Ansh Sharma

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Education

University of Illinois at Urbana-Champaign Aug. 2021 – May 2024
B.S. in Computer Science, Minor in Mathematics, Chancellor's Scholar *Urbana, IL*
Relevant Coursework: Discrete Structures, Combinatorics, Linear Algebra, Multivariable Calculus

Princeton University Aug. 2020 – May 2021
Dual Enrollment, Mathematics *Princeton, NJ*
Relevant Coursework: Linear Algebra, Real Analysis

Skills/Awards

Languages/Technologies: Java, Python, C++, JavaScript, Node.js, Qiskit, NumPy, Scikit-learn, Wolfram Mathematica
Olympiad Awards:

Science Olympiad National Tournament - 1st Place, Machines	May 2021
Science Olympiad National Tournament - 6th Place, Circuit Lab	May 2021
USA Physics Olympiad Top 50	April 2021
USA Junior Math Olympiad Qualifier	April 2019
USA Computing Olympiad Gold Division	March 2019

Research Awards:
Regeneron International Science and Engineering Fair Awards: May 2021
- US Air Force Research Laboratory Special Award, 1st Place(Systems Software)
- The King Abdulaziz Foundation for Giftedness and Creativity Special Award

North Jersey Regional Science Fair 1st Place Computer Science and ISEF Grand Prize	March 2021
Nokia Bell Labs Distinguished Research Award	March 2021
Journal of Emerging Investigators Award	March 2021
Association for Computing Machinery Award	March 2021

Experience

Student Researcher July 2020 – Aug. 2020
NJ Governor's School in the Sciences *Madison, NJ*
- Government-sponsored summer research program for which NJ high schools can each nominate two seniors to attend
- Chosen as one of 60 scholars out of 294 nominees
- Explored topics in quantum computing including quantum optimization algorithms, quantum error correction, and VQE
- Designed a probabilistic oracle for Grover's algorithm to solve a partitioning problem for final project
- Additionally took courses on Special Relativity, Geometric Constructions, Molecular Biology of Cancer, and The Big Bang

Research

Improving Upon Quantum Cryptography Protocols Using Entanglement and Quantum Signatures Aug. 2020 – March 2021
- Presented at the Regeneron International Science and Engineering Fair and the North Jersey Regional Science Fair
- Designed a modification of the BB84 QKD Algorithm to improve on qubit efficiency and prevent man-in-the-middle attacks
- Implemented and tested the algorithm using the Python Qiskit library to run algorithm on IBM cloud quantum computers
- Algorithm demonstrated a 20% efficiency increase through setting up an entanglement scheme prior to BB84
- Designed and implemented a parallel quantum digital signature scheme to prevent man-in-the-middle attacks as well
- Provided a framework to extend the algorithm to higher efficiencies in exchange for security trade-offs

Projects

MIT Battlecode Jan. 2021 – Feb. 2021
- Worked in a team of 4 to design an AI bot to play against other teams in a real-time strategy game hosted by MIT
- Iteratively improved on bot over a month through feedback from scrimmage testing against other teams
- Utilized artificial intelligence, pathfinding, distributed algorithms, and communications to optimize the bot's strategy
- Placed 4th/52 high school teams and 22nd/565 overall teams