Dhruva Sambrani

Curriculum Vitae

DhruvaSambrani | dhruvasambrani19@gmail.com | Dhruva Sambrani
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Educational Qualifications

Indian Certificate of Secondary Examination | 2016 | Prakriya Green Wisdom School

90%

Pre Univercity Examination | 2018 | Primus Public School

88%

BS-MS | 2018-2023 | IISER Mohali

CPI: 9.01
Major: Physics
Minor: Science

Relevant Elective Courses | 2018-2023 | IISER Mohali

- Quantum Computing and Quantum Information
- Random Processes
- Non Linear Dynamics
- Modelling Complex Systems
- Network Science
- Theory of Computation
- Machine Learning and Data Science

Academic Endeavours and Conferences

NSSP 2022 | IAPT, Bangalore | Dec 2022

Selected to give a talk on Quantum Walks and Resetting in NSSP 2022. Work will be published in Student's Journal of Physics.

Qiskit Global Summer School | Qiskit | 2022

Participated and completed the QGSS-22 which focussed on Quantum and Classical algorithms to simulate chemical systems.
QGSS Certificate. Credly Certificate

QUANT22 | MPI-PKS Dresden | 2022

Four-day school for master students providing an introduction to the fast-moving field of quantum matter, focusing on many-body systems ranging from exotic states of matter to quantum computers

Vijyoshi Camp | KVPY-IISc | 2017

Attended the Vijyoshi camp in December 2017 against KVPY SA

KVPY | IISc | 2016-18

Qualified KVPY SA(2016), SX(2017), SB(2018) with a rank of 600, 1118 and 24 respectively and hold a KVPY Fellowship.

Research and Work Experience - Discovering the World

Quantum Intern | BQP | May-Nov 2022

Interned at BosonQ Psi in the Quantum team where I proposed and built methods to solve problems of interest as part of a multiskilled team. Projects I was involved in were related to Feynman-Kac equation, Quantum Monte Carlo methods and Complexity analysis. Initially 3 month internship extended to 5 months

Quantum Walks and Resetting | MN Bera | Master Thesis, Aug 2022-May 2023

After studying about quantum walks and search algorithms, I reformulated quantum resetting for walks. We apply a superposition of the evolve and the reset mechanisms and explore the resulting dynamics of the system. Primarily, we are interested in increase mean first hit time, speeding up related algorithms which depend on Quantum Walks.

Quantum Resetting of Quantum Systems | MN Bera | May-July 2021

Building on multiple works on Stochastic Resetting of Classical Systems and on Quantum Systems, and implementing a novel quantum resetting. We explored the dynamics, dependance on initial conditions, and time to steady state.

RLNN for Quantum Multiple Hypothesis Testing | Sarah Brandsen | Oct-Nov 2020

Studied RLNN is used for Quantum Multiple Hypothesis Testing. Project involved learning about RLNN and I helped optimize certain parts of the code for the suggested algorithm.

Ordering Channels | Sarah Brandsen | Dec 2020-Jan 2021

An attempt to partial ordering of quantum channels by concepts of Data Driven Inferences. We define an order over the set of positive, trace preserving maps on the existence of another map which when applied would lead to equivalence. Based on Buschemi et. al. and Dall'Arno et. al.

Introduction to Quantum Mechanics and Computing | Arvind | May-July 2019

Studied Mathematical Structures that underlie Quantum Mechanics and a theoretical introduction to QCQI. Also attempted to simulate a Quantum Computer on a Classical computer and making a Julia module for the same. Report also serves as documentation of the code in the form while publishing.

Relativistic Black Body Radiation | JS Bagla | Dec 2018

I studied Black body radiation in special relativistic frames under JS Bagla, IISER Mohali, where I looked at how Black Body Radiation transforms in a frame that is moving uniformly with respect to the source. The quantitative analysis of the force due to non uniform radiation is done using numerical methods in Julia.

Programming - Reinventing The World

Modelling Complex Systems | Julia | 2021

As part of a course, I have learnt multiple models often used in the field and explored quite a bit in the following repository

QuantumComputing.jl | Julia | Package

An attempt to simulate a Quantum Computer and making a Julia module for the same. The associated paper also acts as the documentation

Coursera Courses | Python | Coursera

Completed the course Simulation and modeling of natural processes offered by Geneva University. Received Certificate with a grade of 95.31%
Completed the Specialization Introduction to Discrete Mathematics for Computer Science offered by National Research University Higher School of Economics & University of California San Diego. See Certification

PlutoReport.jl | 10.5281/zenodo.7378474 | Pluto Package

A Julia package to make better reports and talks in Pluto Notebooks, especially with citation support, presentation mode with controls and timing, and planned integration with bibliography managers.

Github Profile | Multiple Languages | Others

Do visit my GitHub profile to see my other projects in a multitude of languages and fields!

Extra-Curricular Activities

Data All The Way

Contributed in translating R code to Julia code on the info-blog Data All The Way. The blog aims to have Data science tutorials and how-tos, with associated code.

Convener, Turing Club | IISER-M | 2019-21

Convener of the Turing Club of IISER Mohali in the academic year of 2019-20, and the interim Convener for 2020-21