Derek Chen

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MIT sophomore with a strong background in analytical thinking and problem solving in mathematics, CS, and biology.

EDUCATION

Massachusetts Institute of Technology **Class of 2026 ◆ GPA: 5.0/5.0**

Computer Science with Applied Math (18-C) and Biology (7)

Relevant Coursework: Algorithms [6.121, 6.122], Computation Structures [6.1910], Computation Theory [18.404], Differential Equations [18.03], Probability [18.600], Linear Algebra [18.06], Machine Learning [6.390], Organic Chemistry [5.12, 5.13]

Extracurriculars: Centrifugues (A Capella), Asian Dance Team, Harvard-MIT Math Tournament (Officer), MIT Science Olympiad (Officer), Momentum AI, Traders@MIT

Employment: Grader for Introduction to Algorithms [6.121], Design and Analysis of Algorithms [6.122]

Belmont High School **Valedictorian, Class of 2022 ◆ GPA: 4.29/4.3**

Extracurriculars: Math Team (Captain), Science Team (Captain), Mock Trial Team, Belmont Free Lessons

Standardized Tests: SAT (1590/1600) ◆ ACT (36/36)

Skills: **Python, Java, HTML/CSS, LaTeX, PyTorch, TensorFlow, NumPy, SQL, Azure**

RESEARCH AND EXPERIENCE

Undergraduate Researcher at the Keating Lab **Dec. 2023 to present**

- Using molecular dynamic simulations to train diffusion models for prediction of cyclic peptide structure

Machine Learning Intern at Air Force Research Laboratory **Jun. to Aug. 2023**

- Developed a Tensorflow neural network to design phononic structures with desired bandgaps to block transmission of certain acoustic wave frequencies
- Modeled phononic crystals with finite element analysis and finite-difference time domain methods

Teaching Assistant for USA Biolympiad **May to Jun. 2023**

- Helped run the 2023 USA Biolympiad National Finals and train the USA IBO team

Undergraduate Researcher at the Liu Lab **Dec. 2022 to Sept. 2023**

- Used Tensorflow neural networks to predict ideal pegRNAs for prime editing by extracting and validating patterns from large datasets of pegRNA modifications
- Performed wet lab research including DNA amplification/purification, bacterial transformation, and tissue culture for validation of models

Research: ML Stock Market Simulation and Trading Bot Application **Apr. to Sept. 2020**

- Completed an Python ML research project with Prof. Franchitti of NYU using GANs and LSTM neural networks to model and predict short-term dynamic markets
- Awarded the $1599 JSHS (Junior Science and Humanities Symposium) Momentum Grant

Leadership: HMMT, MIT Science Olympiad, Traders@MIT Officer **Sept. 2022 to present**

- Helped organize Harvard-MIT Math Tournament, MIT Science Olympiad, and the Traders@MIT invitational through directing meetings, writing tests, coordinating outreach, and managing inventory

ACHIEVEMENTS AND AWARDS

International Biology Olympiad (IBO) Silver Medalist **2021**

- Was one of 4 members of the 2021 USA Biolympiad Team representing the USA in the 32nd IBO

USA Biology Olympiad (USABO) National Finals Gold Medalist **2021 and 2022**

6x American Invitational Mathematics Examination (AIME Qualifier) **2017 to 2022**

USA Physics Olympiad (USAPhO) National Honorable Mention Recipient **2021**

MIT PRIMES Mathematics Track Member **2021 and 2022**

Program in Mathematics for Young Scientists (PROMYS) **Summer 2019 and 2020**

USA Computing Olympiad (USACO) Gold Division Recipient **2017 to present**