Research:

Feb. 2024 - Jul. 2024 My master's project title was "Mathematical Modelling and Implementation of Game Strategy for the Board Game Quoridor." This project involves developing and evaluating strategic algorithms, such as Minimax, Alpha-Beta Pruning, and Monte Carlo Tree Search, to master the game dynamics and optimize decision-making processes.

Mar. 2024 Participated in a 3-week workshop at AIMS South Africa during my master's program, focusing on linear and nonlinear optimization. Topics covered included optimality conditions, KKT conditions, constraint qualifications, and solution techniques.

2018 - 2019 Achieved excellent grades in an Operational Research (OR) course during my bachelor's degree at Helwan University, demonstrating a strong foundation in that field.

Teaching and Mentoring Experience

Sep. 2024 - Present **Assistant Lecturer**, *Canadian International College "CIC"*, Part Time.

Sep. 2024 - Present **Assistant Lecturer**, *El-Gazeera Higher Institute for Engineering and Technology*, Cairo.

Oct. 2022 - Aug. 2023 **Teaching Assistant**, *El-Gazeera Higher Institute for Engineering and Technology*, Cairo.

Sep. 2020 - Present **Freelance Mathematics lecturer**, *Online teaching*.

Sep. 2020 - **Teaching Assistant**, *Mathematics Dep., Faculty of Science, Helwan University*, Helwan.
Apr. 2021

Conferences & Publications

Conferences

- May. 2024 Presented a research poster on 'Mathematical Modelling and Game Strategy for Quoridor' at After Research-Party, Heidelberg University.
- Mar. 2024 Presented a research poster on 'Mathematical Modelling and Game Strategy for Quoridor' at Siyakhula event, AIMS South Africa.
- 25-27 Oct. 2023 Spring School "On Symmetries of Differential & Difference Equations and Their Applications", Stellenbosch, South Africa
- 31 Aug. 2023 Quadratic Forms, Rings and Codes, Laboratoire de Mathématiques de Lens, France
- 24-28 Jul. 2023 Five days faculty development program on 'Data Analysis using Advanced Computational techniques', Department of Statistics and Department of Mathematics, Amity University Kolkata, North India
- 27-28 Jan. 2023 Categories, Rings and Modules, a conference in honor of Alberto Facchini, Online
- 10-21 Dec. 2022 Rings, Algebras, and Category Towards Coding and Computer Algebras, CIMPA school, Helwan University
- 24 Jul. 2019 Topology and its Applications, Helwan University.

Publications

- Feb. 2025 Co-author, Manuscript in Preparation
- Developed and implemented a novel methodology for solving multilevel quadratic programming problems under interval-valued intuitionistic fuzzy uncertainty.
 - Applied advanced linearization techniques and extended fuzzy approaches to transform and solve complex optimization problems.
 - Conducted numerical experiments to validate the methodology, demonstrating its effectiveness in handling hierarchical decision-making structures.
- Feb. 2025 Co-author, Manuscript in Preparation
- Contributed to the development of optimization algorithms for solving multilevel solid transportation problems in a rough interval environment.
 - Implemented constraint, interactive, and fuzzy approaches to address uncertainty and achieve compromise solutions.
 - Conducted extensive numerical experiments to highlight the advantages of the proposed computational techniques.

Awards & Achievements

- Feb. 2025 Have been accepted to organize an [IndabaX Egypt](#) event in 2025.
Funding Source: [Deep Learning Indaba](#) and [MasterCard Foundation](#).
Funding Amount: 3000 USD

- Apr.2024 - May.2024 [Have been Invited to Heidelberg University's HGS MathComp visiting program for a research project. Supervised by Dr. Michael Winckler from April 21, 2024 to 29 May 2024.](#)
Funding Source: IWR Heidelberg University
Funding Amount: 3200 EUR
- Oct. 2023 Have been selected for a fully funded scholarship to study a Master's degree at Cape Town University, South Africa.
Funding Source: [Mastercard foundation](#) and [AIMS](#)
Funding Amount: 9000 USD
- Dec. 2019 Seventh Place in the Ideal Student Competition at Helwan University.
- Dec. 2019 Ideal Student Certificate, Faculty of Science.

Memberships

- 31 May. 2024 [Operation Research Society student member.](#)
- Apr.2024 - Apr.2026 [European Mathematical Society student member.](#)

Skills

Skills: \LaTeX , C++, [Python](#), R software, CPLEX Software, Microsoft Office, GeoGebra, plotly, Canva,
Languages: Arabic(native), English ([Upper Intermediate](#)), French (Basic).

Volunteer & Social works

- Mar. 2024 As a Mastercard Foundation Scholar, actively participated in community service initiatives, dedicating hours to social work and volunteering efforts. Engaged in educational tutoring at Muizenberg High, South Africa.
- Mar. 2024 [Volunteered at Siyakhula, an event by AIMS, to boost Africa's mathematical sciences.](#)
- Dec. 2022 [Participated as a volunteer at CIMPA \(Algebra Winter School\), facilitating academic exchanges and supporting the organization of workshops focused on advancing algebraic knowledge and research collaboration among international scholars.](#)

Personal information

Date of birth: 22 Dec. 1997
Citizenship: Egyptian

References

Dr Karin-Therese Howell e-mail: howell@aims.ac.za
Academic Director, African Institute for Mathematical Science, South Africa.

Prof. Susan Eldeken e-mail: Sfdeken@science.helwan.edu.eg
Mathematics Department, Helwan University, Cairo, Egypt.