Spandan **Senapati**

CS Ph.D. student, University of Southern California

Los Angeles, California, USA

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Education

University of Southern California

Los Angeles, California

Ph.D. in Computer Science, advised by Prof. Haipeng Luo and Prof. Vatsal Sharan — *Aug 2023 - Present*

- Research Interests: Statistical Learning Theory, Online Learning, Trustworthy Machine Learning, Generative Modeling

Indian Institute of Technology Kanpur

Kanpur, Uttar Pradesh

Bachelor of Technology in Computer Science and Engineering — *July 2018 - May 2022*

- Cumulative Performance Index (CPI): **9.1/10.0** (graduated with **Distinction**)
- Awarded **Proficiency Medal** at the 55th Convocation for the best undergraduate project done by a graduating student in the CSE department
- **Academic Excellence Award** (2018-19, 2019-20): Awarded for excellent academic performance in an academic year

Experience

Indian Institute of Technology Kanpur

SPiN Lab, IIT Kanpur

Graduate Research Assistant, Advisor: Prof. Ketan Rajawat — *Aug 2022 - May 2023*

- Project on Sharpened Lazy Incremental Quasi-Newton (SLIQN) method, the first algorithm with an $\mathcal{O}(d^2)$ per-iteration complexity and an explicit non-asymptotic superlinear convergence rate
- Paper accepted to AISTATS 2024 (Valencia, Spain)

Tata Institute of Fundamental Research

Remote

Internship, Advisor: Prof. Rahul Vaze — *Aug 2022 - May 2023*

- Project on Online Convex Optimization with Switching Cost and Delayed Gradients. Proposed an algorithm and a novel analysis technique to bound its competitive ratio for the OCO-S problem with delayed gradients. Derived nearly matching lower bounds for the problem
- Paper accepted to IFIP Performance 2023 (Chicago, USA)

Related Search Team - Microsoft Bing

Microsoft IDC, Hyderabad

Data Scientist intern, RS STCI Team — *May 2021 - July 2021*

- Project on Topics in Organised Map of Suggestions (TOMS). Developed an efficient clustering algorithm and built an interface which automated the clustering process and allowed doing several large-scale experiments seamlessly
- Offered a Pre-Placement offer (PPO) for a full-time data scientist position

Publications and Preprints

Efficient Swap Multicalibration of Elicitable Properties

[Arxiv]

Lunjia Hu$^{\alpha-\beta}$, Haipeng Luo$^{\alpha-\beta}$, **Spandan Senapati**$^{\alpha-\beta}$, Vatsal Sharan$^{\alpha-\beta}$ — *Nov 2025*

Under submission (STOC'26)

Improved Bounds for Swap Multicalibration and Swap Omniprediction

[Arxiv]

Haipeng Luo$^{\alpha-\beta}$, **Spandan Senapati**$^{\alpha-\beta}$, Vatsal Sharan$^{\alpha-\beta}$ — *May 2025*

Annual Conference on Neural Information Processing Systems (NeurIPS), 2025 (**Spotlight presentation**)

Simultaneous Swap Regret Minimization via KL-Calibration

[Arxiv]

Haipeng Luo$^{\alpha-\beta}$, **Spandan Senapati**$^{\alpha-\beta}$, Vatsal Sharan$^{\alpha-\beta}$ — *Feb 2025*

Annual Conference on Neural Information Processing Systems (NeurIPS), 2025 (**Spotlight presentation**)

Optimal Multiclass U-Calibration Error and Beyond

[Arxiv][Openreview]

Haipeng Luo$^{\alpha-\beta}$, **Spandan Senapati**$^{\alpha-\beta}$, Vatsal Sharan$^{\alpha-\beta}$ — *Sep 2024*

Annual Conference on Neural Information Processing Systems (NeurIPS), 2024

Sharpened Lazy Incremental Quasi-Newton Method

[PMLR][Arxiv]

Aakash Lahoti*, **Spandan Senapati***, Ketan Rajawat, Alec Koppel — *Jan 2024*

International Conference on Artificial Intelligence and Statistics (AISTATS)

Online Convex Optimization with Switching Cost and Delayed Gradients

[PER][PEVA][Arxiv]

Spandan Senapati, Rahul Vaze — *Aug 2023*

IFIP Performance 2023. Full paper: Elsevier Performance Evaluation (PEVA), Extended abstract: ACM SIGMETRICS Performance Evaluation Review (PER)

Proximal Algorithms for Smoothed Online Convex Optimization with Predictions *[IEEE Xplore][Arxiv]*

Spandan Senapati, Ashwin Shenai, Ketan Rajawat *Aug 2023*

IEEE Transactions on Signal Processing

Note: $\alpha - \beta$ denotes alphabetical ordering, which is custom in theoretical computer science research; $*$ denotes equal contribution

Report

Fall'23 **Failure Cases of Empirical Risk Minimization (ERM) and Structural Risk Minimization (SRM)**, CSCI 699 *[Report]*

Honors & Awards

2022 **Proficiency Medal**, Best undergraduate project done by a graduating student from the CSE department *IIT Kanpur, India*

2018, 19 **Academic Excellence Award**, For excellent academic performance in an academic year *IIT Kanpur, India*

2018 **All India Rank 161**, Joint Entrance Examination Main, among 1.5 Million Candidates *India*

2018 **All India Rank 191**, Joint Entrance Examination Advanced, among 200000 Candidates *India*

2017 **All India Rank 24**, KVPY Scholarship, Indian Institute of Science and Government of India *Bangalore, India*

2016 **NTSE Scholar**, Awarded to the top 1000 students in the nation by the Government of India *India*

2016 **IJSO OCSC**, Selected for the team selection camp of the International Junior Science Olympiad(top 35 India) *Mumbai, India*

2017, 18 **National Top 1% ,** National Standard Examination in Physics(NSEP) among 200000 Candidates *India*

2018 **National Top 1% ,** National Standard Examination in Chemistry(NSEC) among 200000 Candidates *India*

2017, 18 **State Top 1% ,** National Standard Examination in Astronomy(NSEA) *India*

2017 **3rd in State**, Represented Odisha State in the Indian National Maths Olympiad(INMO) *India*

2016 **State Top 35**, Represented Odisha State in the Indian National Maths Olympiad (INMO) *India*

Travel Grants

2024 **GSG Professional Development Fund**, Issued by USC

2023 **National Science Foundation (NSF) Student Travel Award**, Issued by IFIP Performance 2023

Talks

2023 **IFIP Performance 2023**, Online Convex Optimization with Switching Cost and Delayed Gradients *Chicago, USA*

2024 **USC Theory Lunch**, Optimal Multiclass U-Calibration Error and Beyond *Los Angeles, USA*

Teaching

Fall'24 **Teaching Assistant**, Theoretical Machine Learning (CSCI 678) *USC*

Skills

Programming C, C++, Python

Machine Learning Framework Pytorch

Reviewing

Conference NeurIPS 2024, 2025 (**Top Reviewer**), ALT 2026 (Emergency Reviewer), FORC 2026 (External Reviewer), FOCS 2025 (External Reviewer)

Journal IEEE BITS the Information Theory Magazine

Service

SHINE Mentor *USC*

USC Summer High School Intensive in Next Generation Engineering (SHINE) *June 2024 - July 2024*

- Mentored a high school student in building an online learning-based program that can beat a human user repeatedly in a game of rock-paper-scissors

Coordinator

IIT Kanpur

Special Interest Group in Machine Learning(SIGML) *May 2021 - Nov 2021*

- Responsible for the smooth conduction of talks in different active areas of research in Machine Learning

Student Guide

IIT Kanpur

Counselling Service *July. 2019 - July 2020*

- Responsible for the guidance and mentorship at a personal level of 5 freshman undergraduates and the smooth conduction of various events in the Orientation Session for the incoming Batch of Y19

Project Mentor

IIT Kanpur

Association of Computing Activities (ACA) *Jan 2020 - Jun 2020*

- Introduced Inference algorithms in Bayesian ML to a group of freshman undergraduates, and prepared assignments to track progress