

Dhruv Koul

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EDUCATION

MIT WPU

B.Sc. (Hons.) in Computational Physics
CGPA: 8.14

Pune, India
August 2022 – April 2026

Delhi Public School Bangalore North

Higher Secondary School
CGPA: 8.00

Bangalore, India
May 2021 – June 2022

TECHNICAL SKILLS

Quantum Tools: Qiskit, PennyLane, STIM, Crumble, Pymatching, Qism, TQEC

Languages: Python, C++, Fortran

ML/AI Frameworks: Scikit-learn, TensorFlow, Keras, BERT, LSTM

Development Tools: Git, Linux, VS Code, PyCharm

Other: AutoCAD, LaTeX

RESEARCH EXPERIENCE

Quantum Error Correction Research — IISER Bhopal

December 2024 – April 2026

Remote Research Associate under [Associate Prof. Dr. Ankur Raina](#)

Developing a comprehensive Python library for quantum error correction implementing encoding techniques, noise models (depolarizing, amplitude damping), and multiple decoding strategies (MWPM, union-find, belief propagation). Using STIM, Qiskit, PennyLane, and Pymatching for simulation framework. Responsibilities include API design, component integration, accuracy testing, and technical documentation with plans for open-source release.

CERTIFICATIONS

- Hands-on Quantum Computing Workshop at IISER Bhopal via NPTEL.
- IISER Kolkata: Quantum Error Correction
- Course on Artificial Intelligence.
- IBM: Practical Introduction to Quantum Safe Cryptography.
- IBM: Fundamentals of Quantum Algorithms.
- IBM: Variational Algorithm Design.
- IBM: Basics of Quantum Information.

ACADEMIC PROJECTS

• Simulation of Quantum Error Correction Codes

Conducted an in-depth study of quantum error correction techniques with simulations on surface codes using Python tools including Stim, Qiskit, and PennyLane. Modeled and compared decoding strategies such as Minimum Weight Perfect Matching (MWPM) to Union-Find algorithms.

- **Two-Month Certificate Course on Artificial Intelligence**

Completed a two-month certified course on Artificial Intelligence covering foundations in statistics to advanced deep learning models.

- **Hybrid Approach to Real-Time Sentiment Analysis Using Text and Audio Cues**

Developed a hybrid sentiment analysis pipeline that combines speech signals and text-based inputs for real-time emotion recognition. Integrated lexicon-based methods and deep learning models such as LSTM and BERT to analyze sentiments of English and Hinglish dialogue.

- **Study of Heat Dissipation through a Semiconductor device using Multiple Compositions of Thermal Paste**

Conducted an industry-collaborated project to test heat dissipation through semiconductor chips using uniquely formulated thermal paste compositions.

- **Python Coding for Plotting of Charge Density**

Developed a simulation to visualize electric potential and induced charge density from a point charge placed above a grounded conducting plane, using both analytical solutions and numerical simulations.

ACHIEVEMENTS AND EXTRACURRICULAR ACTIVITIES

- Attended Quantum India Bengaluru 2025 – Premier quantum technology summit featuring Nobel Laureates and leading researchers, gaining insights into cutting-edge developments in quantum computing, AI, and hardware.
- Vice President of the Science Exhibition Organizing Committee.
- Member of the Physics Podcast Writing Team.
- Won Bronze at the National Taekwondo Championship.
- Sports President at MIT WPU.
- Student Coordinator and Anchor for the Second International Conference on Current Trends in Physics and Photonics.