GYANATEET DUTTA

Quantum Computing Researcher

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EDUCATION

Master of Science (MSc) - Computer Science & Artificial Intelligence
University of Leeds, UK | 2023 – 2024
Relevant coursework: Quantum Computing, Machine Learning, GPU Computing

Bachelor of Technology (B.Tech) - Electronics and Computer Science
Kalinga Institute of Industrial Technology (KIIT), India | 2019 – 2023 | **Grade: 8.61/10** *(First Class with Distinction)*

QUANTUM ERROR CORRECTION EXPERIENCE

Quantum Error Correction Research | *Personal Projects* | 2024 - Present

- **Surface Code Implementation**: Developed comprehensive surface code quantum error correction using Stim framework
- **Error Threshold Analysis**: Computed error thresholds and analyzed logical error rates for fault-tolerant quantum computation
- **Code Compilation**: Created software tools for compiling QEC circuits to different hardware specifications
- **Benchmarking**: Systematically evaluated QEC process performance across various code distances and noise models

Quantum Algorithm Implementation | *Research Projects* | 2022 - Present

- **Shor's Algorithm**: Implemented modular arithmetic circuits optimized for near-term quantum devices on Quantum Rings backend
- **Quantum Circuit Compilation**: Developed efficient circuit transpilation methods for multiple quantum hardware platforms
- **Hardware Integration**: Experience with Qiskit, PennyLane, and hardware-specific quantum programming frameworks

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TECHNICAL SKILLS

Scientific Python & Software Engineering

- **Python**: Expert-level proficiency in scientific computing (NumPy, SciPy, Matplotlib)
- **Quantum Programming**: Qiskit, PennyLane, Stim, Torch Quantum, CuQuantum
- **Software Testing**: Unit testing, integration testing, and continuous integration practices
- **Version Control**: Git, collaborative development workflows
- **Data Analysis**: Statistical analysis, experimental design, and results interpretation

Quantum Computing Platforms

- **Circuit Compilation**: Experience transpiling quantum circuits for IBM Quantum, Google Quantum AI, and Quantum Rings
- **Error Analysis**: Quantum noise modeling, error mitigation techniques, and performance benchmarking
- **Hardware Abstraction**: Multi-platform quantum algorithm deployment and optimization

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PROFESSIONAL EXPERIENCE

Research Intern | *University of Leeds* | Mar 2025 - Sep 2025

- Developing computer vision algorithms for real-time surgical phase detection
- Implementing Vision Transformers and self-supervised learning methods (DINOv2)
- Collaborative research environment with medical professionals and computer scientists

Research and Development Scientist | *Science Museum Group* | Nov 2023 - Present

- Leading 3D reconstruction projects using Structure-from-Motion algorithms
- Implementing Neural Radiance Fields (NeRF) for cultural heritage preservation
- Cross-functional team collaboration on VR integration projects

AWS AI & ML Scholar | *Amazon Web Services* | Jul 2022 - Jun 2023

- Developed reinforcement learning models using Proximal Policy Optimization
- Achieved top 15% performance in competitive ML challenges
- Experience with cloud-based machine learning deployment and scaling

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QUANTUM ACHIEVEMENTS

- 🥇 **1st Place Winner** - as "Quantum Bits" team | *Yale Quantum * 2025 *Quantum Rings* Challenge |
- **IBM Quantum Challenge 2024** - Completed advanced quantum algorithm challenges
- **Future Leaders in Quantum Hackathon 2025** - Selected participant

- **UK Quantum Hackathon 2025** - Selected by National Quantum Computing Centre
- **IBM Quantum Summer School 2024** - Advanced quantum algorithms and error correction

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RELEVANT PROJECTS

Quantum Continuous Thought Machine | *2024*

- Developed hybrid quantum-classical neural architecture with quantum memory components
- Implemented quantum synchronization layers for distributed quantum information processing
- Applied to classification and reinforcement learning tasks with demonstrated quantum advantage

Surface Code Error Correction Suite | *2024*

- Comprehensive implementation of surface code QEC using Stim framework
- Automated syndrome decoding and logical error rate analysis
- Benchmarking tools for comparing QEC performance across different code families

Multi-Platform Quantum Circuit Compiler | *2023-2024*

- Software tools for compiling quantum algorithms to various hardware backends
- Optimization strategies for different qubit connectivity graphs and gate sets
- Performance analysis across IBM Quantum, Google Quantum AI, and specialized hardware

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PUBLICATIONS

1. **"Solving The Travelling Salesmen Problem using HNN and HNN-SA algorithms"**
   arXiv:2202.13746 | 2022 | Demonstrates optimization algorithm development and analysis
2. **"Improved Pothole Detection Using YOLOv7 and ESRGAN"**
   arXiv:2401.08588 | 2024 | Shows experimental design and performance benchmarking skills

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CORE COMPETENCIES

Problem Solving: Proven track record in developing novel solutions for complex quantum computing challenges
Team Collaboration: Experience working in multidisciplinary research teams across academic and industry settings
Communication: Strong technical writing and presentation skills, demonstrated through publications and competition success
Experimental Design: Systematic approach to numerical experiments, statistical analysis, and result interpretation

Proactive Learning: Self-directed learning in emerging quantum technologies and rapid adaptation to new frameworks