

# Dhruva Sambrani

## Curriculum Vitae

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

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### BS-MS | 2018-2023 | IISER Mohali

CPI: 9.01

Major: Physics

Minor: Data Science

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

Masters Thesis: Quantum Resetting of Walks. [Online Version](#)

### Pre University Examination | 2018 | Primus Public School

88%

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

90%

## Academic Endeavours and Conferences

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### 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

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### 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**

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### **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

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### **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