Zahin Ritee

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EDUCATION

Columbia University, *New York City, NY* **Sep '25 - May '26**
M.S. in Mechanical Engineering
Scholarships: GEM Scholarship

Columbia University, *New York City, NY* **Sep '23 - May '25**
B.S. in Mechanical Engineering- Magna Cum Laude (4.104)
Scholarships: Barry Gold Water Scholarship '23, Class of 1990 Scholarship '22-'23, $82.661K Columbia Grant

Adelphi University, *Garden City, NY* **Aug '20 - May '25**
B.S. in Physics- Summa Cum Laude (4.00)
Scholarships: $112K Presidential Scholarship, Dr. Edward Burke Award, Omicron Delta Kappa Emerging Leader, Physics Honor Society Inductee, Dean's Student Circle

WORK EXPERIENCE

Fire Safety Research Institute, UL, MD, *Mechanical Engineering Intern & GEM fellow* **Jun '25 - Aug '25**
- Implemented TDLAS in CAPA exhaust to measure water vapor in real time, using Python for data analysis and LabVIEW for laser and optical fiber control.
- Designed in Autodesk Inventor, integrated lasers and performed precision optical alignment.

Mechanical Engineering Lab I-II, Columbia University, NY, *Teaching Assistant III* **Sep '24 - May '25**
- Set up and instructed weekly labs, graded lab reports and quizzes in SpeedGrader for 77 students.

Brookhaven National Laboratory, NY, *Summer Student intern* **Jun '22 - Jul '22**
- Completed training in Quantum Computing through the Virtual Co-Design Center for Quantum Advantage.

RESEARCH EXPERIENCE

Nonlinear Controls, Columbia University, NY, *Robotics and Controls* **Sep '25 - Present**
- Developing speech-based command control with NLP, enabling the robot to autonomously execute actions using spatial orientation for accurate movement and positioning.

IRES, University at Albany, SUNY, NY, *Environmental Engineering* **Jun '24 - Jul '24**
- Analyzed and reported on air pollution in Dhaka using CPC, BC, and Purple Air sensors, quantifying UFP, BC, and PM2.5 levels in indoor and outdoor environments to support urban air quality research.

Newman Lab, Cornell University, NY, *Condensed Matter Physics* **Jun '23 - Aug '23**
- Conducted DFT calculations on Rb_3Sb and GaAs using Cornell HPC cluster.
- Assessed potential of Rb_3Sb as a source of spin-polarized photoelectrons.

Non-Linear Optics, Adelphi University, NY, *Super-Resolution Nonlinear Optics* **Oct '21 - May '23**
- Aligned multi-beam optical setup for quantum dot interference.
- Configured Spatial Light Modulator as diffraction mask to obtain super resolution in optical lithography.

Physics Department, Adelphi University, NY, *Theoretical Optical Physics* **Jul '22 - May '23**
- Simulated optical beams with one-dimensional Fourier spectra (ODFS) using MATLAB.
- Reduced numerical error from 28% to 19% using arc length-weighting method.

ENGINEERING PROJECTS

Senior Design Project – Space Robot, Columbia University, NY **Sep '24 - May '25**
- Designed and simulated a modular block–based construction robot in SolidWorks, performing FEA, motion studies, and Fusion 360 CAM for manufacturability.
- Fabricated components using CNC machining (Tormach, Fryer Mill, Lathe), 3D printing, laser cutting, and water jetting to assemble and test the robot.
- Conducted tensile testing and performance analysis to validate structural integrity and system scalability.

Machine Design Project – Linkage Mechanism, Columbia University, NY **Sep '24 - Dec '24**
- Led kinematic planning, 3D modeling, and linkage design in SolidWorks; performed motor analysis for selection, Fusion 360 CAM for toolpaths, and manufactured components using 3D printing and water jetting.
- Programmed and controlled the system in C++ with a PID controller, integrating wiring, sensors, signal processing, transmission design, and actuation tuning for optimized performance.

SKILLS

- **Programming, Design & Simulation:** MATLAB, Python, C++, LabVIEW, SolidWorks, Fusion 360, Autodesk Inventor, FEA.
- **Manufacturing & Fabrication:** CNC Machining (Tormach, Fryer Mill, Lathe, Drill Press, Band Saw), 3D Printing, Laser Cutting, Water Jetting.