# Asish Kumar Mandoi

Associate Software Engineer, Citrix Systems Bachelor of Technology in Electrical Engineering Indian Institute of Technology Kanpur

	INTERESTS
	Quantum Computing, Optimization Theory, Neuromorphic Computing
	EXPERIENCES
Jul '23 – Present	<ul> <li>Associate Software Engineer, Citrix Systems</li> <li>Core Networking Team, NetScaler Business Unit, Bengaluru, India</li> <li>Contributed to the two most high-visibility projects for Citrix for the year 2023-24, Citrix Secure Private Access &amp; F5 to NetScaler Config Converter</li> <li>Developed PolicyGen AI, an LLM-based tool equipped with latest intelligent prompt optimizers (DSPy) to generate NetScaler policies from natural language prompts, and demonstrated its working</li> <li>Made security upgrades for authentication and privacy protocols in SNMPv3 used in NetScaler, by extending support to the latest standards</li> </ul>
Dec '21 – Apr '23	Research Associate. OResearch Project. OWorld
QWorld 2 GitHub 2	<ul> <li>Optimizing Logistics using Quantum Algorithms, Mentor: Dr. Paweł Gora</li> <li>Contributed to a working publication focused on various hybrid quantum-classical techniques to solve combinatorial optimization problems in logistics</li> <li>Validated theoretical results of 5 solvers of the Vehicle Routing Problem (VRP) by performing experiments for 550+ VRP instances on the D-Wave quantum annealers</li> <li>Devised a new solver for VRP with higher performance compared to existing solvers</li> <li>Co-mentored several interns in designing QUBO formulations for VRP</li> <li>Presented our work on Quantum Annealing based VRP formulations at IT conferences –</li> </ul>
	WDI 2022 ♂ and Data Science Summit 2022 ♂
Jan '23 – Mar '23	<ul> <li>Quantum Computing Analyst Intern, Unisys India</li> <li>Enterprise Computing Solutions Research &amp; Innovation Team</li> <li>Made valuable contributions to the development of a proof of concept-based prototype in collaboration with the D-Wave team to tackle large-scale Vehicle Routing</li> <li>Evaluated the commercial viability of the model by achieving near optimal solutions for datasets with over 1000 nodes in under 5 mins of runtime</li> </ul>
	PRESENTATIONS
Nov '22	A. Mandoi, "Quantum Annealing methods for solving the Vehicle Routing Problem." Talk presented at Data Science Summit 2022 🗸 , Warsaw, Poland.
Apr '22	S. Borah, A. Mandoi, A. Verma, "Heuristic QUBO Formulations for solving the Vehicle Routing Problem using Quantum Annealing." Talk presented at the 13th WDI '22 🖸 , Warsaw, Poland.
	SELECTED PROJECTS
Dec '22 – Jul '23 Report ⊠	<ul> <li>Hopfield Neural Networks for Combinatorial Optimization</li> <li>Thesis Project, Advisor: Prof. Shubham Sahay</li> <li>Studied the properties of annealing-inspired computing accelerators based on nonvolatile memory technology for combinatorial optimization with near-optimal accuracy and performance</li> <li>Achieved near-optimal solutions to 800+ node optimization problems by implementing Hopfield Neural Networks and applying various stochastic and weight annealing techniques</li> </ul>
Mar '23 – Apr '23	Quantum Logic Gate between a Solid State Quantum Bit and a Photon
Report ⊡	<ul> <li>Advisor: Prof. Shilpi Gupta, EE698Y (Quantum Optics)</li> <li>Demonstrated controlled-NOT gate behavior in a Quantum Dot (QD)-cavity system subjected to pump-probe lasers by solving the Lindblad Master Equation to obtain cavity reflection coefficient</li> <li>Reproduced the reflection spectrum by simulating a theoretical model of the QD-cavity system</li> <li>Presented the outcomes of the project to the class, elucidating the process, the conclusions, and the key ideas involved</li> </ul>

#### Mar '22 – Apr '22 Quantum Algorithms for Semidefinite Programming and its Applications

Report 🗗

- Advisor: Prof. Ketan Rajawat, EE609A (Convex Optimization in SP-COM)
  Studied Arora and Kale's classical algorithm based on Multiplicative Weights Update method for solving Semidefinite Programs (SDPs)
  - Compared the classical complexity and lower bounds with that of the quantum extension of SDP solvers and subsequent speed-ups
  - Investigated practical applications of quantum algorithms for solving SDPs like Quantum Error Recovery and Shadow Tomography

## **ACHIEVEMENTS & HONOURS**

#### Professional Achievements

#### 2024 Citrix Systems

Among top 20% employees to be awarded rating – 1 as a recognition of valuable contributions by employees throughout the year

#### Programming Achievements

#### 2022 HAQS, qBraid ☑

Won the qBraid Open Challenge and among the top 3 contenders in the QML Challenge

#### 2022 Quantum Excellence, Qiskit Global Summer School 2022, IBM

Badge C Among 1200 worldwide to complete the 2 week long Qiskit Global Summer School program with intensive hands-on labs focused on quantum simulations using NISQ hardware

#### 2021, 22 IBM Quantum Challenges

Badges ☑ Among 1000 worldwide to complete challenges of *fall 2021* and *spring 2022* by solving problems in areas of finance, fermionic chemistry, machine learning and optimization

### Scholastic Achievements

- 2019 All India Rank 3592 in JEE-Advanced out of 220,000+ shortlisted candidates
- 2019 All India Rank 7480 in JEE-Main out of 0.9 million+ candidates
- 2019 National Top 300 to be selected for Indian National Chemistry Olympiad, HBCSE
- 2017 All India Rank 322 in KVPY out of 50,000+ candidates and awarded KVPY Fellowship by Govt. of India, and IISc Bangalore

#### EDUCATION

- 2019 2023 Bachelor of Technology in Electrical Engineering, CPI: 7.5/10.0 Minor in Quantum Physics Indian Institute of Technology Kanpur, India
  - 2019 Grade XII (CBSE Board), Cumulative Percentage: 93.8% MBS Public School, Bhubaneswar, India
  - 2017 Grade X (CBSE Board), CGPA: 10.0/10.0 DAV Public School, Bhubaneswar, India

# TECHNICAL SKILLS

LanguagesC, C++, Python, Go, MATLAB, JavaScriptWebNode.js, HTML, CSS, PHP, MySQL, SQLite, RedisFrameworksQuTiP, TensorFlow, Qiskit, Ocean, DSPy (prompt optimizer for AI models)Utilities/ToolsGit, Docker, Kubernetes, Jenkins, Splunk, LTEX, Linux shell utilities

## RELEVANT COURSEWORK

Computer Science Quantum Computing, Data Structures and Algorithms, Fundamentals of Computing, Introduction to Machine Learning

- *Electrical Core* Quantum Optics, Semiconductor Devices, Digital Communication Networks, Convex Optimization in SP-COM, Digital Control, Digital Electronics, Microelectronics
- Maths & Physics Quantum Physics, Probability and Statistics, Partial Differential Equations, Complex Analysis