Mannat Vikramaditya Jain

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EDUCATION

2025 (current) **Garden City High School, New York**
- GPA: Weighted: 100.10, Unweighted: 96.28.
- SAT: 1570 (800 Math; 770 EBRW), PSAT: 1500.
- 18 APs, including AP CS A, AP Calc BC, AP Chem, AP Physics C, AP Statistics, et al., and secured 5s.
- National Merit Semifinalist 2025.

2024-25 **Harvard Extension School, Harvard University, Cambridge, MA**
- MATH E-21A, Multivariable Calculus, Fall 2024.
- MATH E-21B, Linear Algebra, Spring 2025.

2023-25 **Columbia University Science Honors Program, Columbia University, New York**
- Weekly, in-person classes at Columbia Engineering campus in Data Science, Algorithms, & "R" Language.
- Entry via competitive exam.

2024-25 **Stony Brook University, School of Medicine and College of Engineering and Applied Sciences, NY**
- Computer Science and Informatics Summer Research Experience Program; Independent research.
- Training DNABERT to identify A2I RNA editing sites in pre-mRNA to predict impact of alternative splicing.

RESEARCH PAPERS AND EXPERIENCE IN BIOLOGICAL AND BIOMEDICAL ENGINEERING

2024-25 **Duke University School of Medicine, Duke University, North Carolina**
- First author with Department Chair; developing Protein Language Models (PLM) for novel synthetic restriction enzymes & DNA computers in cancer research. Creating industry protocols for PLM.
- Co-author of second paper.

2024-25 (accepted for publication in SCCM Journal of Jan 2025) **MIT Lab for Computational Physiology & Society of Critical Care Medicine Congress (SCCM), Chicago**
- Co-author on the paper, *"Differences in Documentation Practices Across the Intensive Care Units in US – A Cluster Analysis."* Paper accepted for publication in SCCM Journal.
- 1st Place Team. Presenter of "Health Equity & Diversity" paper at Critical Care Congress, FL; only high schooler invited to SCCM Datathon, Chicago.

2024-25 **School of Medicine & College of Engineering & Applied Sciences, Stony Brook University, NY**
- Co-author on a paper on training DNABERT to identify A2I RNA editing sites in pre-mRNA.

PATENTS PENDING

2024 Utility – Prov. Application under 35 USC 111(b); 3007; #66555092. **Patent pending: Artificial Intelligence-Based, Bi-Directional, Customizable Platform for Real-Time Translation of Any Sign Language to Any Spoken Language.**
- The invention relates to the field of language translation, specifically to a system and method for real-time translation of American Sign Language (ASL) into multiple global languages.
- The invention aims to bridge the communication gap between ASL users and non-signers, facilitating seamless interaction.

2024 Utility – Prov. Application under 35 USC 111(b); #2622. **Patent pending: A.I.-Driven Real-Time Search Index for Educational Platforms.**
- The invention relates to educational technology, specifically a software application that leverages artificial intelligence (A.I.) to create a real-time search index for Google Classroom.
- The invention enables students to locate relevant documents, materials, and assignments tied to specific topics, enhancing productivity and learning outcomes in digital educational environments.

AWARDS AND HONORS: International and National Awards

Global Semi-Finalist; Winners TBD, 2024

Ellison Scholar Semi-Finalist (International Competition); Scholarship for Global Technology Innovators, $125,000 Per Year for Six Years

- Focus on scientific and technological innovation in health and medical science.
- Scholarship to fund undergraduate studies and innovation projects, spanning the full development pipeline—translating research and discovery into practical solutions and scaling these for global impact.

Commendation; International Essay Prize, 2024

John Locke Institute, London; Global Essay Competition 2024

- Economics category; Subject: "What is the Optimal Global Population?"
- Graded by Princeton & Oxford faculty; selected from more than 35,000 applicants.

First Prize, International Datathon, 2024

1st Place Team, Society of Critical Care Medicine 2024 International Datathon, Chicago, 2024

- Core member of the team that won first prize in the Health Equity and Diversity category for an analysis of ethnic biases in ICU treatment using the eICU-CRD database.
- Selected to present at the International Society of Critical Care Medicine Congress 2025, Orlando, FL.

International Science Champion Award, USAID, ISEF, 2024

US Agency for International Development (USAID), "International Science Champion Award," 2024

- USAID presents "the *Science for Development Award* to recognize innovative student projects in science & technology…[to] advance [the] ability to meet current and future development challenges."
- Award received for developing a deep learning (DL) algorithm to identify Regions of Interest in fetal ultrasounds (Intersection over Union = 0.82) to detect fetal lung immaturity.

First Prize, National Technology Award, 2024

Congressional App Challenge, US House of Representatives, 2024

- The Congressional App Challenge is an official initiative of the U.S. House of Representatives and is one of the nation's most prestigious prizes in student computer science.
- Winner of NY-04 district; one winner per congressional district from 11,334 contestants in the U.S.

National Presidential Award for Service, 2xGold, 2023, 2024

AmeriCorps Presidential Volunteer Service Gold Award, Washington DC, 2023 and 2024

- Twice awarded the U.S.' highest award for youth volunteer service for founding and running (for three years) Garden City's first chess training program for seniors and children.
- Recognized by the Mayor and New York press (GC News, Garden City Living, and Newsday) for positively impacting more than one-third of the town's population.

National Award, Gold, 2023

Premio de Oro, National Spanish Exam, 2023

- 99th percentile.

AWARDS AND HONORS: State and Regional Science and Technology Awards

April 2023, 2024

Grand Award Winner (2nd Prize), New York State Science and Engineering Fair

- 2nd place out of 400 in the Computational Biology and Bioinformatics category for developing a deep learning algorithm to detect fetal lung immaturity in low-resource countries.
- 3rd prize awarded for graph neural network-based ASL to text translation project.

April 2024

Grand Award Winner (2nd Prize), Long Island Science and Engineering Fair

- 2nd place out of 130 in the Computational Biology & Bioinformatics category for the same project as above.

2024

Regional Finalist, Junior Science and Humanities Symposium

- 3rd place in the Mathematics & Computer Science category for the same project as above.

2023

Finalist, New York State Science Congress

- Awarded by the Long Island STEM Education Leadership Association for Excellence in STEM.
- Best in Physics, awarded for graph neural network-based ASL to text translation project.
- Highest Honors: Long Island Science Congress.

2024, 2023 **Humanities in Science Award x2, SAAWA**
- 1st place, STEM category, for the A.I. Fetal Lung Maturity project.
- 1st place, STEM category, for the project graph neural network-based ASL to text translation system.

2024 **Think Award, Vex Robotics Competition**
- VEX Award for Top Coder; Citation: "Most effective use of coding techniques and programming design to solve the game challenge."
- Lead Coder, Garden City High School team.

2021 **FRC Rookie Game Changer Award, FIRST**
- International award to "celebrate a rookie team's outstanding success."
- Lead programmer on FRC Team *Bravesolders* (#8582).

AWARDS AND HONORS: Other Academic Awards

2023, 2024 **AP Scholar With Distinction x2, College Board**

2024 **Gold Medalist x2, Al Kalfus Math Fair**
- Awarded in 2023 for the 3-body problem project and in 2024 for an odometry project.
- Al Kalfus Math Fair has over 900 participants annually.

2024 **Excellence in Science Research Award x2, Garden City High School**
Awarded in 2023 and 2024 for being the only student in the school to receive Grand Awards at the New York State Science and Engineering Fair twice.

2023 **Medalist, Science Olympiad**
Won at the Nassau West Regional Science Olympiad in the category of Fermi Questions.

NON-ACADEMIC AWARDS AND HONORS: Leadership and Outreach Awards

2024 **New York State Senate Youth Leadership Recognition Award, NY**
- Awarded by New York State Senator Kevin Thomas for "attaining outstanding achievement and serving as a leader and positive role model in the community."
- Received a Proclamation from the New York State Senate.

2023 **Adelphi University Prize for Leadership, Garden City, NY**
- Awarded to juniors for exemplary achievement and community service.
- Received Adelphi University library privileges, tuition-free courses, and monetary award.

PROJECTS: Biological and Biomedical Engineering

2024 (Accepted for publication to SCCM Journal) **Lead Analyst, eICU-CRD Database, Society for Critical Care, Chicago**
- Analyzed the eICU-CRD database to determine the relationship between ICU documentation and actual mortality, discovering ethnic biases in ICU treatment in Midwest areas (after adjusting for illness severity).
- Won First Prize at SCCM's International Discovery Datathon, Chicago, 2024.

2024 (In progress) **Developed Protein Language Models for DNA Computing, Duke University School of Medicine**
- Used Protein Language Models to discover novel synthetic restriction enzymes; currently modeling the enzymes with AlphaFold 3 to assess viability.

2023-25 (provisional patent received) **Developed a Deep Learning Algorithm and Exploring Application to Identify Hypertrophic Cardiomyopathy in Non-Standard Cases in Low-Resource Countries**
- Wrote code in PyTorch to create a novel hybrid DL U-Net and 'You Only Look Once' model to identify regions of interest in fetal ultrasounds (Intersection over Union = 0.82).
- Deep-learning algorithm re-purposed for a 50:50 joint venture with one of Asia's largest hospital networks to identify HCM in non-standard cases (obesity, diabetes, etc.).

2024 **Trained DNABERT to identify A2I RNA editing sites in pre-mRNA, Stony Brook University.**

(In progress)
- Sourced data from REDIportal hg38 genome sequence.
- Currently analyzing high-attention regions to determine chemical motifs affecting alternative splicing.

PROJECTS: Computer Science And Robotics

2023-25 (Provisional patent received)
Launched A.I. Ed-Tech Platform Built on Patent-Pending Algorithm
- Designed and built a novel search engine that won the national Congressional App Challenge 2024.
- Working with NY-04 Congressman D'Esposito to launch the app in schools across NY.
- Invited to represent NY-04 Congressional District in the Annual Congressional Hackathon, DC.
- Probable impact: 2.6 million students in NY, 50 million in the U.S.; saves >100 hours/student/year.

2022-25 (Provisional patent received)
Graph Neural Network-Based ASL-To-Text Translation System; Launched Non-Profit in Asia
- Wrote code in TensorFlow to develop a novel ASL-to-text translation system that merged Graph Neural Networks and Transformer architecture for real-time translation of ASL to multiple languages.
- Launched OneMudra.com, and provided (free of cost) to three institutions in India.
- Pilot underway in schools for the deaf in NY.

2023-24
V5RC Robotics Code for Team 68602A; Won First Prize for Best Software in Competition
- Wrote the code for V5RC Team 68602A in C++; implemented Kalman filters, Monte Carlo localization, and reinforcement learning algorithms from scratch.
- Won First Prize for Best Software at Farmingdale State Qualifier.

2021-22
A Novel Search Engine for Wikipedia; Won Multiple Science Awards in NY
- Freshman year project.
- Wrote code in JavaScript to create a natural language processing-based search engine.

2021
FRC Robotics Software and Website
- Wrote the code for the robot for FRC team *BraveSolders* (#8582) in Java.
- Developed the team's website (React).

LEADERSHIP, VOLUNTEER AND SPORTS

2022-25
Founder, Chess4Community, Garden City, NY
- Founded and led Chess4Community, the town's first-ever chess program for cognitive development for senior citizens and children in elementary and middle school.
- Arranged town-wide events to teach chess, ran multiple year-long programs at the Garden City Senior Center and the library, and organized tournaments where the mayor distributed prizes.

2023-25
Founder and President, Bioinformatics A.I. Club, Garden City High School, NY
- Founded the first Bioinformatics-A.I. Club, dedicating significant time and effort to its growth.
- Organized lectures by CEOs of cutting-edge biotech companies and researchers from Harvard-MIT HST, Johns Hopkins, Rockefeller, and others.
- Taught A.I. fundamentals, RDkit for chemistry, DeepChem for molecular design, and bioinformatics.
- Mentored younger students for science competitions and participated in mock juries.

2022-25
Various Leadership Positions in High School Clubs
- Robotics Club, Treasurer: Led recruitment that tripled membership and raised $6,000.
- Chess Club, Vice President: Started a program to travel to elementary and middle schools to teach chess.
- Literary Circle, Member: Biweekly meetings to discuss nonfiction and its impact on modern society.

2022-2024
Tennis, JV/Varsity; FIDE/USCF Rated Chess Player (Peak Rating 1813)

INTERNSHIPS

2024-2025
Department of Biomedical Informatics School of Medicine and College of Engineering and Applied Sciences, Stony Brook University, New York
- Working with Dr. Davuluri, Director, Biomedical Informatics, Stony Brook University, NY, to train DNABERT to identify A2I RNA editing sites in pre-mRNA.
- Sourced data from REDIportal hg38 genome sequence.

- Trained DNABERT to identify A2I RNA editing sites
- Currently analyzing high-attention regions to determine chemical motifs that affect alternative splicing.

2022 **Central Square Foundation (Financed by Bill and Melinda Gates Foundation), New Delhi**
- Central Square Foundation (CSF) is a non-profit focused on enhancing educational learning outcomes in India through system-led reforms in education policy.
- I conducted primary field research and developed a post-pandemic ed-tech initiative for low-income segments that could create at-scale impact by being accessed by a hundred million poor households.

LANGUAGES & CERTIFICATIONS

Native Proficiency: English, Hindi
Intermediate Proficiency: Spanish, Punjabi
Programming Languages: JavaScript • Python • Java • Rust • C++ • Lisp

2024-2025 **Stanford School of Medicine Online**
A.I. in Healthcare.

2024 **MIT Affiliates CITI Training**
Data or Specimens Only Research.

2024 **MIT Affiliates CITI Training**
Conflict of Interest Seminar.

2023 **John Hopkins University, Whiting School of Engineering, Maryland**
- Modeled biological systems and designed experiments to test computational models.
- Earned three college credits for course “Bioengineering and Biotechnology.”

2022 **Cold Spring Harbor DNA Learning Center, Cold Spring Harbor, New York**
- DNA Science (June 2022), DNA Barcoding (June 2023).
- Worked with BLAST and modern bioinformatics tools.
- Published new sequences to the National Institutes of Health GenBank.

2016-22 **Summer School, John Hopkins Center for Talented Youth, Johns Hopkins University, Maryland**
Various courses in Elementary & Middle school: Zero to Infinity (2016), Physics of Engineering (2017), Inductive and Deductive Reasoning (2018), Writing Your World (2019), Algebra I (2020), AP CS A (2021), Advanced Physics (2022).