

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 | Major GPA 4.00 /4.00
- Working towards an honours thesis on characterising noise and building tools to reduce it in superconducting qubit quantum computer architecture.

IBM Quantum

Online

Qiskit Global Summer School

Jul-21 – Aug-21

- Received excellence badge in a two-week intensive summer school designed with a focus on quantum machine learning to empower the next generation of quantum developers and scientists.

Mahindra United World College

Pune, India

International Baccalaureate Diploma (42/45)

Aug-16 – May-18

- Full scholarship to school that emphasises on educational excellence, global leadership, and social responsibility.

HONORS & AWARDS

2022	National	Sigma Pi Sigma Honors Society Inductee
2021	University	Physics Honors Prize: Highest grade in the first two years of physics classes
2021	Regional	Easter Collegiate Badminton Championship Northern Conference (Silver Medal)
2020	University	Summer Research Grant: \$1500 grant given to 66 students in total
2019-21	University	Dean's List (all eligible semesters)
2019	National	Next Genius Scholar (Full scholarship to attend the University of Rochester)
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)

RESEARCH & WORK EXPERIENCE

Mana Fund

San Francisco, USA

Research Intern

May-22 – Present

- Designing statistical models to quantify risks and expected yield in potential investments.
- Building tools to predict yield using machine learning and forecasting on-chain transaction data.

Blok Lab (Quantum Information with Superconducting Qubits)

Rochester, USA

Undergraduate Research Assistant | Mentor: Dr Machiel Blok

Sep 2021 – Present

- Characterised noise in superconducting qubit's preparation, readout to increase pure-state fidelity.
- 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 (using higher dimensional optimisation) and experimentally tested optimal laser pulse parameters for optical beam splitters in the Rb Bose-Einstein Condensate (BEC) 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

- Designed multi-class convolutional neural networks with TensorFlow and scikit-learn to find galaxies with supernovae (SN) in the spectral data with 90%+ accuracy and high precision.
- Developed data pre-processing techniques for noise-removal and network optimisation to increase the accuracy of binary classifier from 65% to 95%.

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 these conjectures for large numbers.

LEADERSHIP & ACTIVITIES

University of Rochester Rochester, USA
Society of Physics Students (SPS) | President (Previously Secretary) Aug-21 – Present

- Started a new initiative to promote STEM education through interactive DIY activities for students at Rochester City School District, where the majority are low-income, Black and Hispanic students.
- Organised tutoring for more than 300 students for introductory physics classes, previously as secretary.
- Won outstanding chapter award (given to top 15% chapters) for community building, physics outreach.

Badminton Team | Student Athlete Aug-21- Jan-22

- Selected to a 10-member team out of around 120 members to represent the University Badminton Team.

Ass. for the Development of Interest in Indian Subcontinent (ADITI) | Member Aug-19- Present

- Regular volunteer to help with Holi, Diwali, South Asian Exposition, and other community events.

Gap Year New Delhi, India

The Global Education and Leadership Foundation (tGELF) | Intern Aug-18 – Apr-19

- Worked on impact evaluation of Shuruaat Bus- a joint initiative of NITI Ayog and tGELF to strengthen the Indian entrepreneurial ecosystem.
- Formulated strategies to increase youth participation in #WASHUp (Water, Sanitation and Hygiene) campaign.

TEACHING EXPERIENCE

Waves and Modern Physics (Honors), Department of Physics and Astronomy Jan-21 – May-21

- Helped the instructor plan weekly lessons; assisted students with assignments in office hours; graded exams.

Introduction to Programming using Python, Department of Computer Science Aug-20 – Dec-20

- Guided 15 students with projects in python through office hours and tutoring; graded projects and exams.

CONFERENCES & PRESENTATIONS

Title: Optimizing Beam Splitters for Matter Waves (pdf)

- Society of Physics Students Summer Research Symposium Sep-21
- Los Alamos National Laboratory Summer Symposium Jan-21

Title: DESI Transient Identification Pipeline (pdf)

- American Astronomical Society, Co-presenter Jun-21
- Rochester Symposium for Physics Students Mar-21
- DESI Research Forum Aug-21

Title: On Bounds, Winning Strategies, and Generalizing the Zeckendorf Game (pdf)

- Young Mathematics Conference (premier conf. for undergraduate math research), Co-presenter Aug-20
- University of Connecticut Mathematics REU Conference Aug-20

Mentorship and Community Building

- Summer Opportunities Talk, “*How to Intern at National Labs?*” Nov-21
- LaTeX Workshop, “*LaTeX: A Brief Introduction and the Essentials*” Sep-21

PUBLICATIONS

- [1] [Submitted Manuscript] “High efficiency Bose-Einstein condensate splitting using tailored optical standing-wave pulses”. In: Atoms (2022).
- [2] “Developing a Transient Identification Pipeline for DESI Using Machine Learning”. In: Bulletin of the American Physical Society (2021).
- [3] “Winning Strategy for the Multiplayer and Multivalence Zeckendorf Games”. In: arXiv preprint arXiv:2009.03708 (2020).
- [4] “Bounds on Zeckendorf Games”. In: arXiv preprint 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.