

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** Bhubaneswar, India
Integrated Master's (CGPA till 4th semester: 9.30/10.0) 2018 - 2023
 - Major in physics with a minor in computer science.
 - Relevant coursework:
 - * Physics: Quantum mechanics, Classical mechanics, Statistical mechanics, Electromagnetism, Special theory of relativity, Nuclear & particle physics, Electronics, Computational Lab.
 - * Mathematics: Mathematical methods, Set Theory, Real Analysis.
 - * Computer Science: Theory of Computation, Discrete Structures (Combinatorics & Graph theory), Design and Analysis of Algorithms, Programming & Data structures lab.
- **Maharishi Vidya Mandir Senior Sec. School** Chennai, India
All India Senior Secondary Certificate Examination (CBSE) - 95.6% May 2018
 - Subjects taken: Physics, Mathematics, Chemistry, Computer Science, English.
 - Received a perfect score in Computer Science (Object Oriented Programming in C++).
- **PSG Public School** Coimbatore, India
All India Secondary School Examination (CBSE) - CGPA 10 May 2016
 - Subjects taken: Science, Mathematics, Social Sciences, English, Hindi.

Honors/Awards

- **National Graduate Physics Examination** (National topper) 2020
Indian Association of Physics Teachers
 - Secured a score among the top 118 students in the country.
- **Department Topper** (1st & 2nd year) 2018-2020
- **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

- **Quantum Winter Hackathon** Virtual Event
December 2020
BosonQ Psi, Quantum Computing India
 - A month long hackathon involving the discretization of 1D wave equation using implicit time integration scheme. Also showed the speedup between classical approach and quantum implementation using HHL algorithm.
 - Scored among the top 10 teams around the world.
- **IBM Quantum Challenge (Fall)** Virtual Event
November 2020
IBM
 - A 3 week competition which involved solving puzzles of varying difficulty level using Grover's algorithm and implemented using Qiskit.
- **Global Quantum Programming Workshop** Virtual Event
November 2020
QWorld
 - A 5-day workshop introducing the basics of quantum computing, with hands-on coding exercises using Qiskit.
 - Cleared the quizzes and received a diploma for the same.
- **Qiskit India Challenge** Virtual Event
September 2020
IBM Quantum
 - A 2 week hackathon which involved the basics of programming quantum circuits using Qiskit.
 - The final challenge involved the implementation of a *variational quantum classifier* (VQC) to separate the digits '4' and '9' from an MNIST dataset through machine learning. My team achieved an overall model accuracy of 79.6%.
- **Mini School on quantum machine learning** South Africa
September 2020
National Institute for Theoretical Physics
 - A 4 week summer school involving lectures by Amira Mahomed Abbas on the fundamentals of quantum machine learning through Qiskit and PennyLane.
 - Scored above 90% in the 2 quizzes held during the school to qualify for a certificate.
- **Qiskit Global Summer School** Virtual Event
July-August 2020
IBM Quantum
 - 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
June 2019
Homi Bhabha Centre for Science Education, TIFR
 - 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.
 - Field trip to *Giant Meterwave Radio Telescope (GMRT)* and *National Centre for Radio Astrophysics (NCRA)*.
- **National Science (VIJYOSHI) Camp** Bengaluru, Karnataka
December 2018
Indian Institute of Science
 - 3 day science camp organized by the *Institute of Science* and constituting of lecture series on scientific research.

Academic experience

- **Summer Project on Anisotropic Magnetoresistance** Bhubaneswar, India
Institute of Physics, Bhubaneswar May - June 2019
 - Project guide: Dr. Debakanta Samal, Reader-F, Institute of Physics
 - 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 30+ commits since April 2020.

Licenses & Certifications

- **Certificate of Recognition** BosonQ Psi
BosonQ Psi, QCI, ISCFD December 2020
 - In recognition of exemplary performance at “Quantum Winter Hackathon 2020”.
 - Scored among the top 10 teams from around the world.
- **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.
- **Certificate of Quantum Proficiency** IBM
IBM Quantum September 2020
 - For demonstrating an applied understanding of the basics of Quantum Computing using Qiskit, plus the ability to apply and experiment with classical machine learning techniques and the *Variational Quantum Classifier* (VQC) algorithm.
- **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%
- **Certificate of Quantum Excellence** IBM
IBM Quantum July 2020
 - Received for demonstrating applied understanding and comfort with and about Quantum Computing using Qiskit.

Volunteering

I have worked under the **Avanti Fellows** NGO programme during the months January-April 2019 as a mentor. My weekend work involved having a one-to-one discussion with students of classes XI and XII of **Jawahar Navodaya Vidyalaya (JNV) Dhenkanal, Odisha, India**.

Technical skills

Programming and scripting languages

C, C++, Shell scripting, R and Python (Libraries: *Scipy*, *Numpy*, *Matplotlib*, *Sympy*, *Pandas*)

Markup languages

L^AT_EX, Markdown, Groff, HTML

Quantum Frameworks

Qiskit, PennyLane, QuTiP

General computing literacy

Proficient in operating GNU/Linux (includes Debian and Arch Linux derivatives) & Windows, terminal commands, **tmux** multiplexer, gnuplot and **Vim** text editor. I also have a working knowledge of **Git**, a version control system.

