Darshan Chakrabarti

Curriculum Vitae — December 2024

Personal information

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Education

09/2021 – PRESENT   **Ph.D. Student in Industrial Engineering and Operations Research** at Columbia University. I am currently in my fourth year, working primarily on computational game theory, and am fortunate to be advised by Prof. Christian Kroer.
▷ Research interests: artificial intelligence, optimization, economics and computation.

▷ I am supported by a NSF Graduate Research Fellowship.

08/2016 – 05/2019   **B.S. in Computer Science** at Carnegie Mellon University
GPA – 3.96, CMU Presidential Scholar, Minor in Mathematics, Minor in Machine Learning

Publications

1. D. Chakrabarti, J. Grand-Clément, C. Kroer (2024). Extensive-Form Game Solving via Blackwell Approachability on Treeplexes. In: *Neural Information Processing Systems (NeurIPS)*. (Acceptance rate: 2.5 %). *Spotlight Paper.*

2. J. Černý, C. K. Ling, D. Chakrabarti, J. Zhang, G. Farina, C. Kroer, G. Iyengar (2024). Contested Logistics: A Game Theoretic Approach. In: *Conference on Game Theory and AI for Security (GameSec)*. *Best Paper.*

3. D. Chakrabarti, G. Farina, C. Kroer (2024). Efficient Online Learning in Polyhedral Games using Best-Response Oracles. In: *Conference on Artificial Intelligence (AAAI)*. (Acceptance rate: 23.7%).

4. M. Curry, V. Thoma, D. Chakrabarti, S.M. McAleer, C. Kroer, T. Sandholm, N. He, S. Seuken (2024). Automated Design of Affine Maximizer Mechanisms in Dynamic Settings. In: *Conference on Artificial Intelligence (AAAI)*. (Acceptance rate: 23.7%).

5. S.A. Esmaeili, D. Chakrabarti, H. Grape, B. Brubach (2024). Implications of Distance over Redistricting Maps: Central and Outlier Maps. In: *Conference on Artificial Intelligence (AAAI)*. (Acceptance rate: 23.7%).

6. D. Chakrabarti, J. Diakonikolas, C. Kroer (2023). Block-Coordinate Methods and Restarting for Solving Extensive-Form Games. In: *Neural Information Processing Systems (NeurIPS)*. (Acceptance rate: 26.1%).

7. D. Chakrabarti, J.P. Dickerson, S.A. Esmaeili, A. Srinivasan, and L. Tsepenekas (2022). A New Notion of Individually Fair Clustering: α-Equitable k-Center. In: *International Conference on Artificial Intelligence and Statistics (AISTATS)*. (Acceptance rate: 29.2%).

8. D. Chakrabarti, J. Gao, A. Saraf, G. Schoenebeck, and F. Yu (2022). Optimal Local Bayesian Differential Privacy over Markov Chains (Extended Abstract). In: *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*.

9. B. Brubach, D. Chakrabarti, J.P. Dickerson, A. Srinivasan, and L. Tsepenekas (2021). Fairness, Semi-Supervised Learning, and More: A General Framework for Clustering with Stochastic Pairwise Constraints. In: *Conference on Artificial Intelligence (AAAI)*. (Acceptance rate: 21.4%).

10. B. Brubach, D. Chakrabarti, J.P. Dickerson, S. Khuller, A. Srinivasan, and L. Tsepenekas (2020). A Pairwise Fair and Community-preserving Approach to k-Center Clustering. In: *International Conference on Machine Learning (ICML)*. (Acceptance rate: 21.8%).

Refereed workshop papers

11. D. Chakrabarti, G. Farina, C. Kroer (2023). Efficient Learning in Polyhedral Games via Best-Response Oracles. In: *NeurIPS 2023 Workshop on Optimization for Machine Learning (OPT 2023)*.

12. M. Curry, V. Thoma, D. Chakrabarti, S.M. McAleer, C. Kroer, T. Sandholm, N. He, S. Seuken (2023). Automated Design of Affine Maximizer Mechanisms in Dynamic Settings. In: *European Workshops on Reinforcement Learning (EWRL16)*.

13. G. Brero, D. Chakrabarti, A. Eden, M. Gerstgrasser, V. Li, and D. Parkes (2021). Learning Stackelberg Equilibria in Sequential Price Mechanisms. In: *ICML 2021 Workshop on Reinforcement Learning Theory*.

14. D. Chakrabarti, J. Gao, A. Saraf, G. Schoenebeck, and F. Yu (2020). Optimal Local Bayesian Differential Privacy over Markov Chains. In: *Mechanism Design for Social Good (MD4SG)*.

Work experience

08/2020 – 08/2021	**Research Fellow** at **Harvard John A. Paulson School of Engineering and Applied Sciences**. Explored deep reinforcement learning for automated mechanism design in dynamic multi-agent environments, under the supervision of Prof. David Parkes.
01/2019 – 02/2021	**Applied Research Software Engineer** at **Strategy Robot**. Developed game-theoretic AI for the Department of Defense.
06/2018 – 08/2018	**Research Assistant** at **University of Maryland Combinatorics and Algorithms for Real Problems REU**. Researched under the supervision of Prof. John Dickerson on a project entitled Diversity in Matching Markets. Was funded jointly by Dr. An Zhu and Google.
08/2017 – 12/2018	**Teaching Assistant** at **Carnegie Mellon University** for *15-251: Great Theoretical Ideas in Computer Science*. Held weekly recitations, helped students write good proofs in office hours, and was involved with rubric creation for homeworks and exams to ensure fair grading and feedback for students.
06/2017 – 08/2017	**Research Analyst Intern** at **Convex Capital Management**. Implemented automatic retrieval and analysis of ETF price data using a combination of fundamental and technical analysis to rank potential investments using MATLAB, all put in to production. Helped analyze potential improvements to Convex Proprietary Leading Economic Index which is used to develop risk ratings for 30 countries around the world.

Relevant coursework

- Integer Programming (Fall 2023)
- Market Design (Spring 2023)
- Dynamic Programming (Spring 2022)
- Optimization (Fall 2021/Spring 2022)
- Stochastic Modeling (Fall 2021/Spring 2022)
- Foundations of Optimization (Fall 2021)
- Graduate Artificial Intelligence (Spring 2019)
- AI Methods for Social Good (Spring 2019)
- Truth, Justice, and Algorithms (Fall 2018)
- Quantum Computation and Information (Fall 2018)
- Parallel Computer Architecture and Programming (Fall 2018).
- Machine Learning with Large Datasets (Spring 2018)

Awards and Honors

2023 – PRESENT	NSF Graduate Research Fellowship
2021	Columbia Provost Office Diversity Fellowship
2021	Columbia Robert Gartland Fellowship
2017	Putnam Top 500
2016 – 2019	CMU Presidential Scholar

Software

Programming languages

C++14	I am fluent in C++14 and its standard libraries.
PYTHON	I am fluent in Python.
JAVA, MATLAB	I also have experience with Java and MATLAB.

Numerical, learning, and optimization libraries

SCIPY STACK	Python's scientific stack (NumPy, SciPy, Matplotlib, pandas).
PYTORCH, TENSORFLOW	Deep learning packages.
RLLIB	Reinforcement learning library.
CVXPY	Convex optimization package.
EIGEN	Linear algebra library for C++.
GUROBI	Optimization solver for LPs, MIPs, QPs, etc.

Service

Reviewed for EC (2024), NeurIPS (2023, 2024: *Top Reviewer*), ICLR (2023, 2024), ICML (2024), and AAAI (2024).

Teaching

01/2022 – PRESENT	TA for IEOR 4111: Operations Consulting (Columbia).
09/2017 – 12/2018	TA for 15-251: Great Ideas in Theoretical Computer Science (CMU).

Outreach

10/2021 – 04/2022	Columbia University Saturday Honors Program (**SHP**) instructor. ▷ Spring 2022: Economics and Computation ▷ Fall 2021: Introduction to Algorithms
10/2021 – PRESENT	Women in Science at Columbia Mentorship Undergraduate Mentoring Program mentor.
09/2020 – PRESENT	Member of **MD4SG** Civic Participation working group.