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, 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