Satvik Saha

Curriculum Vitae

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▬▬▬ Education

2019 – Present	**BS-MS**, *Indian Institute of Science Education and Research*, Kolkata. Current CGPA – 9.59/10 SGPA for Semester I – 9.69, II – 9.38, III – 9.58, IV – 9.56, V – 9.60, VI – 9.60, VII – 9.80
	Major courses: Algebra I-III, Algebraic Topology, Analysis I-V, Geometry of Curves and Surfaces, Graph Theory and Combinatorics, Linear Algebra I-II, Numerical Analysis, Probability I, Statistics I-II, Statistical Inference, Topology
2019	**ISC**, *Delhi Public School, Megacity*, Kolkata. Class 12 – 93.5%, Indian School Certificate (ISC)
2017	**ICSE**, *Delhi Public School, Megacity*, Kolkata. Class 10 – 94.2%, Indian Certificate of Secondary Education (ICSE)

▬▬▬ Research interests

Data Analysis, Machine Learning, Mathematical Modelling, Computational Statistics.

▬▬▬ Scholarships

2018	Awarded the *Kishore Vaigyanik Protsahan Yojana* scholarship, with rank 649 (SA).

▬▬▬ Projects

August 2022 – Present	**Multi-Task Learning in Natural Language Processsing**. *Supervisor:* Dr. Kripabandhu Ghosh, IISER Kolkata
	Studying the basics of Multi-Task Learning (MTL). Will look at the applications of this machine learning technique in the area of Natural Language Processing (NLP).
July 2022	**The Poincaré Theorem for Fundamental Polygons**. *Supervisor:* Dr. Somnath Basu, IISER Kolkata
	Studied topics in algebraic topology. Explored tilings of the hyperbolic plane as covering spaces of genus 2 and above surfaces, and how this allows such manifolds to be realized as surfaces of constant negative curvature.

July 2021	**The Stone-Weierstrass Theorem**. *Supervisor:* Dr. Somnath Basu, IISER Kolkata Studied topics in introductory group theory, analysis, and topology. Presented a generously illustrated proof of the Stone-Weierstrass theorem (notes, presentation).
April 2021	**Modelling the role of open air stubble and waste burning in elevated $PM_{2.5}$ concentrations in the Newtown area**. *Supervisor:* Dr. Sujata Ray, IISER Kolkata Studied the Gaussian Plume model for understanding the concentration and spread of pollutants at ground level. Used this to model the effects of stubble burning in the locality of Newtown, Kolkata, and examine the extent of damage caused by this practice. Discussed whether this can explain the highly elevated levels of $PM_{2.5}$ levels in Kolkata, which persist over larger areas. (term paper)
October 2020	**Ground based observations of Noctilucent Cloud brightness and frequency**. *Supervisor:* Dr. Sujata Ray, IISER Kolkata Surveyed literature on Noctilucent Clouds (NLCs), particularly regarding their increasing frequency over 2014-2020. Collected and analysed ground observation data from the Noctilucent Cloud Observing Network (NLCNET) forum to corroborate this trend. Compared these findings with data from satellite missions, chiefly the Cloud Imaging and Particle Size (CIPS) experiment. Discussed the roles of agents such as greenhouse gases and solar forcing in this phenomenon. (term paper, presentation)
April 2020	**Age stratified SIQR model for the COVID-19 pandemic**. *Supervisor:* Prof. Ranjit Kumar Upadhyay, IIT Dhanbad Studied the basic SIQR compartmental model in epidemiology, in the context of the emerging COVID-19 pandemic. Modified this model by subdividing each compartment into age groups, with varying degrees of interaction amongst each other. Applied this model (using numerical simulations in python) to understand trends in infection rates/mortality in countries with different age structures in their population. (paper)

Publications

Software skills

Languages	Proficient in Python, MATLAB Familiar with C, C++, Java, R, Mathematica
Tools	Git, HTML/CSS/JS, LaTeX, Numpy/Scipy, Pytorch, Tensorflow

Student interests

Chess	Played for the IISER Kolkata Chess Team in the Inter IISER Sports Meet (IISM) 2019, as well as Revival 2021.

Coding	Contributed to writing and maintaining the welearn-bot project, a command line interface for my institute's learning platform.
	Designed and wrote the website of Identity, the Maths Club of IISER Kolkata, current maintainer.
Others	Founding member of Identity, the Maths Club of IISER Kolkata; organized and coordinated events and competitions, designed problems, contributed articles and blog posts.
	Part of the winning team in the Mathematics Treasure Hunt, 2020 organized by IISER Pune.