Aleezay Sheikh

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Education

Massachusetts Institute of Technology *Expected Graduation:* May 2026
S.B. Mathematics with Computer Science *GPA: 4.9/5.0*

Experience

Drug Optimization: Summer Science Program, Indiana University June 2021 – Sept 2021
Team Researcher *Remote*

- Developed a Python algorithm to search through *T. punctulata's* Protein Data Bank for binding sites that matched a user-entered protein sequence motif
- Modeled TpCdc14 phosphatase activity using Michaelis-Menten kinetics to estimate steady-state parameters of TpCdc14 enzyme using Python
- Characterized TpCdc14's substrate specificity and hypothesized its mechanism of action by utilizing statistical methods (e.g. Welch's t-test) to identify phosphopeptide chains that most effectively binded to TpCdc14
- Performed in-silico screening of inhibitors using MOE and then optimized a selected inhibitor's binding affinity (leading to a 27% increase) through functional group modifications

Prather Lab, MIT June 2023 – Sept 2023
Undergraduate Researcher *Cambridge, MA*

- Designed plasmids to utilize quorum sensing in regulating metabolic pathways of E.Coli, specifically engineered vectors to circumvent E. Coli's natural feedback inhibition and increase carbon flow for Chorismate production

Teaching Assistant at Sartartia Math Club 2019 – 2022
Volunteer Basis *Sugar Land, TX*

- Designed a curriculum to teach competition math topics (ranging from combinatorics to algebra) to middle schoolers as AMC 8 preparation—overall students' average scores increased by 32%
- Assisted in organizing annual math tournaments for over 200 students; primary responsibilities consisted of leading teams of volunteers to write exams, find sponsorships, and set up an online registration system.

Miscellaneous Computational Projects, MIT Sept 2023 – Dec 2023
Student/Self-directed *Cambridge, MA*

- Developed a version of an autocomplete/autocorrect engine using prefix trees for text-processing tasks
- Designed and programmed an n-dimensional Minesweeper game from scratch
- Created and implemented a Scheme interpreter (a dialect of LISP)
- Converted Sudoku into a SAT (boolean satisfiability) problem and programmed an SAT solver to optimally solve 3x3 puzzles

Relevant Coursework

- 18.901: Introduction to Topology
- 18.600: Probability and Random Variables
- 18.650: Fundamentals of Statistics
- 18.100B: Real Analysis
- 18.032: Theory-based Differential Equations
- 18.06: Linear Algebra
- 6.1220: Design and Analysis of Algorithms
- 6.1210: Data Structures and Algorithms
- 6.3900: Introduction to Machine Learning
- 6.1200: Discrete Mathematics for Computer Science

Miscellaneous

Awards: 2021 AIME Qualifier (scored 7/15), TX State Science Olympiad Silver Medalist in Designer Genes, National Merit Semifinalist
Technical Skills: Python, NumPy, LaTeX, MOE, Basic PyTorch
Interests: Bhangra, Tennis, Music Theory, Reading, Ice Skating, Running
Other: MIT Math Learning Center Tutor, selected as a tutor that all undergraduates can reach out to for math classes' preparation and questions