(+1) 908-421-1543
aniket4@illinois.edu
aniketdeshpande.com

Aniket Deshpande

Education

University Of Illinois, Urbana-Champaign — Urbana, IL

B.S. Physics, Specialization in Mathematical Physics — 2023 - 2026 *(expected)*

- *Relevant Coursework:* Machine Learning Theory, Numerical Analysis, Stochastic Processes, Statistics & Probability I & II, Data Structures & Algorithms, Real Analysis, Quantum Information Theory, Quantum Mechanics I, Electromagnetism I, Classical Mechanics I & II, Special Relativity & Mathematical Methods, Differential Equations, Abstract Linear Algebra
- *Research Interests*: Tensor methods for quantum information, stochastic processes for mathematical finance, physics-informed machine learning & numerical analysis.
- Minors in Mathematics and Scientific Computing

Projects

Quantum Circuit Volume for Graph Models — *08.2024 - 12.2024*

- Developed quantum circuit methods to simulate graph channels, optimizing simulation cost and complexity analysis for quantum walks in the birth-death process.
- Constructed lower and upper bounds of $\mathcal{O}(\sqrt{n})$ and $\mathcal{O}(n)$, respectively, for simulation length of a quantum random walk on a birth-death process.
- Poster developed with the *Illinois Mathematics Lab* available on website.

Research

Computation & Neurodynamics Lab | Urbana, IL — 01.2025 - Present

- Researching stochastic modeling techniques for kinetic schemes and learning with calcium and NMDA receptors.
- PI: Dr. Matthew Singh

Lab for Numerical Parallel Algorithms | Urbana, IL — 09.2024 - Present

- Performing research in quantum complexity and quantum Monte Carlo methods for tensor networks.
- PI: Dr. Edgar Solomonik

Polymer Physics Theory Group | Urbana, IL — 08.2024 - 01.2025

- Performed computational simulations of free-draining bottle brush polymers with explicit side-chains using a coarse-grain model
- Refactored and improved coarse-grain model using stochastic differential equations and brownian motion results. Implemented the model in `C`.
- Visualized relationships between various physical attributes of the bottle brush polymers in `Python`.

Industry

Space Dynamics Laboratory | Albuquerque, NM — 05.2024 - 08.2024

- Developed a `Python` scraper to expedite the data collection of NICT ionograms to 600+ ionograms downloaded per hour.
- Researched numerical analysis methods to improve the noise reduction of ionograms using various filtering methods. Implemented filters in `Python` and `Julia` and ran statistical analysis (PSNR, MSE, SSIM) to compare efficiencies.
- Researched methods to improve automatic ionogram scalers using deep learning architecture (CNNs) and techniques.

Skills

Programming: Python, C/C++, Java, Julia, Mathematica

Libraries: Matplotlib, SciPy, NumPy, Pandas

Utilities: Anaconda, Git, Jupyter, Shell, LaTeX