

# 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 5<sup>th</sup> semester: 9.19/10.0)* 2018 - 2023
  - Major in physics with a minor in computer science.
  - Relevant coursework:
    - \* Physics:
      - Theory - Quantum mechanics, Classical mechanics, Statistical mechanics, Electromagnetism, Special Theory of relativity, Nuclear & Particle physics.
      - Labs - Computational Lab, Electronics Lab, Modern Physics Lab, Nuclear Physics Lab, Solid State Physics 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

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- **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** (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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- **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

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- **Software Developer Internship** 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++.
- **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

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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 40+ commits since April 2020.

## Licenses & Certifications

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- **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**

*University of California, Berkeley*

edX

*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

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- **Project Lovelace**

*Scientific programming problems*

[Website](#)

*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).

- **Full-Stack Quantum Computation**

*Community-driven, open-source education resources*

[Website](#)

*December 2020 - Present*

- Part of the team as a curator of various articles on quantum technologies, submitted by volunteers.

- **Mentor at Avanti Fellows NGO**

*Jawahar Navodaya Vidyalaya (JNV)*

Avanti Fellows

*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

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### Programming and scripting languages

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

### Markup languages

L<sup>A</sup>T<sub>E</sub>X, Markdown, Groff, HTML

### Quantum Frameworks

Qiskit, QuTiP, PennyLane

### General computing tools

Vim, Git, tmux, gnuplot

