**Xingjian “Nicholas” Lyu**

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**Education**

**Harvard University** Cambridge, MA

A.B. Degree in Physics. GPA: 3.89/4.0 . Expected May 2025

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

# Vocational experiences

**Jane Street** NYC, United States

Quantitative Research Intern(return offer) Jun-Aug 2024

* Full-stack development of the firm’s first deep-learning based weather model for commodity pricing.
* Applied differentiably enforced physical conservation laws to standard autoregressive models, addressing catastrophic rollout instability and suboptimal bias-variance tradeoff in autoregressive tasks.

# Technical Experiences

**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](https://arxiv.org/abs/2409.08180)”, first author (Oct 8).
* “[Displaced Fermionic Gaussian States and their Classical Simulation](http://arxiv.org/abs/2411.18517)”, first author (Nov 27).

**Semeghini Lab in Applied Physics**

Undergraduate researcher April 2022 – Oct 2024

* Spearheaded the design and implementation of a [control system](https://github.com/nlyu1/NI-experiment-control) 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.

**Kaggle** Cambridge, United States

[Competitions Master](https://www.kaggle.com/roguekk007) 2019-2022

* Top placement in Bengali.AI grapheme classification challenge (0.03 percentile), Google Landmark Recognition (2%), Rainforest species audio detection (2.5%), Steel defect detection (3.2%), among others.
* Competition Master status, representing the top percentile of 200k participants in global machine learning challenges in cutting-edge industrial and research problems.
* Google Open-Source Software Experts prize (Apr 2022): [Comprehensive JAX+TPU Intro](Comprehensive%20JAX+TPU%20Intro)

# Technical Skills

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

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