

## SUMMARY

Hi! I am a second-year undergraduate Engineering Physics student at the University of Toronto, with strong interests in quantum computing, quantum information, and machine learning. I am particularly interested in the integration of quantum hardware to accelerate classical machine learning models.

## SKILL

**Languages:** Java, Python, MATLAB, C/C++, R,  $\LaTeX$   
**Libraries:** Scipy, OpenCV, Pandas, Qiskit, Pytorch, Penny-Lane  
**Certificates:** IBM Basics of Quantum Information, Qiskit FallFest 2023, Laser Safety Training Certificate  
**Technologies:** COMSOL, CAD, Arduino, PCB Design, Power tools

## PUBLICATION & POSTER

1. Chen,H., Li,J.,(Nov. 30, 2023 - March 3, 2024) *Denoising CGI Renderings using Deep Learning*,CUCAI 2024 , Kingston , ON, 2024. [Conference Paper Link]
2. Li,J. Braverman,B.,(Aug 23, 2024) *Low-Noise, Vibration Minimized Optical Shutter Using DC Brushed Motor*, UNERD 2024, Toronto, ON, 2024. [Conference Poster Link]

## EXPERIENCE

### 2025.05 - Present | Quantum Information Research Intern

*Qian Lab, UofT*

- Generated hyperentangled photon pairs via SPDC in Germanium-doped periodically poled silica fiber.
- Performed photon coincidence measurements using SPCM-AQRH-FC-15 Avalanche Photon Detector.
- Implemented quantum state tomography in MATLAB on the hyperentangled photon pair.
- Designed a TTL pulse generator PCB using a monostable multivibrator to gate the photon detector.  
[Matlab / PCB / Fiber Optics]

### 2024.05 - 2025.05 | Quantum Optics Research Intern

*Braverman Lab, UofT*

- Simulated Hermite-Gaussian beam propagation through a spatial filter system.
- Optimized filter properties to achieve >95% HG0 mode fidelity.
- Modeled light propagation in disordered optical cavities using COMSOL.
- Trained a feedforward neural network to predict output wavelength from the disordered optical cavities with a mean squared error of 1.2nm.
- Designed a low-vibration mechanical optical shutter with 8 ms shutter period.  
[Scipy / COMSOL / Pytorch / PCB]

### 2024.09 - Present | UTMIST QuDiffuse Project Lead

*UTMIST, UofT*

- QuDiffuse: Applying the D-Wave quantum annealer to accelerate Denoising Diffusion Probabilistic Model(DDPM) training by employing RBM in Markov chain
- Achieved 10x training speedup on MNIST data set compared to classical DDPM.
- Awarded “Most Innovative Project” at UTMIST 2025 Showcase.  
[Pytorch / D-Wave]

### 2024.05 - Present | Research Supervisor - IYPT Canadian Physics Camp

*IYPT*

- Mentored Canada’s National Physics Team, resulting in two Bronze Medals at IYPT 2024 and 2025.
- Organized the national camp, developed experimental/theoretical guidelines, and delivered undergraduate-level lectures.  
[Matlab / COMSOL]

## AWARD & HONOR

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|---|------------------|
| • CQIQC Undergraduate Fellowship - \$10,000 research grant              | 2025.05          |
| • ESROP-UofT Recipient - \$7,000 research grant                         | 2024.05          |
| • Dean’s Honour List, Applied Science and Engineering UofT              | 2024.05          |
| • Silver Medal, Online International Young Physicist Tournament(O-IYPT) | 2022.07          |
| • 2 x International Top 20, Sir Isaac Newton’s Physics Exam             | 2022.04, 2023.04 |