Tarun Kumar Allamsetty

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Education

- **Duke University** — Durham, NC
  M.S. in Electrical and Computer Engineering (Quantum Computing Track) — *Aug 2025 – Present*
  - **Scholarship**: Duke ECE Merit Award – $3,386 per semester for three full-time semesters.
- **College of Engineering Pune (Technological University)** — Pune, India
  B.Tech in Electronics and Telecommunication Engineering — *Aug 2018 – May 2022*

Professional Experience

- **ION Group** — Pune, India
  Software Engineer – Foundation & iCM Platform — *Jun 2022 – Jun 2025*
  - **Performance Optimization**: Reduced data-load time from 21 min to 7.5 sec using flame-graph profiling.
  - **Data Engine Design**: Developed in-memory calculation engine for availability and limit computations (FNMA).
  - **Rule-Based Frameworks**: Built filters and timezone handlers for scalable data classification and validation.
  - **Testing Infrastructure**: Implemented Cucumber test suite covering 92% of code with 1000+ scenarios.
  - **System Quality**: Delivered zero post-production bugs and implemented diagnostic logging for traceability.
  - **Leadership**: Led onboarding sessions on SOLID principles and clean code for three years in a row.
- **Securonix** — Pune, India
  Security Software Engineer Intern — *May 2021 – Aug 2021*
  - **Threat Detection Automation**: Developed Flask tool to transfer and process IOCs, improving detection speed.
  - **Backend Scripts**: Automated SQL and web-scraping tasks to optimize team operations and reporting.

Quantum Computing Projects & Open Source Contributions

- **PennyLane**: Enhanced testing framework by implementing `assert_equal` for detailed operator comparisons (PR #5780); implemented `QutritChannel` for qutrit noise models (PR #5793); improved shot-sampling efficiency with `shots.bins()` (PR #5476).
- **Amazon Braket Python SDK**: Resolved Issue #603 by handling conflicts between FreeParameter names and OpenQASM reserved keywords (PR #999).
- **Qiskit**: Contributed fix for Issue #12106 to address `synth_cnot_count_full_pmh` in linear reversible circuit synthesis.
- **Qbraid-QIR**: Reported missing Base Profile support in generated QIR (Issue #215); community subsequently implemented fix.
- **Quantum Tic Tac Toe**: Designed an educational game demonstrating superposition, entanglement and measurement; packaged with Docker and Streamlit for deployment. Source: GitHub.

Workshops & Certifications

- **IBM Quantum Challenge 2024**: Completed challenge problems on IBM Quantum hardware platforms.
- **Qiskit Global Summer School 2024**: Focused on quantum systems and algorithms.
- **QHack 2024**: Placed Top 100 in coding challenges.
- **UnitaryHack 2024**: Solved four open-source quantum bounties.
- **IBM Quantum Explorer Advanced Badge**: Achieved Advanced Badge status on IBM Quantum Explorer.

Scholarships

- **Duke ECE Merit Award**: Awarded $3,386 per semester for three semesters at Duke University.

Teaching & Mentorship Experience

- **ION Group**: Conducted onboarding for new undergraduate hires for three years; mentored team members in iCM Limits architecture.
- **DSAI Club, COEP**: Delivered technical sessions on machine learning research (Efficient Net paper and hyperparameter tuning).

Technical Skills

- **Languages:** Python, Java, SQL, C++
- **Quantum Tools:** Qiskit, PennyLane, Amazon Braket, Qbraid
- **Frameworks:** Flask, Streamlit, Docker, Angular
- **Concepts:** Quantum Noise Models, Circuit Synthesis, Performance Optimization, Test Automation

Research Interest

Interested in experimental quantum computer realizations, with emphasis on qubit control, stabilization and device calibration to advance scalable and reliable quantum hardware development [1].