

Benjamin Shimabukuro

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Education

Massachusetts Institute of Technology (*undergrad*)
Mathematics (Course 18), Class of 2025, GPA 5.0

Mt. Everest Academy, San Diego, CA (*high school*)
Class of 2021 Valedictorian, GPA 4.5

Coursework

Probability and Random Variables, Statistics, Algorithms, Theory of Probability, Algebraic Topology, Real Analysis, Abstract Algebra, Partial Differential Equations, Discrete Math, Relativity, Quantum Mechanics

Work Experience

Financial Math Researcher (*Summer 2024, Lafayette College REU*)

- Worked with other undergraduates to calculate the VIX for six different time intervals and analyze the relationship between the VIX principal components and the returns of variance swaps, S&P 500 straddles, and VIX futures
- Used Python packages including NumPy and Pandas to process 8 GB of financial data from OptionMetrics
- Back-tested potential options trading strategies inspired by the results of our research; identified a strategy with theoretical annual returns of over 20% between 2000 and 2023
- Poster is scheduled to be presented at the Joint Mathematics Meetings in January 2025

Math and Physics Tutor (*2018 - present, website: sites.google.com/view/shimabukurotutoring*)

- Tutored private clients in subjects from basic arithmetic to linear algebra, as well as math/physics competitions
- Helped one student to earn an honorable mention in the USA Junior Math Olympiad and USA Physics Olympiad
- Created videos for tutoring startup Explain ([explanations.io](https://www.explanations.io)) and regularly met with the site's founder to discuss ideas to improve the website and attract more viewers

Undergraduate TA (*Fall 2023, MIT*)

- Graded homework assignments for 18.300 (Principles of Continuum Applied Mathematics) at MIT
- Answered students' questions about problems to improve their understanding of the material

Other Activities

Problems Staff (*HMMT, 2021 - present*)

- Worked with Harvard and MIT students to organize bi-annual math competitions for high school students
- Wrote 3 problems that appeared on the test (Feb. '22 Geometry #3, Nov. '22 Guts #26, Nov. '23 General #9)
- Created Python and C programs to verify answers to problems and ensure accuracy
- Volunteered at educational events related to the contest

Math Competitions

- 2019 USA Junior Math Olympiad honorable mention (21st place out of over 40,000 AMC 10 participants)
- 2021 American Regions Math League 4th place team award

Puzzle Hunts (*2021 - present*)

- Organized puzzle hunting efforts at my college residence hall (Floorpi)
- Completed the 2022, 2023, and 2024 MIT Mystery Hunts with the → → → Galactic Trendsetters → → →

Music/YouTube (*channel: [youtube.com/c/BenjaminShimabukuro](https://www.youtube.com/c/BenjaminShimabukuro)*)

- Posted many original compositions and other videos on YouTube channel (230,000+ views)
- Used Python packages including PyDub, Pillow, and CV2 to generate experimental music videos

Directed Reading Program (*MIT, Winter 2023 and 2024*)

- Read math books with MIT graduate student mentors to learn about advanced topics, such as "Polynomial Methods in Combinatorics" and "Topology from the Differentiable Viewpoint," over a four-week period
- Gave collaborative presentations at the end of the program summarizing what we read

Treasurer (*MIT Baptist Student Fellowship, 2022 - present*)

- Filled out applications to secure MIT funding for equipment and food at events
- Led initiatives to design and post colorful fliers around campus to increase awareness of our events