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# Mohammed Ehab

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## Education

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### Massachusetts Institute of Technology (MIT) (2021-2025)

*BS in Electrical Engineering and Computer Science, with Mathematics.*

*GPA: 5.0*

**Notable Courses:** Deep Learning, Underactuated Robotics, Bio-Inspired Robotics, Semi-Definite Optimization, Visual Navigation of Autonomous Vehicles, Distributed Algorithms, and Multi-Agent Learning.

**Notable Skills:** Python, C++, PyTorch, Algorithm Design, Problem Solving, Git, Julia, MATLAB, ROS2, and Pandas.

## Research Experience

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### MIT Robot Locomotion Group

**July 2023-Present**

*Robotics Researcher* | Julia, Drake, Semi-Definite Optimization

Leading the work on an algorithm for approximating the reachability sets of underactuated robotic systems using SOS programming, with the goal of designing fast agile controllers and certifying safety.

### Jump Trading

**July 2024-September 2024**

*Quantitative Researcher* | Pandas, ML, Modeling

Worked on developing pricing models as well as improving the execution of the firm's algorithmic trading strategies.

### Harvard School of Dental Medicine

**July 2023-September 2023**

*Bioinformatics Researcher* | R, C++, Algorithms

Leveraged big single-cell RNA data to map protein interaction pathways in the immune system. Developed a graph algorithm to infer the direct outcomes of injecting a cell with each protein.

### MIT Computational Web Group

**December 2022-February 2023**

*Machine Learning Researcher* | PyTorch, Git, Tensorboard

Worked on a framework for distributed machine learning that outperforms federated and even centralized learning with a 5% increase in accuracy over the CIFAR-10 dataset. Conducted various experiments to understand the learning dynamics over iterations. Results were accepted into the ICML workshop on localized learning.

### MIT Computational Connectomics Group

**June 2022-August 2022**

*Machine Learning Researcher* | PyTorch, Linux, HPC

Worked on safe robust AI by studying the phenomenon of adversarial examples for deep neural networks. Conducted extensive literature reviews to find the best theory for their existence. Investigated using GANs and DDPMs to project adversarial examples back into the distribution and invented a new provably-robust classification scheme.

## Other Experience

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### Competitive Programming (2015-2021)

Solved thousands of algorithmic problems, which taught me how to write fast, bug-free code under time pressure.

Created more than 70 novel problems for 20000+ participants and worked in a team of 5 to run the Egyptian Olympiad in Informatics. Earned 2 silver medals in the International Olympiad in Informatics and 1 bronze medal, and

reached top 1% in the world on Codeforces, earning the title of Grandmaster.