

Sarah Mokhtar

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Education

Massachusetts Institute of Technology (MIT) Expected graduation date: May. 2026

B.S. in Computer Science and Engineering (6-3)

B.S. in Mathematics (18)

Relevant Courses: Design and Analysis of Algorithms, Fundamentals of Programming, Advanced Complexity Theory, Discrete Probability and Random Variables, Computational Structures, Fine-Grained Complexity, Machine Learning, Algebra 1, Probabilistic Methods in Combinatorics, Stochastic Processes, Advanced Algorithms

Experience

MIT CSAIL, Theory of Computation Group | Cambridge, MA

06/2024 - Present

Undergraduate Researcher

- Working with Professor Ryan Williams on the Hardness of MCSP problem which is a major topic in complexity theory
- Proving and defining new lower bounds for circuit complexity by applying assumptions of MCSP hardness under different reduction types
- **Technical Skills** : Complexity Theory, Algorithms, Probability.

MIT CSAIL, Language Programming Verification Group | Cambridge, MA

09/2023 - 05/2024

Undergraduate Researcher

- Worked with Prof. Adam Chlipala on developing a compiler for a high-level programming language inspired by python
- Applying Mathematical proofs to verify that the compiler correctly transforms the source code into machine code/intermediate code.
- **Technical Skills** : Coq, Formal Verification, Programming Languages

MIT Physics Departement | Cambridge, MA

12/2022 - 08/2023

Undergraduate Researcher

- Worked with Prof. Michael Williams and his post-doc on training a Lipchitz constrained neural network to identify ghost particles and fake tracks at LHCb at cern.
- Selecting optimal features among electron characteristics in order to develop the model
- **Technical Skills** : Pandas, Machine Learning, PyTorch, Constrained Neural Networks, Statistics, feature selection

Activties and Honors

- **3x Egyptian Olympiad in informatics bronze medalist.**
- **Silver medal in Egyptian Olympiad in Informatics for teams and participated in the international competition.**
- **Bronze medal in Egyptian collegiate programming contest**
- **Participated in European Girls Olympiad in informatics**
- **7th place and Arab and Africa collegiate programming contest**
- **Reached final stage of Weblab competition at MIT**
- **Participated in Women's Datathon organized by Citadel 2024**
- **Participated in Citadel's Trading invitational 2024**
- **Part of Alpha phi sorority**
- **Theatre Director at MIT Life on Theatre Group**

Projects

- **Multi-player video game:** 01/2023 - 02/2023
Worked with my team to implement a multi-player game called Cara-a-Cara as part of Weblab competition at MIT.
Technical Skills : React, node.js, mongoDb, javascript
- **Survey on the hardness of MCSP:** 03/2024 - 05/2024
Worked on a team of two on a research project on the hardness of MCSP as part of the Advanced Complexity Theory Class; we read papers discussing various approaches to tackle this problem then we wrote a seven-page survey based on our research.
Technical Skills : Algorithms, Proofs, Complexity Theory