Vashisth Tiwari

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EDUCATION

University of Rochester — Rochester, USA
Bachelor of Science in Physics, Bachelor of Arts in Mathematics — *Aug-19 – May-23*

- Cum. GPA 3.98/4.00 | Physics Major GPA 4.00 /4.00
- Honors thesis on characterising noise and tools to reduce it in superconducting qubit quantum computers.
- **Scholarships:** Next Genius Scholar + UWC Davis Scholar (Full Scholarship), Dean's List (all eligible semesters).
- **Classes:** Deep Learning, Probability & Handling of Large Datasets (Grad), Data Structures & Algos, Linear Algebra (Hons)

EXPERIENCE

Mana Fund (Stealth startup working in crypto and artificial intelligence) — San Francisco, USA
Machine Learning & Research Intern — *May-22 – Present*

- Devised statistical models to study volatility and risk in potential investments to better predict the expected yield.
- Prototyped a tool to automate smart contract decoding; built data pipeline to fetch transaction data using the Graph.

Blok Lab (Quantum Information with Superconducting Qubits) — Rochester, USA
Undergraduate Research Assistant |Mentor: Dr Machiel Blok — *Sep 2021 – Present*

- Characterized noise in superconducting qubit's preparation, readout to improve coherence times using SciPy, Mathematica
- Building Infrared noise filters using Eccosorb to increase coherence time in cryogenic microwave setup.

Los Alamos National Laboratory — Los Alamos, USA
Undergraduate Intern |Mentor: Dr Malcolm Boshier — *Jun-21 – Aug-21*

- Discovered optimal laser pulse parameters (using higher dimensional optimizations) for beam splitters in the Bose-Einstein Condensate atom-interferometer.
- Improved the fidelity of high momentum states by 5% beyond the current state-of-the-art pulse parameters.

Dark Energy Spectroscopic Instrument (DESI) — Rochester, USA
Research Assistant |Mentor: Dr Segev BenZvi — *Jan-20 – May 21*

- Generated synthetic data for supernovae (SN); designed machine-learning tools (multi-class convolutional neural networks with TensorFlow, scikit-learn) to find galaxies with SN in the spectral data with 95%+ accuracy, high precision.
- Developed data pre-processing techniques for noise-removal and network optimization; increased the accuracy of binary classifier from 65% to 97%.

Polymath Research Experience for Undergraduates — Online
Undergraduate Intern |Mentor: Dr Steven Miller — *Jul-20– Aug-20*

- Contributed two proofs related to the length estimation of Zeckendorf Game, a number theory project.
- Wrote Mathematica and Python programs to check the conjectures for large numbers; presented the work at conferences.

HONORS AND AWARDS

2022	National	Sigma Pi Sigma Honors Society Inductee
2021	University	Physics Honors Prize: Highest grade in the first two years of physics classes
2020	University	Summer Research Grant: $1500 grant given to 66 students in total
2018	International	Yale Young Global Scholars (Full Scholarship to a summer school at Yale)
2018	International	Zayed Sustainability Prize, Asia Finalist (UAE's award for sustainability pioneers)

PUBLICATIONS

[1] *"High efficiency Bose-Einstein condensate splitting using tailored optical standing-wave pulses".* Atoms ('22)
[2] *"Developing a Transient Identification Pipeline for DESI Using ML".* In: American Physical Society Bulletin (2021).
[3] *"Winning Strategy for the Multiplayer and Multivalence Zeckendorf Games*". arXiv:2009.03708 (2020).
[4] *"Bounds on Zeckendorf Games*". arXiv:2009.09510 (2020).
[5] *"Extending Zeckendorf Theorem to a Non-constant Recurrence and the Zeckendorf Game on this Nonconstant Recurrence Relation".* Fibonacci Quarterly, Vol. 58, Number 5 (2020).

LEADERSHIP AND ACTIVITIES

Society of Physics Students (SPS) *|President (Previously Secretary)* — *Aug-21 – Present*

- Started outreach initiative to promote physics among middle school students; organized tutoring for >200 students.
- Won outstanding chapter award (*top 15% of chapters nationally*) for community building, physics outreach.

Advanced Electromagnetism *(Fall '22),* ***Waves & Modern Physics*** *(Spring '21),* ***Intro. to Programming*** *(Spring '20) | TA*

- Coached students on fundamental concepts in office hours, assisted students with homework and projects, graded exams.

SKILLS AND INTERESTS

Technical Languages: Python, Java, Mathematica, Solidity, SQL
Frameworks, Libraries: TensorFlow, Keras, PyTorch, NumPy, Pandas, AstroPy, Scikit-Learn, Qiskit
Presentations: American Astronomical Society, Young Mathematics Conference (premier conf. for undergrad. research)
Interests: Hiking and Backpacking, Running, Coffee, Brain Teasers