**Shankha Suvra Dam**

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## Education

**Indian Statistical Institute, Bangalore Centre** — Bengaluru, Karnataka
Bachelor of Mathematics (Hons.) — Expected Year of Graduation: 2026
Aggregate: 75.55%

**Relevant Courses:** Discrete Mathematics, Classical Mechanics, *Intro to Stochastic Processes*, *Probability I, II, III* (includes Measure-Theoretic Probability), Ordinary Differential Equations, *Function Spaces*, Analysis of Several Variables

**Delhi Public School, Ruby Park** — Kolkata, West Bengal
12th CBSE, Aggregate: 95.6% — Year of Graduation: 2023

**Delhi Public School, Ruby Park** — Kolkata, West Bengal
10th CBSE, Aggregate: 90.8% — Year of Graduation: 2021

## Interests

Probability Theory
Statistical Mechanics (particularly Percolation)
Graph Theory (particularly Random Graphs and Graph Dynamics)
Theoretical Computer Science and Combinatorics

## Achievements

**Madhava Nurture Camp 2025** — CUSAT, Bhaskaracharya Pratishthana
Attended the Madhava Nurture Camp 2025 at CUSAT, following qualification through the Madhava Mathematics Competition 2025

**Academic Scholar Stipend** — Indian Statistical Institute, Bangalore Centre
Received a monthly sum of 5000 INR for maintaining good academic performance — July 2023 - current

**Scholar Badge** — Delhi Public School, Ruby Park
Awarded the Scholar Badge for outstanding academic performance in 12th CBSE Boards — May 2023

**Scholar Badge** — Delhi Public School, Ruby Park
Awarded the Scholar Badge for outstanding academic performance in 10th CBSE results — May 2021

## Academic Exposures

**Mathematical Morphology** — November 2025 - current

- Learnt fundamentals of mathematical morphology under Professor B. S. Daya Sagar
- Studied non-linear image processing using set-theoretic operators (erosion, dilation, opening, closing), and explored various filtering techniques and transforms for data
- Explored basics of watersheds, fractals, Gaussian Random Fields and Brownian surfaces.

**Summer Research Intern** — SIP Summer 2025, Department of Mathematics, IIT Guwahati

- Worked under the guidance of Professor Gautam Kumar Das on Dispersion Problems in 2D

- Explored the various approaches to approach the max-min dispersion problem, the class of facility location problems and approximation algorithms
- Studied Computational Geometry and Approximation Algorithms, referencing foundational texts including *Computational Geometry* by *de Berg, et al.*

**Undergraduate Directed Group Reading Projects (UDGRP)** Math Club, ISI Bangalore

- UDGRP is a programme held by the Math Club of ISI Bangalore, in which Bachelors students direct their juniors into exploring new topic they have explored themselves during the Summer and Winter Breaks.

- **Tilings** Winter 2025
  - Currently studying about the basics of tilings and packings. To move towards Random tilings and Lozenge tilings.

- **Random Walks** Winter 2025
  - Currently studying about percolation, self avoiding walks. To move towards Random Polymers.
  - **References:** *Random Walk Notes (Leiden University)* by *Hollander et al.*, *Random Polymers* by *Frank der Hollander*

- **Dynamical Systems** Winter 2024
  - Studied about Basic Stability Analysis and Basics of Local Theory of Non-Linear Systems

- **Enumerative Combinatorics** Winter 2024
  - Studied about various topics under the domain of Combinatorics, particularly pertaining to Additive Combinatorics and Random Graphs

**Independent Study**

- ***Statistical Mechanics: Entropy, Order Parameters, and Complexity*** by *James P. Sethna*: Exploring some ideas in Statistical Mechanics (Studied till before Entropy)
- ***Graph Dynamics*** by *Erich Prisner*: Studied general ideas involved in working with a graph operator, and explored some of the major graph operators, including Gallai and Line Graphs
- ***Graph and Matrices*** by *Ravindra B. Bapat*: Studied ways of utilising Linear Algebra and techniques on matrices in analysing graphs

## Talks

**Introduction to Expander and Ramanujan Graphs** October 2025, Math Club, ISI Bangalore

- Gave a talk about Expander graphs and Ramanujan graphs, introducing the various definitions and properties of expander graphs and building towards Ramanujan graphs
- Discussed about the three definitions of expander graphs: combinatorial, spectral and probabilistic, and talked about Derandomisation of Randomised Algorithms using Ramanujan Graphs
- Based on self-directed study of the book *Expander Families and Cayley Graphs: A Beginner's Guide* by *Mike Krebs* and PMSP talks by *Avi Wigderson* at *Institute of Advanced Studies*

**Logic of Voting: When Math Meets Democracy** LIMIT Camp 2024, Category A

- Gave a talk on the topic of voting systems, introducing the concepts involved when judging fairness of various voting systems, and eventually stating and introducing Arrow's Theorem.
- Based on first few chapters of *Handbook of Computational Social Choice* by *F. Brandt, et al.*

## Activities

**TheAlgorithms** — GitHub Organisation
**Contributor** — October 2021 - current

- TheAlgorithms is a GitHub Organisation focused on maintaining a curated and well-documented list of implementations of various useful algorithms in a variety of languages
- 20+ PRs accepted, 27 issues raised

**Math Club** — Indian Statistical Institute, Bangalore Centre
**Technical Team Member** — February 2024 – September 2025

- Responsible for maintaining the Math Club website, and regularly updating it
- Introduced new setups for broadcasting of Math Club talks for greater efficiency and polish

**LIMIT** — Indian Statistical Institute, Bangalore Centre
**Technical Team Head, Core Committee Member** — August 2024 – September 2025

- Responsible for collaboration with students and professors to organise the LIMIT camp.
- Revived the once dead examination by updating dependencies and implementing various features, including an alternate payment system, to enable the exam to happen
- Represented requirements, opinions and interests of the Technical Team to the Core Committee

**Cultural Committee** — Indian Statistical Institute, Bangalore Centre
**Secretary** — October 2024 – May 2025

- Helped organize a variety of campus-wide cultural events, from festive celebrations to open mic nights.
- Restarted the annual college eSports tournament
- Ran the popular Literature Tournament, a strategic card game unique to our campus

## Skills

**Programming Languages**
Python, C, JavaScript, TypeScript, R, Octave, Shell

**Libraries and Frameworks**
manim, NumPy, pandas, Matplotlib, ggplot2, lubridate, dplyr, express.js, networkx

**Other Technologies**
MongoDB, SQLite, LaTeX, Jupyter Notebooks

**Languages**

- Bengali: Native Proficiency
- English: Full Professional Proficiency
- Hindi: Professional Working Proficiency