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RUPAYAN BHATTACHARJEE

PURPOSE

4th year integrated BS-MS student pursuing Physics. Passionate about research in Quantum Computing. Well versed in C++ and Python. Experienced in Qiskit SDK. Capable of learning complicated and math-intense topics in little time. Experience in Applied Scientific Research. Taken courses on various topics of Quantum Information Science including Quantum Computing and Quantum Programming. Participated in QML Summer School, Hackathons and Events(Qiskit). Extremely eager to apply these skills to carry out both fundamental and applied research in Quantum Computing/Information Science and Quantum Technologies, including topics in theoretical, experimental as well as computational domains.

SKILLS

Quantum Computing, **Quantum Machine Learning**(Basic), **Python**, **Qiskit SDK**, **C++**, **LATEX**, **Jupyter Notebooks**, **Anaconda**, **Applied Scientific Research.**

EXPERIENCE

Indian Association for the Cultivation of Science, Kolkata — *Master's Thesis*

MAR 2022 - ONGOING

- "Dynamics and Relaxation of Charge Carriers in Ionic Conductors" under Prof. Aswini Ghosh

Wigner Research Center for Physics, Budapest — *Research Internship*

MAR 2022 - ONGOING

- Measurement based quantum protocols for entanglement manipulation and measurement induced chaos in quantum states.

Imperial College London — *Internship*

JUL 2022 - ONGOING

- Quantum Simulation of antigen and molecular drug binding reactions.

UCLQ Quantum Tech Summer School, University College London (UCL) — *Summer School*

JUL 2022

- Quantum Mechanics, Quantum Gates, Algorithms and basics of Quantum Error Correction, Quantum Hardwares, Quantum Communication.(Theoretical)
- LABS : Cleanroom Fabrication, Coulomb Blockade (Characterization of silicon transistors with single electron at 4K), Quantum Devices Lab, Quantum Optical Communication and Quantum-enhanced measurements and detection in Biomedical Nanoscience lab.

Qkrishi — *Internship*

MAY 2022 – JUL 2022

- Developing Quantum Algorithms for Portfolio Optimization

Faculty of Computing, University of Latvia and QWorld — *QCourse511 Graduate Project on Quantum Programming*

DEC 2021 – JAN 2022

- Create educational Jupyter notebooks for teaching **Quantum Machine Learning** covering all the broad principles of ML using quantum computation as well as specific algorithms in QML, primarily feature spaces and Kernel methods in the QSVM architecture under a supervised setting.

Indian Association for the Cultivation of Science, Kolkata — *Project Student*

NOV 2021 – FEB 2022

- (Experimental Project) Chemical synthesis of g-C3N4 nanosheets and analysis of optoelectronic properties.
- (Theory Project) Instabilities in theories with Lagrangians with higher-order time derivative dependence and possible resolutions.

Indian Association for the Cultivation of Science, Kolkata — *Project Student*

NOV 2021 – FEB 2022

- (Experimental Project) Chemical synthesis of g-C3N4 nanosheets and analysis of optoelectronic properties.
- (Theory Project) Instabilities in theories with Lagrangians with higher-order time derivative dependence and possible resolutions.

Qiskit Global Summer School: Quantum Machine Learning — *Summer School(Certificate of Quantum Excellence, 100/100)*

JUL 2021 – JUL 2021

- Completed the two-week intensive course provided by IBM Quantum, completing all graded lab work assignments with a final cumulative score above 75%, demonstrating applied understanding and comfort with and about **Quantum Computing** and **Quantum Machine Learning** using **Qiskit**.
- Topics: **Quantum Gates and Circuits**, **Basic Quantum Algorithms**, **Quantum Approximate Optimization Algorithm(QAOA) and Applications**, **Variational Quantum Circuits**, **Classical Machine Learning**, **Quantum Feature Spaces and Kernel Methods** (VQC and QKE), **Quantum Kernels and Support Vector Machines**, **Quantum Models and Applications**(including Quantum NNs and Quantum CNNs), **Training Quantum Circuits**, **Barren Plateaus and Trainability Issues**, **Quantum Hardware**, **Hardware Efficient Ansatze for Quantum Machine Learning**.

Inter-University Accelerator Center, New Delhi — *Summer Intern*

JUN 2020 – JUN 2020

- Studied transverse beam optics in particle accelerator lattices made of components such as quadrupoles, dipole bending magnets and drift tubes.
- Studied transverse beam dynamics in achromatic bends.
- Simulated ion beams in achromatic bends using LANA(software).
- Designed achromatic bends through simulation tools using beam parameters and accelerator parameters for the High-Current Injector(HCI) facility under construction at the Inter-university Accelerator Center.

EDUCATION

Indian Association for the Cultivation of Science, Kolkata — *Integrated BS-MS(Physics)*

AUG 2018 – 2023(ONGOING)

- Completed coursework on interdisciplinary topics from Physics, Chemistry, Mathematics, Computer Science and Biology during the first three semesters.
- Currently in the 4th year, taking Graduate level courses in the School of Physical Sciences with a major in Physics.

The Coding School (Qubit by Qubit) — *Quantum Computing*

OCT 2020 – JUN 2021

Introduction to Quantum Computing. Programming Quantum Computers using **Qiskit (IBM Quantum Experience Platform)**

Kendriya Vidyalaya, Silchar — *12th(HS)*

MAY 2016 – MAY 2018

Percentage: 95.2%

1st position from science stream in school. 4th rank from science stream in the region(among all kendriya Vidyalaya Schools).

Subjects: English, Mathematics, Physics, Chemistry, Computer Science(with C++)

Kendriya Vidyalaya, Silchar — *10th(HS)*

2006 – 2018

CGPA: 10/10

Subjects: English, Mathematics, Science, Social Sciences, Sanskrit(Language).

RELEVANT COURSES/CERTIFICATIONS

Courses: **Introduction to Quantum Computing: Quantum Algorithms and Qiskit** (IIT Madras, IBM), **Quantum Mechanics**, **Advanced Quantum Mechanics**, **Graduate Course on Quantum Computing and Programming**, **Computer Science with C++**, **Numerical Methods**(C++), **Advanced Quantum Mechanics**, **Advanced Statistical Mechanics**, **Atomic and Molecular and Optical Physics**, **Solid State Physics**, **Light-Matter Interactions**, **Quantum Liquids**.

Licenses and Certifications: **2021 Qiskit Global Summer School on Quantum Machine Learning (Certificate of Quantum Excellence) – IBM(ID34_509000).** QWorld Global Quantum Programming Workshop Diploma – QWorld. Computation in Complex Systems – Santa Fe Institute. **IBM Quantum Challenge Africa 2021 Achievement – IBM. IBM Quantum Challenge – Fall 2021 – Advanced.**

AWARDS AND HONORS

DST INSPIRE Scholarship for Higher Education – **Department of Science and Technology, Govt. of India.** DST-INSPIRE Scholarship for Higher Education is provided by the DST, GoI

every year to the top 1% students graduating 10+2 for pursuing a career in the basic sciences and taking up research internships.

IACS Institute Fellowship for **Masters Studies from Indian Association for the Cultivation of Science, Kolkata.**It is given to Masters-level students upon fulfillment of "good" academic performance in Bachelors and throughout the BS-MS program.