Shah Ishmam Mohtashim

C-1, Old Tower Bhaban, Fuller Road, University of Dhaka, Dhaka-1000, Bangladesh

(+880) 1740773515 | ✉ sishmam51@gmail.com | 🏠 ishmamshah.github.io/ | 🐙 IshmamShah | 💼 ishmam-mohtashim-77287685

Education

University of Dhaka   *Dhaka, Bangladesh*

B.S. in Chemistry   *2017 - 2022*

- Thesis: Quantum Chemical Computations of the Properties of Hydrogen, Oxygen and Water
- Minor in Physics and Mathematics

Publications

2022   **Qurzon: A Prototype for a Divide and Conquer Based Quantum Compiler**,   *SN Computer*
        10.1007/s42979-022-01207-9   *Science*

Preprints

2022   **Mathematical bridge between epidemiological and molecular data on cancer and**   *bioRxiv*
        beyond,   *2022.09.07.507053*

2021   **On The Variational Formulations For The Graph Isomorphism Problem**,   *arxiv:2111.09821*

2021   **Disordered Phase in Ising and Metastability in Cellular Potts Models Hint at Glassy**
        Dynamics,   *arXiv:2106.11298*

Projects

Network Analysis of Proteins

Functional Protein Research Group   *Ongoing*

- Proposed the research idea, transformed the proteins to network formulations; leading the group
- Residue Interaction Network, Gaussian Network Model and Anisotropic Network Model to predict protein active sites and dynamics.

Subspace Search Variational Quantum Eigensolver   *Project Link*

Pennylane Community Demos   *August 2021*

- Proposed the idea, helped program the algorithm

Variational Quantum Thermalizer for the Sherrington-Kirkpatrick model   *Blog post link*

Microsoft Challenge at the Quantum Coalition Hackathon 2022   *April 2022*

- Proposed the idea, helped program the algorithm and wrote the blog post

Hack the Q-Map: Guess the terrain of the quantum map   *Project link*

MIT iQuHACK 2022 x Microsoft x IonQ Challenge   *January 2022*

- Proposed the initial idea and outlined the quantum terrain generation procedure.

Diagonal Unitary Circuit Decomposer   *Project link*

Quantum Coalition Hack   *April 2021*

- Formulated and programmed a decomposer/transpiler that takes in diagonal unitary matrix and returns quantum gates.

QAOA Implementation for the weighted MaxCut problem

Personal Project   *2021*

- Implemented QAOA for weighted MAXCUT using Qiskit.

Nurse Scheduling Problem using Discrete Quadratic Model   *Project link*

MIT QUANTUM HACKATHON   *January 2021*

- Implemented DQM of the NSP problem using DWave's Hybrid Solvers.
- Met the obligatory hard nurse and hard shift constraint.

Solving 1D advection equation using classical and quantum algorithm

QUANTUM WINTER HACKATHON   *2020*

- Formulated the discretizion of the wave equation using finite difference method.
- Tested the HHL and VQLS algorithm to solve the PDE of advection equation.

Honors & Awards

2021	**Top 20**, Qiskit Hackathon Europe: Research Study Group	
2021	**Advanced Badge**, IBM Quantum Challenge - Fall 2021	
2021	**Advanced Badge**, IBM Quantum Challenge Africa 2021	
2021	**Advanced Badge**, IBM Quantum Challenge 2021	
2020	**Advanced Badge**, IBM Quantum Challenge -FALL 2020	
2020	**Special Mention- Top 10** , Quantum Winter Hackathon	
2018	**National Finalist (top 12),** Famelab	*Bangladesh*
2016	**Runners Up, National Round, Invited to attend National Camp**, Bangladesh, Biology Olympiad 2016	*Bangladesh*
2015	2nd **Runners Up, National Round, Invited to attend National Camp**, Bangladesh, Biology Olympiad 2015	*Bangladesh*
2015	**Top 10, National Round**, Bangladesh Astronomy Olympiad 2015	*Bangladesh*

Talks

Warsaw IT Days 2022

APPROXIMATED APPROACHES TO THE VEHICLE ROUTING PROBLEM ON NISQ DEVICES BY CLASSICAL PREPROCESSING   *April 2022*

IEEE EDS Dhaka University Chapter: Workshop on Quantum Computing

INTRODUCTION TO QUANTUM COMPUTING AND QUANTUM INFORMATION THEORY   *January 2022*

Qoffee O'clock, Qindia, YouTube

DETECTION OF GLASSY DYNAMICS USING QUANTUM COMPUTER   *July 2021*

Community Service

Banglai Quantum Computing

MEMBER   *2020-Ongoing*

- Quantum Computing Community Building amongst Bengali Speaking People
- Helped organize bi-weekly discussion sessions on Saturdays