Ashish Panigrahi

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About me

I am a 3rd year physics student studying at the **National Institute of Science Education and Research, Bhubaneswar, India**. I am interested in quantum physics & quantum computing with its application in the field of science and technology.

Nationality: Indian

Education

- **National Institute of Science Education and Research (NISER)** — Bhubaneswar, India
  Integrated Master's (CGPA till 6th semester: 9.13/10.0) — 2018 - 2023

- **Maharishi Vidya Mandir Senior Sec. School** — Chennai, India
  All India Senior Secondary Certificate Examination (CBSE) - 95.6% — May 2018

- **PSG Public School** — Coimbatore, India
  All India Secondary School Examination (CBSE) - CGPA 10 — May 2016

Honors/Awards

- **National Graduate Physics Examination** (*National topper*) — 2020
  Indian Association of Physics Teachers
  - Secured a score within the top 118 students among 12,000 candidates in the country.

- **Department Topper** (1st & 2nd *year*) — 2018-2020
  School of Physical Sciences, NISER

- **Kishore Vaigyanik Protsahan Yojana** — 2017
  Indian Institute of Science — Bengaluru, India
  - A prestigious fellowship program funded by the *Department of Science and Technology* of the Government of India.

- **National Talent Search Examination** — 2016
  National Council of Education Research and Training — New Delhi, India
  - A national level scholarship program offered by the Government of India.
  - It is one of the oldest and most prestigious scholarship programmes in the country.

Academic exposure

- **Qiskit Global Summer School** — Virtual
  IBM Quantum — July-August 2020
  - An intensive 2 week virtual summer school on quantum computation and designing quantum circuits and algorithms using Qiskit.
  - Did hands-on coding exercises to learn various quantum algorithms, pulse level control of qubits and concepts in quantum chemistry.
  - Also did a project on simulating the ground energy level of LiH molecule using quantum variational eigensolver.

- **National Initiative on Undergraduate Science (Physics)** — Mumbai, Maharashtra
  Homi Bhabha Centre for Science Education, TIFR — June 2019
  - Selected as one of top 70 students in the country to participate in this camp.

- An extensive 12-day course containing lectures, independent lab work and a field trip for 2 days.
- Lecture series on quantum mechanics, quantum information theory and quantum computation, basic condensed matter physics, many body physics, astronomy and astrophysics.
- About 30 hours of independent lab work.

Projects

- **Research Assistant** — Bhubaneswar, India
  Superconducting spintronics group, NISER — *April - June 2021*
  - Project guide: Dr. Kartik Senapati, Reader-F, NISER
  - Worked on a semester project on the topic, "Study of spin current in NM/HM bilayer system".
  - The goal was to be able to detect spin current via a bilayer system involving Cu and Pt, using the method of electrical detection.

- **Software Developer Intern** — Remote
  Quantum Brilliance, Australia — *February - April 2021*
  - Project guide: Dr. Nariman Saadatmand, QBQE Product Manager
  - Worked on QB's quantum emulator (QBQE) and enhanced functionality of its QAOA module using C++.

- **Research Intern** — Bhubaneswar, India
  Institute of Physics, Bhubaneswar — *May - June 2019*
  - Project guide: Dr. Debakanta Samal, Reader-F, Institute of Physics
  - Reading project on "Study on anisotropic magnetoresistance".
  - Topics covered: Origin of magnetoresistance, theory of magnetoresistance in real metals using the 2-band charge carrier model, origin of anisotropic magnetoresistance, its applications and current research scenario in the field.

Open-source contributions

- **Qiskit Textbook** — [GitHub]
  Learn Quantum Computation using Qiskit — *April 2020 - Present*
  - Qiskit is IBM's software development kit for building software to interact with IBM's quantum devices and OpenQASM.
  - The textbook is equivalent to a university level course for learning quantum computation and beyond.
  - I have been an active contributor to this project with over 50+ commits since April 2020.

Licenses & Certifications

- **Introduction to Quantum Computing Course** — Qubit by Qubit
  IBM Quantum & The Coding School — *October 2020 - May 2021*
  - Developed a foundational understanding of quantum computing, with topics including introductory linear algebra, coding with Qiskit, quantum mechanics, quantum algorithms, and quantum applications.

- **Challenge Fall 2020 Achievement - Intermediate** — IBM
  IBM Quantum — *December 2020*
  - Demonstrated an ability to implement near-future quantum data structures and design a quantum game solver using Grover's algorithm.
  - Showed an understanding of quantum circuits, the gates that comprise such circuits, Grover's algorithm, and qRAM (quantum random access memory) as a way to implement complex data structures.

- **CS-191x: Quantum Mechanics and Quantum Computation** edX
  University of California, Berkeley *August 2020*
  - Coursework involved ranging from the basics of the qubit to quantum algorithms such as Grover's, Shor's etc. to the Bloch sphere and Schrödinger's wave equation.
  - Final score: 97%

Volunteering

- **Project Lovelace**
  Scientific programming problems *May 2021 - Present*
  - Project Lovelace is a platform to learn science through programming.
  - Member of the team to add new problems and maintain the website (both frontend and backend).
  - Website: https://projectlovelace.net

- **Full-Stack Quantum Computation**
  Community-driven, open-source education resources *December 2020 - Present*
  - Part of the team as a curator of various articles on quantum technologies, submitted by volunteers.
  - Website: https://fullstackquantumcomputation.tech

- **Mentor**
  Avanti Fellows NGO *January - April 2019*
  - Duties included mentoring students from grades 11 and 12.
  - My weekend work involved having a one-to-one discussion with students on physics and general advice on entrance exams.

Technical skills

Programming and scripting languages

Julia, C, C++, Bash, and Python (Libraries: *Scipy*, *Numpy*, *Matplotlib*, *Sympy*)

Markup languages

LaTeX, Markdown, Groff, HTML

Quantum Frameworks

Qiskit, QuTiP, PennyLane

General computing tools

Vim, Git, tmux, gnuplot