

GYANATEET DUTTA

Master's Student in Computer Science & Artificial Intelligence

University of Leeds, United Kingdom

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EDUCATION

Master of Science - Computer Science & Artificial Intelligence

University of Leeds, UK | 2023-2024

Specializing in Machine Learning, Computer Graphics, GPU Computing, and Video Game Technology

Bachelor of Technology - Electronics and Computer Science

KIIT University, India | 2019-2023

Grade: 8.61/10 (First Class with Distinction)

QUANTUM COMPUTING EXPERIENCE

Quantum Algorithm Development & Competition Success

Yale Quantum Hackathon 2025 - 1st Place Winner ("Quantum Bits")

- **Developed generalized Shor's algorithm for quantum rings problem** to factor large integers
- **Implemented novel quantum factorization approach** extending classical Shor's algorithm to quantum ring structures
- **Led team project** demonstrating advanced understanding of quantum period-finding and modular arithmetic
- Collaborated through **Quantum Buddies organization** for quantum computing research and development

Quantum Machine Learning Research

Self-Directed Research | 2023-Present

- **Implemented Quantum Variational Autoencoders (QVAE)** trained on MNIST dataset using Qiskit
- **Developed Quantum Neural Networks** for IRIS classification problems
- **Created Quantum Diffusion Models and Quantum Transformers** using IBM Qiskit framework
- Built hybrid quantum-classical architectures for machine learning applications
- **GitHub Repository:** [Qiskit_on_Qubit](#) - comprehensive quantum ML implementations

Quantum Frameworks & Technical Skills

- **Expert proficiency in Qiskit** - IBM's quantum computing framework
 - **Quantum algorithm implementation:** Shor's algorithm variants, Grover's search, quantum teleportation
 - **Quantum circuit design and optimization** for NISQ devices
 - **Hybrid quantum-classical computing** approaches for practical applications
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PHYSICS-BASED DEEP LEARNING & PDE EXPERIENCE

Computational Fluid Dynamics with Machine Learning

Research & Implementation | 2022-Present

- **Extensive experience with Physics-Informed Neural Networks (PINNs)** for solving PDEs
- **Implemented neural solutions for Navier-Stokes equations** in computational fluid dynamics contexts
- **Developed ML approaches for Burgers' equations** and other nonlinear PDE systems
- **Applied physics-based deep learning** for aerospace and weather simulation applications
- **Research focus:** Integration of physical constraints into neural network architectures

Numerical Methods & Scientific Computing

- **Strong foundation in numerical solution of linear systems, ODEs, and PDEs**
 - Experience with finite volume methods (FVM) and finite difference schemes
 - **GPU-accelerated scientific computing** using CUDA Python and CUDA C++
 - **High-performance computing** for large-scale PDE solving and simulation
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PROFESSIONAL EXPERIENCE

Research Intern

University of Leeds | Mar 2025 – Sep 2025

- Developing computer vision methods for **real-time surgical phase detection**
- Applying **self-supervised learning (DINOv2) with Vision Transformers** for medical video analysis
- Investigating model robustness for clinical applications

Research and Development Scientist

Science Museum Group, Greater Leeds Area | Nov 2023 – Present

- Leading development of **computer vision pipelines for 3D reconstruction**

- Implementing **Structure-from-Motion (SfM) and Neural Radiance Fields (NeRF)**
- **Integrating AI models with Unreal Engine** for interactive VR environments
- **HELIX XR collaboration:** "Reconstructing Dalton Mills" cultural heritage preservation project

AWS AI & ML Scholar

Amazon Web Services (Remote) | Jul 2022 – Jun 2023

- Developed and optimized **Deep Racer model using Proximal Policy Optimization (PPO)**
 - **Achieved top 15% performance** in AWS Summit competition
 - Gained expertise in **reinforcement learning and production deployment**
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TECHNICAL SKILLS

Programming & Quantum Computing

- **Languages:** Python (Expert), C++, JAX, JavaScript, CUDA C++, CUDA Python
- **Quantum Frameworks:** Qiskit (Expert), PennyLane, Cirq
- **Scientific Computing:** NumPy, SciPy, SymPy, Matplotlib

Machine Learning & AI

- **Deep Learning:** PyTorch, TensorFlow, Keras, Hugging Face (Transformers, Diffusers)
- **Physics-Informed ML:** PINNs, Scientific Machine Learning, Neural ODEs
- **Computer Vision:** YOLO, ESRGAN, Vision Transformers, DINOv2
- **Specialized:** Quantum Machine Learning, Generative AI, Reinforcement Learning

High-Performance Computing

- **GPU Computing:** CUDA programming, mixed-precision training, gradient checkpointing
 - **Platforms:** AWS, Google Cloud Platform (TPUs), Linux environments
 - **Optimization:** Model quantization, distributed computing, parallel processing
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RESEARCH PUBLICATIONS

"Improved Pothole Detection Using YOLOv7 and ESRGAN"

arXiv:2401.08588 (2024)

- Enhanced object detection accuracy using **super-resolution GANs integrated with computer vision**
- Demonstrated novel approach to infrastructure monitoring using deep learning

"Solving The Travelling Salesman Problem using HNN and HNN-SA algorithms"

arXiv:2202.13746 (2022)

- Applied **Hopfield Neural Networks with Simulated Annealing** for optimization problems
 - Demonstrated expertise in **neural network optimization** and combinatorial problem solving
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KEY PROJECTS

Master's Thesis: Surgical Video Prediction

University of Leeds

- Developed **hybrid VAE-Transformer model** for future frame prediction
- Achieved **+2.36dB PSNR improvement** over baseline with efficient inference (28.13 PSNR @ 22 FPS)
- **Advanced model optimization:** FP16 precision, gradient checkpointing for real-time applications

8th Place - JAX Diffusers Global Competition

Hugging Face & Google Cloud | 2023

- Developed **ControlNet for anime-realism art generation** using JAX framework
- **Utilized Google Cloud TPU v4** for efficient training and inference
- Demonstrated proficiency in **cutting-edge generative AI** and distributed computing

B3tt3r: Enhanced 3D Reconstruction

Personal Research (GitHub: Ryukijano/B3tt3r)

- Explored novel **3D reconstruction techniques** combining Mast3r and Spann3r models
 - Focus on **improving reconstruction quality and robustness** for complex geometries
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AWARDS & ACHIEVEMENTS

- 🏆 **1st Place Winner** - Yale Quantum Hackathon 2025 ("Quantum Bits")
 - 🏆 **8th Place Finalist** - JAX Diffusers Community Event (Hugging Face & Google Cloud)
 - 🎓 **AWS AI & ML Scholar** (2022-2023)
 - 🏆 **Top 15% Performance** - AWS Deep Racer Summit Competition
 - 📜 **Deep Reinforcement Learning Certification** - Hugging Face (100% score)
 - 🏆 **NVIDIA CUDA Python Certification** - Fundamentals of Accelerated Computing
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AFFILIATIONS & COMMUNITY

- **Member:** Leeds Extended Reality (XR) Society | University of Leeds

- **Member:** Google Developer Student Club (GDSC) Leeds | University of Leeds
 - **Active Contributor:** Hugging Face Community (models, datasets, and spaces)
 - **Co-Founder:** Quantum Buddies - Quantum computing research organization
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RESEARCH INTERESTS

Core Focus for PsiQuantum Role:

- **Quantum algorithms for partial differential equations** and numerical methods
- **Physics-Informed Neural Networks** for scientific computing applications
- **Hybrid quantum-classical approaches** for computational fluid dynamics
- **Fault-tolerant quantum computing** applications in industrial settings
- **Quantum machine learning** for scientific simulations and modeling

Additional Interests:

- Geometric Deep Learning and Graph Neural Networks
- Neural Rendering and 3D Machine Learning
- Efficient Deep Learning and GPU optimization
- AI applications in healthcare and cultural heritage preservation