

Shipra Agrawal

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| DATE | August 2023 |
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| CONTACT INFORMATION | email: sa3305@columbia.edu web: http://www.columbia.edu/~sa3305/ address: Columbia University 423 Mudd Building 500 West 120th Street New York, NY 10027 |
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| RESEARCH INTERESTS | Sequential decision making under uncertainty, Multi-armed bandits, Reinforcement learning, Online learning, Online optimization, Game theory and Mechanism design. |
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| EDUCATION | Stanford University , Stanford, CA <i>Ph.D., Computer Science</i> Sep 2006 - June 2011 <ul style="list-style-type: none">• Thesis title: “Optimization under uncertainty: Bounding the correlation gap”• Advisor: Yinyu Ye, Management Science and Engineering (MS&E) Indian Institute of Science , Bangalore, India <i>M.E., Computer Science and Automation</i> Aug 2002 - Apr 2004 M.B.M. Engineering College , Jodhpur, India <i>B.E., Computer Science and Engineering</i> Aug 1998 - Apr 2002 |
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| EMPLOYMENT | Columbia University , New York, NY Associate Professor Sep 2015 - present Department of Industrial Engineering and Operations Research Affiliate, Department of Computer Science Affiliate, Data Science Institute Google , New York, NY Visiting Faculty Researcher Jan 2022 - Jan 2023 Amazon , Seattle, WA Amazon Scholar Jan 2019 - Jan 2021 Microsoft Research (MSR) , Bangalore, India Researcher Jul 2013 - Aug 2015 Microsoft Research (MSR) , Bangalore, India Postdoctoral researcher Aug 2011 - Jun 2013 IBM Almaden Research Center , San Jose, CA Research Intern Jun 2008 - Sep 2008 Bell Labs Alcatel-Lucent , Bangalore, India Member of Research Staff Dec 2004 - Aug 2006 Yahoo! Software India Pvt. Ltd. , Bangalore, India Software Engineer Aug 2004 - Dec 2004 |
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(In all the publications listed below, the author ordering is alphabetical and indicates equal contribution, except when the first author is indicated by *)
(Underline indicates student coauthors)

Journal publications

1. **S. Agrawal**, R. Jia, “Optimistic Posterior Sampling for Reinforcement Learning: worst-case regret bounds”, *Mathematics of Operations Research*. Volume 48, Issue 1, February 2023.
 - Conference version in *Neural Information Processing Systems* (NeurIPS), 2017
 - Neurips Spotlight paper: ~4% of 3240 submissions.
2. **S. Agrawal**, R. Jia, “Learning in Structured MDPs with Convex Cost Functions: improved regret bounds for inventory management”. *Operations Research*. Volume 70 Issue 3, May-June 2022.
 - Conference version in ACM conference on Economics and Computation (EC) 2019.
3. **S. Agrawal**, V. Avadhanula, V. Goyal, A. Zeevi, “MNL-Bandit: A Dynamic Learning Approach to Assortment Selection”. *Operations Research*, 67(5):1209-1502 (2019).
 - Conference version in *ACM conference on Economics and Computation* (EC) 2016
4. **S. Agrawal**, N. R. Devanur, “Bandits with Global Convex Constraints and Objective”. *Operations Research* 67(5):1486-1502 (2019).
 - Invited to the special issue of ACM Transactions on Economics and Computation (TEAC) featuring selected papers from EC 2014 (invitation declined).
 - Conference version in *ACM conference on Economics and Computation* (EC) 2014
5. **S. Agrawal**, “Recent Advances in Multiarmed Bandits for Sequential Decision Making”, INFORMS TutORials in Operations Research, Operations Research & Management Science in the Age of Analytics, Pages 167–188, October 2019.
6. **S. Agrawal**, N. Goyal, “Near-optimal regret bounds for Thompson Sampling”. *Journal of the ACM* (JACM), Volume 64 Issue 5, October 2017.
7. **S. Agrawal**, Z. Wang, and Y. Ye, “A Dynamic Near-Optimal Algorithm for Online Linear Programming”. *Operations Research* 62:876-890 (2014).
8. **S. Agrawal**, Y. Ding, A. Saberi, and Y. Ye, “Price of Correlations in Stochastic Optimization”. *Operations Research* 60:243-248 (2012).
 - Conference version in *ACM-SIAM Symposium on Discrete Algorithms* SODA’10
9. **S. Agrawal**, E. Delage, M. Peters, Z. Wang, and Y. Ye, “A Unified Framework for Dynamic Prediction Market Design” *Operations Research* 59:3:550–568 (2011).
 - Conference version in *ACM conference on Economics and Computation* (EC) 2009
10. **S. Agrawal**, N. Megiddo, and B. Armbruster, “Equilibrium in Prediction Markets with Buyers and Sellers”. *Economic Letters* 109:46-49 (2010).
11. **S. Agrawal**, J.R. Haritsa, and B. A. Prakash, “FRAPP: A Framework for High-Accuracy Privacy-Preserving Mining”. *Data Mining and Knowledge Discovery Journal* 18:101-139 (2009).
12. **S. Agrawal**, C. N. Kanthi, K. V. M. Naidu, J. Ramamirtham, R. Rastogi, S. Satkin, and A. Srinivasan, “Monitoring Infrastructure for Converged Networks and Services”. *Bell Labs Technical Journal* 12(2): 63-77 (2007).

Journal papers under review

- **S. Agrawal**, V. Avadhanula, V. Goyal, A. Zeevi, “Thompson Sampling for the MNL-Bandit”, Accepted to Appear, *Mathematics of Operations Research*.
- T. Kocák*, M. Valko, R. Munos, **S. Agrawal**, “Spectral Thompson Sampling”. *Journal of Machine Learning Research*. Accepted conditional on minor revision.

Peer-reviewed conference papers (not superseded by journal publications)

13. S. Yin*, **S. Agrawal**, A Zeevi, Online Allocation and Learning in the Presence of Strategic Agents, *Neural Information Processing Systems (Neurips)* 2022.
14. S. R. Putta*, **S. Agrawal**, Scale Free Adversarial Multi Armed Bandits, The 33rd International Conference on Algorithmic Learning Theory (ALT) 2022.
15. **S. Agrawal**, S. Yin, A. Zeevi, Dynamic Pricing and Learning under Bass Model, *ACM conference on Economics and Computation (EC)* 2021.
16. **S. Agrawal**, E. Balkanski, V. Mirrokni, B. Sivan, Dynamic First Price Auctions Robust to Heterogeneous Buyers *ACM conference on Economics and Computation (EC)* 2021.
17. Y. Tang*, **S. Agrawal**, Y. Faenza, “Reinforcement Learning for Integer Programming: Learning to Cut”. International Conference on Machine Learning (ICML) 2020.
18. **S. Agrawal**, J. Sethuraman, X. Zhang, “On Optimal Ordering in the Optimal Stopping Problem”, *ACM conference on Economics and Computation (EC)* 2020.
19. Y. Tang*, **S. Agrawal**, “Discretizing Continuous Action Space for On-Policy Optimization”, *AAAI Conference on Artificial Intelligence (AAAI)*, 2020.
20. **S. Agrawal**, M. Shadravan, C. Stein, “Submodular Secretary Problem with Shortlists”, *Innovations in Theoretical Computer Science (ITCS)*, 2019.
21. **S. Agrawal**, C. Daskalakis, V. Mirrokni, B. Sivan, “Robust Repeated Auctions under Heterogeneous Buyer Behavior”, *ACM conference on Economics and Computation (EC)*, 2018
22. **S. Agrawal**, V. Mirrokni, M. Zadimoghaddam, “Proportional Allocation: Simple, Distributed, and Diverse Matching with High Entropy”, *International conference on Machine Learning (ICML)*, 2018.
23. C. Pike-Burke*, **S. Agrawal**, S. Grunewalder, C. Szepesvari, “Bandits with Delayed, Aggregated Anonymous Feedback”, *International conference on Machine Learning (ICML)*, 2018.
24. Y. Tang*, **S. Agrawal**, “Exploration by Distributional Reinforcement Learning”, *International Joint Conference on Artificial Intelligence (IJCAI)*, 2018.
25. **S. Agrawal**, V. Avadhanula, V. Goyal, A. Zeevi, “Thompson Sampling for the MNL-Bandit”, *Conference in Learning Theory (COLT)* 2017.
26. **S. Agrawal**, N. R. Devanur, “Linear Contextual Bandits with Knapsacks”. *Neural Information Processing Systems (NeurIPS)*, 2016.
27. **S. Agrawal**, N. R. Devanur, L. Li, “Contextual Bandits with Knapsacks”. *Conference on Learning Theory (COLT)*, 2016.
28. **S. Agrawal**, N. R. Devanur, “Fast Algorithms for Online Stochastic Convex Programming”. *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2015.
- Invited to the special issue of ACM Transactions on Algorithms featuring selected papers from SODA 2015 (invitation declined).
29. T. Kocák*, M. Valko, R. Munos, **S. Agrawal**, “Spectral Thompson Sampling”. *AAAI Conference on Artificial Intelligence (AAAI)*, 2014.

30. **S. Agrawal**, N. Goyal, “Thompson Sampling for Contextual Bandits with Linear Payoffs”. *International Conference on Machine Learning (ICML)*, 2013.
31. **S. Agrawal**, N. Goyal, “Further Optimal Regret Bounds for Thompson Sampling”, *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2013.
32. **S. Agrawal**, N. Goyal, “Analysis of Thompson Sampling for the Multi-armed Bandit Problem”. *Conference on Learning Theory (COLT)*, 2012.
33. **S. Agrawal**, Z. Wang, and Y. Ye, “Parimutuel Betting on Permutations”. *International Workshop On Internet And Network Economics (WINE)*, 2008.
34. **S. Agrawal**, K.V.M. Naidu, and R. Rastogi, “Diagnosing Link-Level Anomalies Using Passive Probes”. *IEEE Conference on Computer Communications (INFOCOM)*, 2007.
35. **S. Agrawal**, S. Deb, K.V.M. Naidu, and R. Rastogi, “Efficient Detection of Distributed Constraint Violations”. Short paper. *International Conference on Data Engineering (ICDE)*, 2007.
36. **S. Agrawal**, P.P.S. Narayan, J. Ramamirtham, R. Rastogi, M. Smith, K. Swanson, and M. Thottan, “VoIP Service Quality Monitoring using Active and Passive Probes”. *International Conference on COMMunication System softWARE and MiddlewaRE (COMSWARE)*, 2006.
37. **S. Agrawal**, J.R. Haritsa, “A Framework for High-Accuracy Privacy-Preserving Mining”. *International Conference on Data Engineering (ICDE)*, 2005.
38. **S. Agrawal**, V. Krishnan, and J.R. Haritsa, “On Addressing Efficiency Concerns in Privacy-Preserving Mining”. *International Conference on Database Systems for Advanced Applications (DASFAA)*, 2004.

AWARDS AND HONORS

- Elected to COLT (Conference on Learning Theory) Board of Directors (aka ‘COLT steering committee’).
- Cyrus Derman Assistant Professorship of Industrial Engineering and Operations Research, Columbia University (effective January 1, 2020 through December 31, 2022).
- NSF CAREER Award 2019-2023.
- Google Faculty Research Award 2017-2018.
- Amazon Faculty Research Award 2017-2018.
- Honorable mention, INFORMS Junior Faculty Interest Group (JFIG) prize 2017.
- Selected as an inaugural member of the ACM Future of Computing Academy (FCA). Announced April 2017.

RECENT ACTIVITIES

- General chair for Conference on Learning Theory (COLT) 2024. (co-chair Aaron Roth).
- Member and participant, DARPA Information Science & Technology (ISAT) study group, since July 2023.
- Member, Tucker Prize committee for ISMP 2024.
- General chair for ALT 2023 in Singapore, Feb 20-23, 2023. (co-chair Francesco Orabona).
- Organizer, Fall’22 semester on Data-Driven Decision Processes at Simons Institute, Berkeley, CA. Aug. 17 – Dec. 16, 2022. (co-organizers Thodoris Lykouris, Siddhartha Banerjee, Shuchi Chawla)