Siddhartha **Jain**

Computer Science @ EPFL · Algorithms · Complexity Theory

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"Somewhere, something incredible is waiting to be known."
Carl Sagan

Education

EPFL
École Polytechnique Fédérale de Lausanne — *Lausanne, Switzerland*
M.S. in Computer Science — *Sep 2020 - Present*

- MSc Research Scholar
- **Relevant Courses**: Advanced Algorithms, Learning Theory, Probabilistic Methods in Combinatorics, Spectral Graph Algorithms

IIIT-Delhi
Indraprastha Institute of Information Technology, Delhi — *New Delhi, India*
B.Tech in Computer Science & Applied Mathematics — *Aug 2016 - Aug 2020*

- Cumulative GPA 9.1/10, Major GPA 9.3/10
- Founded the Math club (Évariste)

Skills

Presentation LaTeX, Illustrator
Programming Python, Mathematica, Julia, C++, Java
Languages English, Hindi, French

Experience

MSc Research Scholar — *Lausanne, Switzerland*
EPFL — *Feb 2021 - Jan 2022*

- Working with Mika Göös.

Research Intern — *Shanghai, China*
ITCS @ Shanghai University of Finance & Economics — *May 2019 - Jul 2019*

- Hosted by Bundit Laekhanukit.
- Showed a result about the inapproximability of a **graph compression** problem. The paper can be found on ArXiv.

Teaching Assistant — *New Delhi, India*
IIIT-Delhi — *Aug 2018 - Nov 2018*

- Course: Discrete Structures.

Projects

Unambiguous DNFs and Alon-Saks-Seymour — *Boolean Functions*
Separations in query/communication complexity — *2020 - 2021*

- Supervisor: Mika Göös, Collaborators: Kasapars Balodis, Shalev Ben-David (UWaterloo), Robin Kothari (Microsoft Research)
- We exhibit an unambiguous k-DNF formula that requires CNF width $\widetilde{\Omega}(k^2)$, which is optimal up to logarithmic factors. As a consequence, we get a near-optimal solution to the Alon–Saks–Seymour problem in graph theory (posed in 1991), which asks: How large a gap can there be between the chromatic number of a graph and its biclique partition number? Our result is also known to imply several other improved separations in query and communication complexity.
- **Paper accepted to FOCS'21**. [ECCC] [arXiv]

Clustering — *Clustering*
Including Outlier Perspective Leads to Better Clustering — *2020 - 2021*

- Co-authors: Shay Ben-Elazar, Vincent Cohen-Addad, Karthik CS
- We propose a completely new paradigm for preprocessing data in an unsupervised manner to improve the performance of clustering algorithms, inspired by **Error-Correcting Codes** and **Locality Sensitive Hashing**.
- In writing.

Algorithms for Big Data

Algorithms

Independent Study at IIIT-Delhi

Aug 2019 - Dec 2019

- Supervisor: Rajiv Raman
- Studied various topics related to Algorithms for Big Data and presented it to my supervisor, peers and other researchers visiting or working at IIIT-Delhi.

Guillotine Cuts & Pattern Avoidance in Permutations

Combinatorics

Bachelor Thesis at IIIT-Delhi

Mar 2018 - Mar 2019

- Advisors: Rajiv Raman, Samrith Ram
- Worked on a combinatorial conjecture on Guillotine Cuts for Axis Parallel Rectangles, which would imply a polytime $O(1)$ approximation algorithm for MISR, as presented in On Guillotine Cutting Sequences [Abed, Chalermsook et al].
- We found an interesting connection to Pattern Avoidance in Permutations, and posed our own conjecture along with a few results.

Honors & Awards

2021	**MSc Research Scholar**, EPFL	*Lausanne, Switzerland*
2020	**Graduation with Honors**, IIIT-Delhi	*New Delhi, India*
2019	**Dean's List**, IIIT-Delhi	*New Delhi, India*

Workshops & Schools

Mathematics of Quantum Computation

Jerusalem, Israel

Israel Institute for Advanced Studies

Dec 2019

Mathematics for Data Science

Bangalore, India

Indian Institute of Science

Jul 2019

Graph Theory & Graph Algorithms

Gandhinagar, India

Indian Institute of Technology, Gandhinagar

Jun 2017

Extracurricular Activity

Évariste (Math Club of IIIT-Delhi)

New Delhi, India

Founder

Aug 2017

- 40+ active members, 8 innovative events per semester.
- Organised Convergence along with Math dept of IIIT-Delhi.

Student Senate of IIIT-Delhi

New Delhi, India

Representative

Apr 2018 - Aug 2019

- Represented CSAM Batch of 2016 in the Senate.
- Represented entire student body in the Disciplinary Action Committee.