

# Purna Dutta

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## Education

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### Indian Institute of Science Education and Research (IISER)

Berhampur, India

*BS-MS Dual Degree*

2019 – 2024

Major in Mathematics, Minor in Computer Science

Cumulative Performance Index - 9.30/10.00

## Projects

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### The Institute of Mathematical Sciences (IMSc)

Chennai, India

*MS Thesis Project*

May 2023 - April 2024

Thesis: Expander Decomposition and Applications [supervisor: [Prof. Saket Saurabh](#)]:

- Reviewed efficient algorithms for expander decomposition, and some applications including computing global mincut and construction of cut-sparsifiers
- Attended graduate-level coursework on algorithms design and analysis, discrete mathematics, logic, randomized algorithms, parameterized algorithms, and linear programming and combinatorial optimization

### Technische Universität (TU)

Berlin, Germany

*DAAD-WISE Fellow*

May 2022 – July 2022

Data analysis with neural networks [supervisor: Robert Spang, under [Prof. Sebastian Möller](#)]:

- Collaborated with supervisor in processing of datasets for two publications
- Collected self heartbeat data and constructed a feedforward neural network model to predict rest or motion that achieved an accuracy of 85%

### Indian Statistical Institute (ISI)

Delhi, India

*Summer Intern*

May 2021 – September 2021

Statistical analysis [supervisor: [Prof. S. K. Neyogi](#)]:

- Collected real-time data
- Performed tests of hypotheses for statistical inferences on the data using Python

### National Institute of Science Education and Research (NISER)

Bhubaneswar, India

*IASc Summer Fellow*

May 2021 – June 2021

Study on transcendental numbers [supervisor: [Prof. Brundaban Sahu](#)]:

- Studied and presented construction of transcendental numbers and proofs of transcendence
- Studied proofs of irrationality of  $\zeta(2)$  and  $\zeta(3)$

## Relevant Coursework

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**Computer Science:** Algorithms design and analysis, Theory of Computation, Discrete Math, Logic, Randomized Algorithms, Parameterized Algorithms, Linear Programming and Combinatorial Optimization, Programming and Data Structures, Introduction to Data Science, Error Analysis

**Mathematics:** Combinatorics and Graph Theory, Optimization Techniques, Calculus, Group Theory, Probability, Linear Algebra, Numerical Analysis, Elementary Number Theory

## Skills

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**LaTeX:** Proficient

**MATLAB:** Basic

**Python:** Proficient

**C:** Intermediate

## Achievements

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- 2022:** [DAAD-WISE Scholarship](#): 3-month research fellowship awarded to less than 12% of applicants by German Academic Exchange Service
- 2021:** [IASc-INSA-NASI Summer Research Fellowship](#): 2-month research fellowship awarded to less than 10% of applicants by the three Indian science academies
- 2019-2024:** [INSPIRE - SHE \(Scholarship for Higher Education\)](#): 5-year scholarship awarded to top 1 percentile (across India) candidates in school-leaving exam by the Government of India

## Workshops attended

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### Advanced Instructional School on Algorithmic Graph Theory

*Indian Institute of Technology (IIT), Indore*

2023

21-day lecture series on current research trends in graph theory

### Vijyoshi Camp for INSPIRE-SHE scholars

*Indian Institute of Science Education and Research (IISER), Kolkata*

2019

3-day workshop on applications of STEM

## Leadership experience

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### Project Spiral, Math club of IISER Berhampur

*Core Committee Member*

2020-2023

- Co-organised Mathematics Online Seminar Series 2023 where faculty from around the world contributed
- Co-organised special lecture by Prof. Ram Murty from Queen's University on  $\pi$ -day
- Co-organised student seminar series on applications of mathematics in other disciplines
- Co-organised an institute-wide mathematics quiz competition
- Presented Goldbach's Conjecture to school students during an outreach event
- Managed budget and resources for events

## References

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*Available upon request*