Xingjian "Nicholas" Lyu

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Education

Harvard University   Cambridge, MA

A.B. Degree in Physics. GPA: 3.90/4.0. Expected May 2025

Selected coursework: Quantum Computation and Information, Computational Learning Theory, Theoretical Computer Science, Information Theory, Systems Programming, Compilers, General Relativity.

Undergraduate Research

Harvard University

Undergraduate Researcher   Oct 2023-Nov 2024

- Advisor: Kaifeng Bu. Both works undergoing review for publication.
- "[Fermionic Gaussian Testing and Non-Gaussian Measures via Convolution](#)", first author (Oct 8).
- "[Displaced Fermionic Gaussian States and their Classical Simulation](#)", first author (Nov 27).

Semeghini Lab in Applied Physics

Undergraduate researcher   April 2022 – Oct 2024

- Spearheaded the design and implementation of a [control system](#) for cutting-edge quantum computing systems, currently operational in Harvard's Yb-Rb and Atom Array II groups.
- Designed an acousto-optic modulator (AOM) double-pass system, using Toptica 399nm laser to empower 2D and 3D magneto-optical traps and Zeeman slowing for ytterbium atoms.
- Designed a micron-resolution length measurement apparatus using interference from a 1064nm laser, used to probe the critical optical path for precise control of atoms.
- Utilized COMSOL Multiphysics to simulate the compensation ability of electrodes, informing the final design to best minimize the Stark shift of atoms.

Extracurricular Activities

Mathematical Picture Language Seminar   Cambridge, United States

Volunteer   Sep 2023-Present

- Help organize [weekly seminars](#) and manage [YouTube channel](#) showcasing talks by renowned physicists and mathematicians like Michael Freedman, Seth Lloyd, and Steven Girvin.

Harvard University   Cambridge, United States

Teaching Assistant for *Physics 151: Mechanics*   Sep 2024-Present

- Host weekly office hours and foster community through organizing course dinners.

Kaggle   Cambridge, United States

[Competitions Master](#)   2019-2022

- Competition Master status, representing the top percentile of 200k participants in global machine learning challenges.

Technical Skills

Computational Libraries: COMSOL Multiphysics, National Instruments Library, PyTorch, JAX

Programming Languages: C++, OCaml, Rust, Python