Romila Gargeshwari

San Francisco, CA and Madison, WI | (510)-449-1491 | romilagargeshwari@gmail.com

Education

University of Wisconsin - Madison

M.S. in Quantum Computing — Sep 2026 - Expected Aug 2027

B.S. in Physics and Mathematics — Sep 2022 - Dec 2025

Relevant Coursework: Intro to Quantum Computing (in progress), Qubit Tune-Up and Programming (in progress), Quantum Physics I–II, Numerical Linear Algebra, Applied Analysis I–II, Probability Theory, Analysis of PDEs

Research Experience

Graduate Researcher, **UW-Madison Yavuz Lab Research Group** — Sep 2026 – Present

Supervisor: Prof. Deniz Yavuz

- Building numerical simulations in Python using a Hamiltonian model of collective spontaneous emission in laser-cooled rubidium atoms
- Comparing simulation results with experimental findings reported in previously published research papers

Undergraduate Researcher, **UW-Madison Neutrino Physics Research Group** — Sep 2023 – May 2026

Supervisor: Prof. Brian Rebel

A Search for CPT and Lorentz Invariance Violations using Neutrinos at NOvA Near Detector

Jan 2025 – May 2026

- Applied FFT-based methods and a Rayleigh distribution model to investigate constraints on Standard Model Extension framework coefficients through sidereal modulations in the NOvA neutrino-event rate (Jan 2025 – May 2025)
- Designed a Python data-matching framework for event–spill matching, including their corresponding proton-on-target calculations and local sidereal phases (June 2025 – Aug 2025)
- Investigated persistent data mismatches using the event–spill matching framework and improved the framework to correct for these anomalies (Sep 2025 – May 2026)

Energy Estimation for Neutral-Current Selected Events at NOvA Near Detector

Jan 2024 – Dec 2024

- Improved an existing bias-correction method using C++ and ROOT fitting, reducing systematic biases in reconstructed neutrino energies (Jan 2024 – May 2024)
- Authored a formal technical note documenting the refined bias-correction methodology and demonstrating its effectiveness (June 2024 – Dec 2024)

- Presented research findings at three NOvA Collaboration Meetings (Aug. 2024, Jun. 2025, Nov. 2025)

Technical Experience

PsiQuantum Hackathon | Quantum Simulation Project, **UW-Madison** — Oct 1-2, 2026

- Implemented and compared first-, second-, and fourth-order Trotterization methods in Python using a model Hamiltonian to quantify the trade-off between quantum resource requirements and simulation accuracy, motivated by a research paper on X-ray absorption spectroscopy

DUNE Detector Production Assistant, **Physical Sciences Lab (PSL)** — Jan 2025 – Dec 2025

Supervisors: Prof. Brian Rebel, Pam Marr-Laundrie, Mary Severson

- Conducted quality control testing of G-Bias Boards and Charge Readout (CR) Boards via visual inspection and automated electronic testing
- Laser-marked G-Bias Boards and CR Boards to ensure traceability throughout production

Technical Skills

- **Programming & Software:** Python (NumPy, SciPy), C++, ROOT, MATLAB, GitHub
- **Computational Methods:** Numerical simulation, numerical linear algebra, FFT analysis, statistical fitting, data-matching algorithms