Natalie Collina

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My research is in the intersection of Machine Learning and Game Theory. In particular, I explore the strategic properties of learning algorithms, and the incentives that arise when AI models are deployed in repeated interactions.

Education

University of Pennsylvania, Ph.D. Student in Computer and Information Sciences **2021 – Present**
Advised by Aaron Roth and Michael Kearns. Supported by the IBM Research Fellowship.

Princeton University, A.B. 2019 **Summa Cum Laude**
Awarded the Outstanding Computer Science Senior Thesis Prize.

Working Papers

Competitive Persuasion Between AI Agents
Natalie Collina, Surbhi Goel, Aaron Roth, Mirah Shi

Breaking Algorithmic Collusion via Simple Defections
Natalie Collina*, Eshwar Ram Arunachaleswaran, Meena Jagadeeson

Preprints

Collaborative Prediction: Tractable Information Aggregation via Agreement
Natalie Collina, Ira Globus-Harris, Surbhi Goel, Varun Gupta, Aaron Roth, and Mirah Shi

The Value of Ambiguous Commitments in Multi-Follower Games
Natalie Collina, Rabanus Derr, and Aaron Roth

Conference Publications

Swap Regret and Correlated Equilibria Beyond Normal-Form Games **EC 2025**
Eshwar Ram Arunachaleswaran, Natalie Collina, Yishay Mansour, Mehryar Mohri, Jon Schneider, and Balasubramanian Sivan

Learning to Play Against Unknown Opponents **EC 2025**
Eshwar Ram Arunachaleswaran, Natalie Collina, and Jon Schneider

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Tractable Agreement Protocols **STOC 2025**
Natalie Collina, Surbhi Goel, Varun Gupta, and Aaron Roth
Also accepted to the Pluralistic Alignment Workshop, NeurIPS 2024

Algorithmic Collusion Without Threats **ITCS 2025**
Eshwar Ram Arunachaleswaran, Natalie Collina, Sampath Kannan, Aaron Roth, and Juba Ziani
Also accepted to CSLAW 2025, non-archival track

An Elementary Predictor Obtaining 2\sqrt(T) Distance to Calibration **SODA 2025**
Eshwar Ran Arunachaleswaran, Natalie Collina, Aaron Roth, and Mirah Shi
Also accepted to the OPT24 Workshop, NeurIPS 2024

Repeated Contracting with Multiple Non-Myopic Agents: Policy Regret and Limited Liability **EC 2024**
Natalie Collina, Varun Gupta, and Aaron Roth.
Also accepted to the 2024 ESIF Economics and AI+ML Meeting.

Pareto-Optimal Algorithms for Learning in Repeated Games **EC 2024**
Eshwar Ram Arunachaleswaran, Natalie Collina, and Jon Schneider.
Also accepted to the 2024 ESIF Economics and AI+ML Meeting.

Efficient Prior-Free Mechanisms for No-Regret Agents **EC 2024**
Natalie Collina, Aaron Roth, and Han Shao.

Efficient Stackelberg Strategies for Finitely Repeated Games **AAMAS 2023**
Natalie Collina*, Eshwar Ram Arunachaleswaran, and Michael Kearns.

Dynamic Weighted Matching with Heterogenous Arrival and Departure Rates **WINE 2020**

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Natalie Collina, Nicole Immorlica, Kevin Leyton-Brown, Brendan Lucier, and Neil Newman.

On the (in)-approximability of Bayesian Mechanism Design for a Combinatorial Buyer **EC 2020**
Natalie Collina and Matt Weinberg.

Journal Publications

Analysis of the ICML 2023 Ranking Data: Can Authors' Opinions of Their Own Papers Assist Peer Review in Machine Learning? **JASA (Discussion Paper)**
Buxin Su*, Jiayao Zhang, Natalie Collina, Yuling Yan, Didong Li, Jianqing Fan, Aaron Roth, and Weijie J. Su
Accepted to the Workshop on Incentives in Academia, EC 2024.
(*denotes author-contribution order; authorship is alphabetical otherwise)

Awards & Honors

IBM PhD Fellowship (2024-2025)
Rising Star in EECS, MIT (2024)
Gift from Amazon AWS in Trustworthy AI (2023)
NSF-GRFP Honorable Mention (2020)
Outstanding Computer Science Senior Thesis Prize (2019)
Sigma Xi Book Award for Outstanding Undergraduate Research (2019)

Work Experience

Microsoft Research Intern, Economics and Computation Group	Summer 2025 (upcoming)
Google Software Engineer	Fall 2019 –Spring 2021
Microsoft Research Intern, Economics and Computation Group	Summer 2019
Amazon Web Services Software Development Intern	Summer 2018

Invited Talks

Collaborative Prediction: Tractable Information Aggregation via Agreement
Caltech RSRG/FALCON Seminar
AWS Responsible AI Science Meeting
CHAI workshop, session on Cooperation and Coordination (upcoming)
INFORMS session on Recommendations, Fairness, and Human-AI Interaction (upcoming)

Algorithmic Collusion Without Threats
2024 Innovations in Theoretical Computer Science (ITCS)
2025 Computer Science and Law Conference (CSLAW)

Tractable Agreement Protocols
Northwestern/TTIC Junior Theorists Workshop
JHU Theory Seminar
AWS Responsible AI Science Meeting
FOCS Workshop on Calibration
TOC4Fairness Seminar
NYC Student Theory Day
2025 Symposium on Theory of Computing (STOC) (upcoming)

Learning to Play Against Unknown Opponents
INRIA Paris Optimization Seminar
Princeton Mechanism Design Lunch

Pareto-Optimal Algorithms for Learning in Repeated Games
2024 Workshop on Algorithms, Learning and Economics (WALE)
2024 ACM Conference on Economics and Computation (EC)
2024 ESIF Economics and AI+ML Meeting

Repeated Contracting with Multiple Non-Myopic Agents: Policy Regret and Limited Liability
EnCORE Seminar (Best Presentation Award)

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2024 ACM Conference on Economics and Computation (EC)
2024 ESIF Economics and AI+ML Meeting

Efficient Prior-Free Mechanisms for No-Regret Agents
2024 ACM Conference on Economics and Computation (EC)
2024 INFORMS Meeting

Efficient Stackelberg Strategies for Finitely Repeated Games
2023 Conference on Autonomous Agents and Multi Agent Systems (AAMAS)

Dynamic Weighted Matching with Heterogeneous Arrival and Departure Rates
2020 Conference on Web, Internet and Network Economics (WINE)

On the (in)-approximability of Bayesian Mechanism Design for a Combinatorial Buyer
2020 ACM Conference on Economics and Computation (EC)

Leadership and Mentorship

Co-leader Economics and Computation Gender Inclusion Workshop	EC 2024, EC 2025
Co-founder and Leader, University of Pennsylvania Theory Seminar	Fall 2022 – present
Head Teaching Assistant, Advanced Topics in Machine Learning (CIS 6200)	Fall 2024
Head Teaching Assistant, Algorithmic Game Theory (NETS 4120)	Spring 2023
Teaching Assistant, New Horizons in Theoretical Computer Science	Summer 2022
Head Teaching Assistant, Introduction to Algorithms (CIS 3200)	Fall 2021

Service

PC Reviewer: EC 2025, FAccT 2022
Subreviewer: STOC 2025, FAccT 2024, SODA 2024, ITCS 2023, EC 2021.
Student Volunteer: CCC 2022.

Other Talks

A General Reduction from No-Regret to No-Swap Regret
Lecture in CIS 6200, University of Pennsylvania.