

# Erez Abrams

107 Sunset Lane, Tenafly, NJ, 07670  
erezm@mit.edu 201-707-6548

## EDUCATION

### Massachusetts Institute of Technology

Physics and Mathematics

2022 - 2025

- Bachelor of Arts in Physics and Pure Mathematics; Minor in Computer Science
- Fall 2022 courses include Algebra I, Quantum Mechanics II, Introduction to Algorithms
- Planned Spring 2023 courses will include Algebra II, Quantum Mechanics III, Relativistic Quantum Field Theory I, Probability and Random Variables

### Bergen County Academies

Academy for the Advancement of Science and Technology

2018 - 2022

GPA: 3.997 / 4.0

- Multivariable Calculus and Linear Algebra, Analysis, Group Theory
- Data Structures, Design Patterns, Processors

### Independent Learning

Textbooks, Projects, and Recorded Lecture Series

- Time-dependent perturbation theory, astrophysics, cosmology
- Computation theory, numerical analysis, computational physics

## TECHNICAL SKILLS

### Math:

Multivariable Calculus

★★★★★★★★☆☆

Differential Equations

★★★★★★☆☆☆☆

Linear Algebra

★★★★★★★★★★★★

Numerical Analysis

★★★★★★☆☆☆☆

### Programming:

C and C++

★★★★★★★★☆☆

Java 14

★★★★★★☆☆☆☆

Python 3, Sagemath

★★★★★★☆☆☆☆

Reverse-Engineering

★★★★★★★★☆☆

Assembly (x86)

★★★★☆☆☆☆☆☆

## EXPERIENCE

Dr. Herschel Rabitz

Research Assistant

2020 - PRESENT

Princeton University

- Optimized algorithms for quantum mechanism analysis by an exponential factor via algebraic topology and proved the optimality of the new technique (paper in progress)
- Currently developing new algorithms for efficient quantum gate design using optimized mechanism analysis techniques
- Developed novel Hamiltonian inversion evolutionary algorithms
- Gained experience in efficiently reading research papers

Dr. Ozgur Dogru

Student Researcher

2018 - 2020

Bergen County Academies

- Built two interferometers for measuring thermal expansion
- Analyzed experimental data to determine expansion coefficients

## ACTIVITIES AND AWARDS

Competitions and Awards:

- Two-time silver medalist at the International Olympiad of Astronomy and Astrophysics
- 2022 USAPhO gold medalist, 2021 USAPhO-Plus competitor
- Silver medalist at Physics Unlimited Explorer Competition 2021
- Founding member of solid-umbrella cybersecurity CTF team

Leadership and Teaching:

- Captain and lecturer at BCA Math Team
- Founder and lecturer at BCA Cybersecurity CTF Club
- Independent private tutor for 5 years
- Former Senior Patrol Leader of BSA Troop 86 (led 60 scouts)

Other:

- Member of MIT Asymptones vocal group
- Member of Studio38 music production studio
- Member of MIT AI Alignment group