Satvik Saha

Curriculum Vitae

E104, ICVS, IISER Kolkata
Mohanpur, Nadia - 741246
✉ ss19ms154@iiserkol.ac.in
🌐 sahasatvik.github.io

Education

2019 – present

BS-MS, *Indian Institute of Science Education and Research*, Kolkata
Current CGPA – 9.63/10

SGPA by Semester: I – 9.69, II – 9.38, III – 9.58, IV – 9.56, V – 9.60, VI – 9.60, VII – 9.80, VIII – 10.00

Relevant courses: Probability I-II, Statistics I-II, Statistical Inference, Nonparametric Statistics, Multivariate Statistics, Linear Models, Numerical Analysis, Machine Learning and Network Analysis, Algebraic Topology.

Teaching experience: Teaching Assistant for Mathematics I (MA1101).

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 Depth Statistics, Nonparametric Statistics, Computational Statistics, Machine Learning.

Awards and Achievements

2022 Scored 338/340 in the GRE General Test.

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

Conferences and Camps

2023 Attended the *Canadian Applied and Industrial Mathematics Society (CAIMS) Annual Meeting* at the University of New Brunswick, Fredericton.

2017 Attended the *National Science (Vijyoshi) Camp* at IISc Bangalore, as a KVPY fellow.

Projects

August 2023 – present

Data Depth Statistics (MS Thesis)
Supervisor: Dr. Anirvan Chakraborty, IISER Kolkata

Studying the role of statistical depth functions in exploratory data analysis, multivariate inference, classification and clustering, outlier detection, regression, etc. Focus on high dimensional and functional data.

May 2023 – July 2023	**Combining in-host and inter-host viral infection dynamics** *Supervisor:* Prof. James Watmough, University of New Brunswick Studied existing agent-based models for the spread of viral infections in a population, as well as ODE-based models for the dynamics of viral infections within a host. Developed a model which operates on both scales, generated and analysed simulation data. Attended the Annual Meeting of the Canadian Society of Applied and Industrial Mathematics (CAIMS 2023).
August 2022 – April 2023	**Multi-Task Learning in Natural Language Processsing** *Supervisor:* Dr. Kripabandhu Ghosh, IISER Kolkata Studied techniques for identifying, quantifying, and neutralizing bias in word embeddings, in the context of Natural Language Processing (NLP). Worked on adapting a Multi-Task Learning (MTL) model for this task.
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 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

2023	Saha, S., Gupta, S., Dutta, S., Chatterjee, S. "Characterising Solutions of Anomalous Cancellation." Accepted for publication at *Resonance*.
2020	Upadhyay, R.K., Chatterjee, S., Saha, S., Azad, R.K. "Age-group-targeted testing for COVID-19 as a new prevention strategy." *Nonlinear Dynamics*, **101**, 1921–1932. DOI: 10.1007/s11071-020-05879-x

Software skills

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

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.

Wrote the popular typst-theorems/ctheorems package for creating numbered environments in the typesetting language Typst.

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.