Sudeep Salgia

Postdoctoral Research Associate
Electrical and Computer Engg. Dept.
Carnegie Mellon University

B44 Porter Hall, Carnegie Mellon Univ.
Pittsburgh, PA - USA, 15213
ssalgia@andrew.cmu.edu
https://sudeepsalgia.github.io/
Google Scholar

Research Interests

I am interested in sequential learning problems arising in reinforcement learning, stochastic optimization, distributed learning, bandits, bayesian optimization, and active online learning. My broad research goals are to:

- facilitate *provably efficient, interpretable, adaptive* data-driven decision-making;
- investigate *fundamental trade-offs* in distributed learning problems;
- design optimal solutions that comply with *practical systemic limitations such as communication, privacy, and computation*.

My research employs tools from high-dimensional statistics, probability theory, large-scale optimization, information theory and machine learning.

Professional Experience

09.23 - Pre **Carnegie Mellon University**
Postdoctoral Research Associate, Electrical and Computer Engineering
Supervisor: Prof. Yuejie Chi

05.21-08.21 **Machine Learning Solutions Lab, Amazon,** *Applied Scientist Intern*
Identifying and building ML solutions to address business problems of clients
Hosted by Daniel Horowitz and Emmanuel Salawu

Education

2018-23 **Cornell University**.
Ph.D., Electrical and Computer Engineering (CGPA 4.18/4.0)
Advisor: Prof. Qing Zhao

2014-18 **Indian Institute of Technology Bombay**.
Bachelor of Technology in Electrical Engineering (with Honors), Minor in CS
Institute Silver Medalist, CGPA 9.74/10

Conference Publications

1. The Sample-Communication Complexity Trade-off in Federated Q-Learning [Paper]
   Sudeep Salgia, Yuejie Chi
   Neural Information Processing Systems (NeurIPS), 2024. ***Accepted as an oral (top*** 1%***)***.
2. Random Exploration in Bayesian Optimization: Order-Optimal Regret and Computational Efficiency [Paper]
   Sudeep Salgia, Sattar Vakili, Qing Zhao
   International Conference on Machine Learning (ICML), 2024. ***Resolves an open COLT problem***.

3. Characterizing the Accuracy-Communication-Privacy Trade-off in Distributed Stochastic Convex Optimization
   Sudeep Salgia, Nikola Pavlovic, Yuejie Chi, Qing Zhao
   Submitted to International Conference on Artificial Intelligence and Statistics (AISTATS), 2025
4. Order-Optimal Regret in Distributed Kernel Bandits using Uniform Sampling with Shared Randomness [Preprint]
   Nikola Pavlovic, **Sudeep Salgia**, Qing Zhao
   Preliminary version in NeurIPS BDU Workshop, 2024
   Submitted to International Conference on Artificial Intelligence and Statistics (AISTATS), 2025
5. Differentially Private Kernelized Contextual Bandits
   Nikola Pavlovic, **Sudeep Salgia**, Qing Zhao
   Submitted to International Conference on Artificial Intelligence and Statistics (AISTATS), 2025
6. Distributed Linear Bandits under Communication Constraints [Paper]
   Sudeep Salgia, Qing Zhao
   International Conference on Machine Learning (ICML), 2023
7. Provably and Practically Efficient Neural Contextual Bandits [Paper]
   Sudeep Salgia, Sattar Vakili, Qing Zhao
   International Conference on Machine Learning (ICML), 2023
8. A Domain-Shrinking based Bayesian Optimization Algorithm with Order-Optimal Regret Performance [Paper]
   Sudeep Salgia, Sattar Vakili, Qing Zhao
   Neural Information Processing Systems (NeurIPS), 2021
9. An order-optimal adaptive test plan for noisy group testing under unknown noise models [Paper]
   Sudeep Salgia, Qing Zhao
   International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2021
10. Stochastic Coordinate Minimization with Progressive Precision for Stochastic Convex Optimization [Paper]
    Sudeep Salgia, Qing Zhao, Sattar Vakili
    International Conference on Machine Learning (ICML), 2020
11. Stochastic Gradient Descent on a Tree: an Adaptive and Robust Approach to Stochastic Convex Optimization [Paper]
    Sattar Vakili, **Sudeep Salgia**, Qing Zhao
    Annual Allerton Conference on Communication, Control and Computing, 2019
12. On Bandlimited Spatiotemporal Field Sampling with Location and Time Unaware Mobile Sensors [Paper]
    Sudeep Salgia, Animesh Kumar
    International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2018

Journal Publications

1. Adaptive Binning Coincidence Test for Uniformity Testing [Paper]
   Sudeep Salgia, Xinyi Wang, Qing Zhao, Lang Tong
   IEEE Transactions on Signal Processing, 2024

2. A Communication-Efficient Adaptive Algorithm for Federated Learning under Cumulative Regret [Paper]
   Sudeep Salgia, Tamir Gabay, Qing Zhao, Kobi Cohen
   IEEE Transactions on Signal Processing, 2024
3. Collaborative Learning in Kernel-based Bandits [Paper]
   Sudeep Salgia, Sattar Vakili, Qing Zhao
   IEEE Transactions on Signal Processing, 2023
4. Disagreement-based Active Learning in Online Settings [Paper]
   Boshuang Huang, **Sudeep Salgia**, Qing Zhao
   IEEE Transactions on Signal Processing, 2022

Invited Talks

12.24 The Sample-Communication Complexity Trade-off in Federated Q-Learning
Neural Information Processing Systems (NeurIPS), Oral presentation

09.24 The Sample-Communication Complexity Trade-off in Federated Q-Learning
Allerton Conference, UIUC

Teaching and Community involvement

Teaching **Teaching Assistant**.
- Statistical Inference and Decision, Introduction to Probability (*Cornell University*)
- Linear Algebra, Electromagnetism (*IIT Bombay*)

Reviewing Reviewer for ICML (2021-24), NeurIPS (2021-24, in top 10% of reviewers in 22-23), AISTATS (2022-25), ICLR (2023, 2025), IJCAI (2024), ISIT (2023-24), AAAI (2025), IEEE/ACM Transactions on Networking, IEEE Transactions on Information Theory

Volunteer **Abhyasika**, *IIT Bombay*.
- Abhyasika is an initiative that runs tutorials for underprivileged children and supports them in their education

Mentorship

12.23 - Pre Nikola Pavlovic, PhD Student, Cornell University

06.24 - Pre Tonghe Zhang, Visting UG student, Tsinghua University

05.22 - 04.23 Tamir Gabay, Masters student, Ben-Gurion University of the Negev

08.22 - 12.22 Danyu Hu, Masters student, Cornell University (Curr. Quantitative Analyst)

08.22 - 12.22 Owen Deng, Masters student, Cornell University (Curr. Design Verification Engineer at Apple)

08.21 - 02.22 Omer Serbetci, Masters student, Cornell University (Curr. PhD student at USC)

2017-18 **Department Academic Mentor**, *IIT Bombay*.
- Selected among 22 students based on interpersonal skills and academic performance to mentor students with academic backlog and help them address concomitant social problems

Scholastic Achievements and Awards

2018	Awarded Jacobs Scholar Fellowship at Cornell University
2018	Silver Medalist in the Class of 2018, IIT Bombay
2014	Secured All India Rank 214 in JEE Advanced 2014 among 150,000 selected candidates from over all India
2017	Selected for the final round of Honda YES Scholarship, among top 20 students in India on the basis of views on and contribution to eco-technology
2015	Best Application Award for our project on Sign Language to Text Converter at the Tech & RnD Expo, IIT Bombay
2005-2012	Stood among Top 100 in India in various Math, Science and Cyber Olympiads

Co-Curricular Activities

- Member of the Cornell Cricket Team
- Amongst top active contributors at Math StackExchange (top 5% in 2023)
- Secured sixth position in a global Creative Writing competition in Mood Indigo 2014 - the cultural fest of IIT Bombay
- Was a Moderator at Brilliant.org, a community based platform for development of skills in Math and Science for international competitive exams, for two years
- Articles published in various print media (English and Hindi)
- Hobbies: Painting, Sketching, Badminton, Cricket

References

References available on request