

## Education

### Emory University

Masters in Physics | [Laney Graduate School Scholar](#)

August 2019-July 2021

**Teaching Assistant:** Intro to Physics (PHYS 141, PHYS 142)

**Coursework:** Machine Learning, Quantum Computation, Quantum Physics, Mathematical Physics, Electrodynamics, Statistical Physics, Classical Mechanics, Nanophotonics

### Netaji Subhas Institute of Technology, Delhi

Bachelors in Engineering, Electronics and Communications | Merit Scholar, I Division

August 2013-June 2017

**Undergrad Research:** Designed next generation of SRAMs with replacement of CMOS with RTDs. [\[Publication\]](#)

Ranked in **Top 0.1% in JEE Mains** out of 1.3 million candidates. Ranked in **Top 0.05%** of [National Science Olympiads](#).

## Professional Experience

### Emory University

Department of Physics, Research Assistant

August 2019-Current

- Worked under [Prof. Boettcher](#), on **Quantum Walks and Computational Physics**. Designed a Novel Quantum System implementing Quantum Walks with Novel Phase disorders. Developed [QWalks Software](#), utilizing Python and C++ libraries, and gained system's parameters of localization.
- Utilized Convolutional Neural Networks to predict the Quantum Advantage of the system by feeding known parameters to the network.
- Used Shooting method for solving Differential Equations in **Mathematical Physics Projects** involving Novel PT Symmetric potential. Developed PT-Sym Eigensolver for Harmonic, Anharmonic and Complex Potentials. [\[demo\]](#)

### SAMEER

Research Assistant

August 2017- Jun 2019

- Member of a crucial team for Design and Implementation of first ever Large Scale Synchrotron cancer therapy facility. Worked on Linear Accelerators and Simulated Transfer Matrix for 6 MeV Linac, assembly of LINAC, resonant cavities, and improved its design for better Q-Factor of LINAC.
- Presented progress of the work at Accelerator School held at KEK, Japan ( Dec 2018)

### Flutr.app

Machine Learning Developer, Founder

August 2017-May 2019

- Developed matches ranking algorithms based on 5 categories and utilized ML algorithms like Random Forest, Logistic Regression, SVM and Multiple Target classifiers.
- Developed ML workflow pipelines, executed several backend and frontend tasks on the scalable MERN stack for the app deployment.

### BARC

Division of Remote Handling & Robotics, Machine Learning Intern

May 2016-August 2016

- Developed a Brain-Computer interface for KUKA robotic arm and EEG controller. Designed and implemented the experiments to capture hand-motion and EEG signals successfully.
- Built a binary classifier to distinguish the data of the left and right brain signals. Successfully trained the Neural Networks for Binary Classifier using Matlab's deep learning toolkit and **increased the accuracy of the model from 70% to 96.3%**.

## Python, C++ and ML Portfolio ( Github : [rshar95](#) )

### QWalks Software

June 2021 - July 2021

- Developed a novel system of quantum walks which utilizes large matrices to store data for state evolution. Increased the execution speed of the model by 1000x using Cython, Numpy libraries and Joblib, Ray for multithreading. [\[demo\]](#)
- Converted QWalks software using C++ STL to optimize the evolution states for the simulation of Disordered Quantum Systems.

### Loan Default Detection through Customer Segmentation

Sept 2020- Nov 2020

- Customer Segmentation is studied using feedback from supervised learning and running unsupervised learning algorithms such as K-means and K-mode clustering. [\[report\]](#)
- Utilized **Elastnet** for Feature selection via analysis of non-zero coefficients. Ran Logistic Regression and CART Classifiers with **99% accuracy** on Binary Targets.

### StockTwits Messenger's Sentimental Analysis

August 2021

- Utilized PyTorch to implement Deep Learning models for classification of sentiments of messages between investors and Traders. Model classified sentiments with **98% accuracy** to generate a signal of the public sentiment for various ticker symbols.

## Skills

**Languages:** Python, C++, Javascript, HTML5 and CSS3, Matlab, Mathematica, SQL, Qiskit

**Fullstack:** MongoDB, Express, React JS, Node JS

**ML Algorithms:** ANN(s), NLP & Deep Learning

Logistic Regression, CART, Random Forests

**ML Libraries:** SciKit Learn, ElastNet, PyTorch

**Software:** Anaconda, Spyder, Jupyter Notebooks,

PostgreSQL, Sublime Text Editor, MS Office, Slack, Bash

**OS:** Windows and Linux.

**Servers:** Firebase, AWS, Google Cloud