



**Madhur Agrawal**  
**Mathematics**  
**Indian Institute of Technology Bombay**

**20B090015**  
**B.S.**  
**Gender: Male**  
**DOB: 1/26/2002**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	CBSE	Delhi Public School Noida	2020	91.60%
Matriculation	CBSE	Delhi Public School Noida	2018	90.80%

Pursuing Minor in Computer Science

## SCHOLASTIC ACHIEVEMENTS

- **Department Rank 3** in the Mathematics Department, with a CPI of **9.09** (Present)
- Invited to attend the **International Mathematical Olympiad Training Camp** (2020)
- Invited to the **International Astronomy Olympiad Orientation-cum-Selection Camp** (2020)
- Cleared **Regional Mathematical Olympiad** and **Indian National Math. Olympiad** (2019,2020)
- Cleared **Indian National Astronomy Olympiad** (2020)
- **National Topper 1%**, **National Standard Examination (Astronomy)** (2019)
- Cleared **National Standard Examination, Physics** (2019)
- Cleared **National Standard Examination, Chemistry** (2019)
- **Honourable Mention, Panini Linguistics Olympiad** (Invitational Round) (2019)
- Eligible to write **Asia Pacific Mathematical Olympiad** for Team India (2020)
- Eligible to write **Asia Pacific Linguistics Olympiad** for Team India (2019)
- Selected to appear in **American Invitational Mathematics Examination** (2019)
- Invited twice to attend the **LIMIT-ISI Bangalore** invitational camp (2020,2021)
- Invited to the final camp for both **Physics** and **Mathematics** at **STEMS-CMI** (2022)
- Secured **All India Rank 1846** in **IIT JEE (Advanced)** among over 2,00,000 candidates (2020)
- Secured a percentile of **99.828** in **JEE (Main)** (January session) among over 11,00,000 candidates (2020)
- Joint **AIR-1** on the **Indian Statistical Institute** Merit list (2020)
- Awarded **Kishore Vaigyanik Protsahan Yojana Scholarship (SA)** by Government of India (2018)
- Won several medals at SOF Olympiads

## WORK EXPERIENCE

**Intern at Spydra Technologies** (2022)

*Blockchain Technology Start-up*

- Learned about Permissioned Blockchain technology for enterprise use
- Studied the documentation for HyperLedger Fabric, an open-source proprietary blockchain platform managed by the Linux Foundation

## PROJECTS

**Competitive Programming** (2021)

*Guide: Tarush Goyal | Summer of Code | IIT Bombay*

- Was extensively drilled in how to approach and get good at Competitive Programming by an ex-IMO India Team member
- Learned many essential data structures, algorithms and programming skills like time complexity estimation, dynamic programming, etc
- Solved many competitive programming problems on sites like Codeforces and Hackerrank

**Representation Theory of Finite Groups** (Ongoing)

*Guide: Aryaman Maithani | Summer of Science | IIT Bombay*

- Learned about the applications of methods in linear algebra to finite groups
- Also studied miscellaneous ideas in algebra like Algebraic Integers and the Combinatorial Nullstellensatz

## Bringing Undergraduate Mathematics to Schoolchildren

(2021-22)

Guide: Prof. Rekha Santhanam | Summer Undergraduate Research Program (SURP) | IIT Bombay

- Designed new material to introduce Grade 5 students to Bézout's lemma and related number theory ideas
- Created a unique and innovative setting involving a giant snakes and ladders board for engaging presentation
- Wove everything into a novelette with characters and an interesting plot

## MENACE

(2021)

Self-Project

- Reverse-engineered the Matchbox Educable Noughts and Crosses Engine by Donald Michie
- Successfully taught MENACE to learn the ideal Tic-Tac-Toe moves by playing against itself repeatedly
- Used file parsing and manipulation to store output depicting the ideal move to play in any situation

## POSITIONS OF RESPONSIBILITY

### Department Academic Mentor

(2022)

- Assigned to mentor three sophomore students after a rigorous interview process
- Act as their first point of contact for any academic decisions and help them navigate the curriculum

### Teaching assistant

(2022)

- Selected to be a Teaching Assistant for **4 courses**
- Conducted weekly hour-long tutorials for 40+ students for MA 106, MA 108 and MA 111
- Conducted weekly **office hours** with a PhD scholar for **300+** students for Calculus 1 (MA 109)

## EXTRA-CURRICULARS

- **Mathematics Subject Topper** at **Mimamsa 2021**, IISER Pune, out of over 500 teams (2021)
- Won **First Place** in **Enumeration, Pravega** a mathematics event organised by **IISc Bangalore** (2021)
- Won **Second Place** at **Physics Bazinga!**, an IIT Bombay quiz (2021)
- Became one of very few to win **First Place** at both **Physics Bazinga!** and **Mathematics Bazinga** in the same year (2022)
- Invited to **Chair a Group Discussion** on Paradoxes of Probability by the MnP Club, IIT Bombay (2021)
- Frequent setter of original questions for IIT Bombay's Quiz Club
- I was a prolific school quizzier and won many kinds of interschool events. Some highlights include
  - National Finalist, TIME Aqua Regia Science quiz at Hyderabad, representing the **North Zone** (2017)
  - Finalist, Columban Open Quiz (2019)
  - First Runners-up, Practical competition, National Inter-DPS Science fest (2019)
  - First place, Surprise, Code wars at DPS Vasant Kunj (2018)
  - Winners, The Mathematical Crusade (Quiz), DPS RK Puram (2018)
- Completed the Summer School of Cult Flute workshop (2021)
- Completed the Summer School of Cult Stand-up Comedy workshop (2021)
- Completed the year-long National Sports Organisation training program (2020-21)

## TECHNICAL SKILLS

**Programming Languages** C++, Python, HTML

**Software** L<sup>A</sup>T<sub>E</sub>X, MS Office, Git

## RELEVANT COURSES UNDERTAKEN

<b>Mathematics</b>	Calculus I, Calculus II, Differential Equations, Basic Algebra, Algebra 1 (Galois Theory), Combinatorics, Real Analysis, Complex Analysis, Multivariate Calculus, Basic Number Theory, Linear Algebra (for engineers), Linear Algebra (over arbitrary fields), Numerical Analysis, Probability 1*
<b>Computer Science</b>	Data structures and algorithms, Design and analysis of Algorithms*, Computer Programming and Utilization, Logic for Computer Science
<b>Others</b>	Quantum Physics and Applications, Electromagnetism, Physical Chemistry, Organic and Inorganic Chemistry, Introduction to Biology, Engineering Graphics and Drawing, Economics, Literature*

\* to be completed by November 2022

**Languages known:** English, Hindi, French (A2/B1 Level)