

Naman Goyal

mail.namangoyal@gmail.com | namangoyal.me | github.com/que-ravon | linkedin.com/in/namangoyal0 | Delhi, India

EDUCATION

Indian Institute of Technology Delhi

CGPA: 9.22/10, Department Rank 1

B.Tech. in Electrical Engineering and M.Tech. in Computer Science (Dual Degree)

Jul. 2024 – May 2029

- **Coursework:** Probability and Stochastic Processes, Discrete Mathematics, Linear Algebra, Microeconomics.

HONORS, AWARDS AND LEADERSHIP

- **International Mathematics Olympiad (IMO): Gold Medalist** at INMO and invited to the IMO Training Camp.
- **International Physics Olympiad (IPhO): Gold Medalist** at INPhO and invited to the IPhO selection camp.
- **Astronomy and Chemistry Olympiads: Gold** at INAO (**top 29**) and INChO (**top 35**); invited to both camps.
- **Informatics Olympiads: Rank 1** (perfect score) in a COCI round; USA Computing Olympiad **Platinum**.
- **Linguistics Olympiad:** Selected for round 2 of the **Panini Linguistics Olympiad (PLO)**.

EXPERIENCE

Virtu Financial

Singapore

Incoming Software Engineering Intern

May 2027 – Jul. 2027

CISPA Helmholtz Center for Information Security

Saarbrücken, Germany

Research Intern, Trusted Systems Group

May 2026 – Jul. 2026

- Designed a security taxonomy and hand-graded **131** open-source RISC-V processors, about 6,500 data points.
- Ran inter-rater reliability statistics with a second coder: Cohen's kappa **0.80** pooled, 0.59 mean per metric.
- Of 116 cores in scope, **97.4%** lack physical-attack defenses, **73.3%** lack secure boot; paper under submission.

PROJECTS

Quantum Algorithms Research: Minimum Weight Cycles

Quantum Computing, Graph Algorithms

- Gave a **quantum algorithm** for minimum weight cycle with a **polynomial speedup** over classical algorithms.
- Combined **quantum counting**, **quantum walks** and **Grover search** with extremal graph theory.
- Proved **lower bounds** with the quantum adversary method; showed triangles are strictly easier than cycles.

Physics-Informed Neural Network for Battery Health

Python, PyTorch, Machine Learning

- Built a **physics-informed neural network** (PINN) with Kolmogorov-Arnold layers to predict State of Health.
- Enforced degradation physics with an **augmented Lagrangian** loss for **constrained optimization**.
- Trained on **114,000** cycles from 140 cells: **1.17% mean absolute error**, R-squared 0.82 on held-out cycles.

QicQacQoe: Quantum Tic-Tac-Toe (MIT iQuHACK)

Python, Qiskit, Quantum Computing

- Built a quantum tic-tac-toe game on a **13-qubit** Qiskit circuit, with **superposition** and **entanglement** as moves.
- Implemented Hadamard, CNOT and **quantum teleportation** moves, with measurement collapsing the board.
- Made every game reproducible by replaying its gate history on the Qiskit Aer simulator.

Time-Travelling File System

C++, Data Structures

- Built a **Git-style version control system** in C++ with branching, snapshots and rollback to any version.
- Wrote a **hash map** from scratch: separate chaining, djb2 hashing and resizing that keeps node addresses stable.
- Wrote an **indexed binary heap** with a position map, so recent-file queries update in logarithmic time.

SKILLS

- **Mathematics:** Probability, Statistics, Markov Chains, Linear Algebra, Combinatorics, Optimization
- **Programming:** C++, Python, NumPy, PyTorch, Qiskit, MATLAB, SystemVerilog, Git, Linux