Curriculum Vitae

Dhruva Sambrani

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Educational Qualifications

BS-MS | 2018-2023 | IISER M

CPI: 9.39
SPI (Sem 1): 9.8
SPI (Sem 2): 9.8
SPI (Sem 3): 8.8
SPI (Sem 4): 9.4
SPI (Sem 5): 8.1
SPI (Sem 6): 8.9
SPI (Sem 7): 9.0

12th Grade | 2018 | Primus

Physics: 99
Math: 94
Chemistry: 95

10th Grade | 2016 | Prakriya

Science: 94
Math: 95

Programming - Reinventing The World

IISER-M App | Android | Firebase

I started making the Unofficial IISER-M app for Android in the Summer of 2019. With 200+ downloads, it remains in constant development with new features being added every 6 Months

QuantumComputing.jl | Julia

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

Simulation and Modelling | Python | Coursera

Completed the course Simulation and modeling of natural processes offered by Geneva University. Received Certificate with a grade of 95.31%

Discrete Math for CS (Specialization) | Python | Coursera

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
Courses Completed:

Mathematical Thinking in Computer Science
Introduction to Graph Theory
Combinatorics and Probability
Delivery Problem
Number Theory and Cryptography

Modelling Complex Systems | Julia

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

Minivet Birding App | Android | SQL

I contributed in making the Minivet Birding App under Dr. Manjari Jain's Behavior and Ecology Lab, IISER-M. Minivet is an app developed to assist both budding and experienced birders.

Functional Programming | Scala | Coursera

Completed the course Functional Programming Principles in Scala offered by Geneva University. Received Certificate with a grade of 96.00%

Github Profile | Multiple Languages

Do visit my GitHub profile to see my other projects in a multitude of languages and fields! Link at the bottom of the page

Research Experience - Discovering the World

Relativistic Black Body Radiation | JS Bagla | Winter 2018

As part of my First Year Winter Project, I took up the project 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. We see that the radiation is no more uniform, leading to a force on the particle. The quantitative analysis of this force is done using numerical methods in Julia.

Ordering Channels | Sarah Brandsen | Winter 2020

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. [New J. Phys. 21 113029] and Dall'Arno et. al. [Proc. R. Soc. A.47320160721]. Left incomplete due to Pandemic and restart of semester.

Quantum Resetting of Quantum Systems | Manabendra Nath Bera | Summer 2021

An ongoing project building on multiple works on Stochastic Resetting of Classical Systems [arXiv:2107.11686] and on Quantum Systems [arXiv:2008.00510.pdf; Phys. Rev. B 98, 104309], and extending Anubhav Srivastava's Master's Thesis [2021, IISER Mohali], we apply a superposition of the evolve and the reset mechanisms and explore the resulting dynamics of the system. We see that for numerical examples, the convergence rate is faster and much closer to the reset location than in stochastic resetting. We want to extend this faster convergence to potentially speed up Quantum Walks [ISBN:978-3-319-97812-3], speeding up multiple algorithms which depend on Quantum Walks. Further, stochastic resetting can also model certain biological and economical processes which may be better explained by Quantum Resetting.

Introduction to Quantum Mechanics and Computing | Arvind | Summer 2019

My First Year Summer Project was an introductory reading to the Mathematical Structures that underlie Quantum Mechanics and then take it forward to a theoretical introduction to Quantum Information and Quantum Computing. I also attempt to simulate a Quantum Computer on a Classical computer and making a Julia module for the same.

This paper serves as a very brief introduction to Quantum Computing and documentation of the code in the form while publishing.

RLNN for Quantum Multiple Hypothesis Testing | Sarah Brandsen | Summer 2020

Optimized certain parts of the code for the algorithm suggested in the paper. Project stopped due to non-continuation of project from guide.

Superpositioned Grover's Algorithm | Manabendra Nath Bera | Summer 2021

In a similar vein to Quantum Resetting, this is an ongoing project to speed up the Grover's Search problem by applying a superposition of the Oracle and the Unitary.

Academic Achievements

KVPY | 600 | 1118 | 24

Qualified KVPY SA, SX, SB with a rank of 600, 1118 and 24 respectively and hold a KVPY Fellowship

Vijyoshi Camp | 2017

Attended the Vijyoshi camp in December 2017 against KVPY SA

Mimamsa Center toppers | IISER Pune | 2019

My team was the centre topper in Mimamsa 2019, a Science quiz conducted by IISER-P.

Extra-Curricular Activities

Teaching Underprivileged Children | 2016

As a way to give back to the community, I taught underprivileged children English and Mathematics for two weeks in my school in 2016. The group involved two children, both of whom had learning disorders.

Photography

I also occasionally dabble in photography, though I don't consider myself to be very good at it . Visit my Photography Page for a peek at some of my photos!

Blog

I've started a new blog, lets see how it goes!

Convener, Turing Club | IISER-M | 2019-20

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

Coding and Programming

I am an avid programmer and know multiple languages. Visit the Programming Section of this website