Abhay Saxena

BS-MS Undergraduate
Department of Physical Sciences,
Indian Institute of Science Education and Research, Kolkata.

+91-8851932898
as21ms086@iiserkol.ac.in
saxenabhay@outlook.com
saxenabhay.github.io

Research Interests

Topological Matters, DFT and Computational Physics, Quantum Computation, Machine learning, Hard Condensed Matter

Education

Degree	Institute	Board	CGPA/Percentage	Year
BS-MS	Indian Institute of Science Education and Research, Kolkata	-	7.76 (Till 6th Sem)	2021-26
Senior Secondary	Navyug Convent School Delhi	CBSE	92%	2021
Matriculation	Cambridge School Noida	CBSE	96.2%	2019

Projects

- **Study of Topological insulators and DFT** *June 2024 - Present*
  Supervisor: Dr. Kuntal Roy (EECS Department, IISER Bhopal)
  – Demonstrated deep comprehension through rigorous discussions with an advisor for a detailed study of topological materials, emphasizing on Hall effects, SSH, Kane-Mele model, Majorana Fermion and graphene properties. Used *Kwant* for analyzing graphene nanoribbons and Quantum ESPRESSO for DFT studies on topological insulators.

- **Quantum Computing - Quantum Algorithms in Qiskit** *May - Jul 2023*
  Supervisor: Dr. Kuntal Roy (EECS Department, IISER Bhopal) **GitHub** • **Presentation** • **Report**
  – Title: Efficiency Comparison and implementation of VQE, VQD and p-VQD Algorithms in Qiskit
  – Studied in detail about various types of Eigensolvers, Time Evolver (p-VQD) Algorithms and other optimizer and amplifiers and customized implimentation of VQE, VQD and p-VQD in *ibmq_quito*.

- **Coding Project in Django, Nextjs and Javascript** *May - Jul 2023*
  Supervisor: Dr. Dwaipayan Roy (CDS Department, IISER Kolkata) **Report** • **Certificate**
  – Title: Exploring and Implementing a Robust Crediting Module in Canteen Management System
  – Integrating Cashfree and MobiKwik payment gateway system in Students mess credit system using Python and Javascript

Technical Skills

- **Profocient Programming Languages**: Python, C, MATLAB, Kotlin, Javascript
- **Scripting Languages**: html/css/js, LaTeX, Numpy/Scipy/Matplotlib, React/NextJs
- **Tools and Frameworks**: Quantum Espresso, Qiskit, Git, Tensorflow, flutter, Android Studio, Arduino, Blender, Django

Relevant courses

Advanced Quantum Mechanics (**term paper**), Computational Physics, Linear Algebra I, Programming and Data Structures II, Nuclear Physics Laboratory, Mathematical Methods of Physics, Electrical Circuits and Electronics

Student Interests

- **Academic**
  – **Completed Machine learning Foundational Crash Course by Google AI**
  – Implemented Fundamental Quantum support vector machines using kernel tricks in Qiskit
  – **2023:** Volunteered Regular Classroom Teaching for summer vacation at **ek pehel**
- **Coding:**
  – **2023**:Completely coded and designed my Personal Website (**link**) from scratch
  – **2022**: Kotlin Based YouTube client on android that allows modification to website functionality and background action using GeckoView (**GitHub**)
  – **2016**:Exercise App for spaced repeated timers and statistics, based on Cordova and updated to Webview(**GitHub**)
  – Arduino Projects: Nokia 5110 display, HC-05 and esp8266 based iot experiments
  – Attended IIT Delhi Rendezvous IOT Workshop for esp WiFi Module
- **Music:**
  – Intermediate Guitar and Piano player
  – Music and covers on LMMS audio workstation(**Link**)

Achievements

- **Programming and Data Structures Course Group Project** Outstanding Group Assignment Honourable Mention Certificate: Prof. Kripabandhu Ghosh, CDS IISER Kolkata (Nov 2023) - **Certificate**
- Qualified JEE Advanced 2022
- Zonal topper for SOF National Cyber Olympiad Class 9, international rank 57 Class 7