

# Ashish Panigrahi

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## About me

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I am a 3<sup>rd</sup> 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

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- **National Institute of Science Education and Research** Bhubaneswar, India  
*Integrated Master's (CGPA till 4<sup>th</sup> semester: 9.30/10.0)* 2018 - 2023
  - Major in physics with a minor in computer science.
  - Relevant coursework:
    - \* Physics: Quantum mechanics, Classical mechanics, Electromagnetism, Electronics.
    - \* Mathematics: Mathematical methods, Set Theory, Real Analysis.
    - \* Computer Science: Theory of Computation, Discrete Structures (Combinatorics & Graph theory), 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

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- **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** (1<sup>st</sup> & 2<sup>nd</sup> 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

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- **IBM Quantum Challenge** 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

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- **Summer Project on Anisotropic Magnetoresistance** Bhubaneswar, India  
May - June 2019  
*Institute of Physics, Bhubaneswar*
  - 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

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- **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

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- **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

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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

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### Programming and scripting languages

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

### Markup languages

L<sup>A</sup>T<sub>E</sub>X, 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.

