

# HEDYEH BEYHAGHI

University of Massachusetts Amherst

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<https://hedyehbeyhaghi.github.io/>

## RESEARCH INTERESTS

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Algorithmic Game Theory and Mechanism Design, Algorithms under Uncertainty, Machine Learning Theory

## EDUCATION

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**Ph.D. in Computer Science.** Cornell University. 2019

Theory of Computation Concentration

Artificial Intelligence Concentration

Applied Mathematics Concentration

Thesis: *Approximately-Optimal Mechanisms in Auction Design, Search Theory, and Matching Markets.*

Advisor: Éva Tardos.

Thesis Committee: Robert Kleinberg, Joseph Halpern, S. Matthew Weinberg

**M.S. in Computer Science.** Cornell University. 2017

**B.S. in Computer Engineering.** Sharif University of Technology. 2012

## APPOINTMENTS

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**Assistant Professor.** *Sept. 2024 – present*

University of Massachusetts Amherst.

Manning College of Information & Computer Sciences.

**Post-doctoral Research Associate.** *2022 – 2024*

Carnegie Mellon University.

Machine Learning Department, School of Computer Science.

Supervisor: Maria-Florina Balcan.

**Post-doctoral Research Fellow.** *2019 – 2021*

Toyota Technological Institute at Chicago and Northwestern University.

Supervisors: Avrim Blum, Jason Hartline, Samir Khuller.

## RESEARCH VISITS AND INTERNSHIPS

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**Ivy-Plus Exchange Scholar.** Princeton University. *2017 – 2019*

Host: Matt Weinberg.

**Visiting Student.** Microsoft Research, New England. *April 2019*

Host: Brendan Lucier.

**Intern.** Google, New York. *Summer 2017*

**Visiting Scholar.** UC Berkeley. *Fall 2015*

Semester on Economics and Computation at the Simons Institute for the theory of computing.

## MENTORING

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**Ph.D. Advisees.** *current*

Amirmahdi Mirfakhar  
Ahmed Luqman

**Undergraduate Thesis Advisee.** *current*

Om Mehta

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## SURVEY PAPER

Hedyeh Beyhaghi, Linda Cai.

**Recent Developments in Pandora's Box Problem: Variants and Applications.**

ACM SIGecom Exchanges Vol. 21.1.

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## WORKING PAPERS

Maria-Florina Balcan, Hedyeh Beyhaghi.

**The Active and Noise-Tolerant Strategic Perceptron.**

Xuchuang Wang, Bo Sun, Hedyeh Beyhaghi, John C.S. Lui, Mohammad Hajiesmaili, Adam Wierman.

**Competitive Algorithms for Multi-Agent Ski-Rental Problems.**

Ehsan Aghazadeh, Ahmad Ghasemi, Hedyeh Beyhaghi, Hossein Pishro-Nik.

**CGES: Confidence-Guided Early Stopping for Efficient and Accurate Self-Consistency.**

Preliminary version accepted in *NeurIPS 2025 Efficient Reasoning Workshop*.

Amirmahdi Mirfakhar, Xuchuang Wang, Mengfan Xu, Hedyeh Beyhaghi, Mohammad Hajiesmaili.

**Bandit Learning in Matching Markets with Interviews.**

Amirmahdi Mirfakhar, Maria-Florina Balcan, Hedyeh Beyhaghi.

**A New Framework for Efficient Proportional Sampling with Applications to Online Learning.**

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## JOURNAL PAPERS

Maria-Florina Balcan, Hedyeh Beyhaghi.

**New Guarantees for Learning Revenue Maximizing Menus of Lotteries and Two-Part Tariffs.**

Transactions on Machine Learning Research, 2024.

Hedyeh Beyhaghi, Negin Golrezaei, Renato Paes Leme, Martin Pál, Balasubramanian Sivan.

**Improved Revenue Bounds for Posted-Price and Second-Price Mechanisms.**

Operations Research, Volume 69, Issue 1, pp. 297 - 314, 2021.

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## REFEREED CONFERENCE PAPERS

Helia Karisani, Mohammadreza Daneshvaramoli, Hedyeh Beyhaghi, Mohammad Hajiesmaili, Cameron Musco.

**The Secretary Problem with Predictions and a Chosen Order.**

In Proceedings of the 17th Innovations in Theoretical Computer Science (ITCS), 2026.

Hedyeh Beyhaghi, Linda Cai, Yiding Feng, Yingkai Li, Matt Weinberg.

**Competition Complexity in Multi-Item Auctions: Beyond VCG and Regularity**

In Proceedings of the 26th ACM Conference on Economics and Computation (EC), 2025.

Hedyeh Beyhaghi, Linda Cai.

**Pandora's Problem with Nonobligatory Inspection: Optimal Structure and a PTAS.**

In Proceedings of the 55th Annual ACM Symposium on Theory of Computing (STOC), 2023.

Hedyeh Beyhaghi, Modibo Camara, Jason Hartline, Aleck Johnsen, Sheng Long.

**Screening with Disadvantaged Agents.**

In Proceedings of the 4th Annual Symposium on Foundations of Responsible Computing (FORC), 2023.

Saba Ahmadi, Hedyeh Beyhaghi, Avrim Blum, Keziah Naggita.

**Setting Fair Incentives to Maximize Improvement.**

In Proceedings of the 4th Annual Symposium on Foundations of Responsible Computing (FORC), 2023.

Saba Ahmadi, Hedyeh Beyhaghi, Avrim Blum, Keziah Naggita.

**On classification of strategic agents who can both game and improve.**

In Proceedings of the 3rd Annual Symposium on Foundations of Responsible Computing (FORC), 2022.

Maryam Bahrani, Hedyeh Beyhaghi, Sahil Singla, S. Matthew Weinberg.

**Formal Barriers to Simple Algorithms for the Matroid Secretary Problem.**

In Proceedings of the 17th Conference on Web and Internet Economics (WINE), 2021.

Saba Ahmadi, Hedyeh Beyhaghi, Avrim Blum, Keziah Naggita.

**The Strategic Perceptron.**

In Proceedings of the 22nd ACM Conference on Economics and Computation (EC), 2021.

Hedyeh Beyhaghi, Éva Tardos.

**Randomness and Fairness in Two-Sided Matching with Limited Interviews.**

In Proceedings of the 12th Innovations in Theoretical Computer Science (ITCS), 2021.

Hedyeh Beyhaghi, S. Matthew Weinberg.

**Optimal (and Benchmark-Optimal) Competition Complexity for Additive Buyers over Independent Items.**

In Proceedings of the 51st ACM Symposium on Theory of Computing (STOC), 2019.

Hedyeh Beyhaghi, Robert Kleinberg.

**Pandora's Problem with Nonobligatory Inspection.**

In Proceedings of the 20th ACM conference on Economics and Computation (EC), 2019.

Hedyeh Beyhaghi, Éva Tardos, Daniela Saban.

**Effect of Selfish Choices in Deferred Acceptance with Short Lists.**

Accepted to the 4th International Workshop on Matching Under Preferences (Match-Up), 2017.

Hedyeh Beyhaghi, Éva Tardos, Nishanth Dikkala.

**Effect of Strategic Grading and Early Offers in Matching Markets.**

In Proceedings of the 8th International Symposium on Algorithmic Game Theory (SAGT), 2015.

Hedyeh Beyhaghi, Zahra Fahmi, Mohammad Amin Fazli, Jafar Habibi, Pooya Jalaly, Mohammad Ali Safari.

**Naturality of Network Creation Games, Measurement and Analysis.**

In Proceedings of the 2012 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM), 2012.

## TEACHING EXPERIENCE

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**Instructor** (UMass Amherst)

Algorithmic Game Theory (COMPSCI 690AG).

*Spring 2026*

Theory Seminar (COMPSCI 891M).

*Fall 2025*

Advanced Algorithms (COMPSCI 611).

*Spring 2025, Fall 2025*

**Guest Lecturer**

Strategic Classification and the Strategic Perceptron (two lectures)

*Spring 2023*

*Carnegie Mellon University course on Foundations of Learning, Game Theory, and Their Connections.*

Strategic Classification and the Strategic Perceptron (one lecture)  
*Carnegie Mellon University course on Advanced Topics in Machine Learning Theory.*

*Fall 2022*

### **Teaching Assistant**

#### **The Structure of Information Networks.**

*Spring 2018*

Cornell University, Instructor: Jon Kleinberg.

#### **Networks.**

*Fall 2016*

Cornell University, Instructors: David Easley, Éva Tardos.

#### **Networks.**

*Fall 2012*

Cornell University, Instructors: Jon Kleinberg, Éva Tardos.

#### **Design and Analysis of Algorithms.**

*Fall 2010, Spring 2011*

Sharif University of Technology.

#### **Discrete Structures.**

*Spring 2010, Spring 2011*

Sharif University of Technology.

#### **Signals and Systems.**

*Spring 2011*

Sharif University of Technology.

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## **AWARDS, FELLOWSHIPS, AND DISTINCTIONS**

Manning College of Information & Computer Sciences Dean Fellowship. University of Massachusetts Amherst. *2024-2027*

Post-doctoral Research Fellowship. Toyota Technological Institute at Chicago. *2019*

Post-doctoral Research Fellowship. Northwestern University. *2019*

Ranked 3rd in the National Scientific Olympiad in Computer Engineering, Iran. *2012*

Ranked 1st, 1st, 2nd, and 5th in the Nationwide Graduate Entrance Exam in Algorithms and Computation, Software Engineering, Artificial Intelligence, and Computer Architecture, respectively, Iran. *2012*

Recognized as an exceptionally talented B.Sc. student and been granted an unconditional offer of admission to the M.Sc. program in Computer Engineering at Sharif University of Technology. *2011*

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## **INVITED TALKS / POSTERS**

### **Active, Noise-Tolerant, and Strategic Online Classification**

- Workshop on Learning-augmented Algorithms: Theory and Applications, SIGMETRICS, 2025

### **Decision Making under Uncertainty and Strategic Behavior**

- University of Alberta, 2024
- Boston College, 2024
- UMass Amherst, 2024
- CMU Theory Lunch, 2024

### **Pandora's Problem with Nonobligatory Inspection: Optimal Structure and a PTAS**

- Vancouver School of Economics at the University of British Columbia, 2024
- CMU Theory Lunch, 2023
- INFORMS, 2023

### **On Classification of Strategic Agents Who Can Both Game and Improve**

- Symposium on Foundations of Responsible Computing, 2022

- NeurIPS workshop, 2021 (Poster)

### The Strategic Perceptron

- NeurIPS workshop, 2021 (Poster)

### Optimal (and Benchmark-Optimal) Competition Complexity for Additive Buyers over Independent Items

- Google, Mountain View, 2021
- Toyota Technological Institute at Chicago, 2019
- Symposium on Theory of Computing, 2019

### Pandora's Problem with Nonobligatory Inspection

- Midwest Theory Day, 2019
- INFORMS, 2019
- Conference on Economics and Computation, 2019

### Improved Revenue Bounds for Posted-Price and Second-Price Mechanisms

- Microsoft, 2019
- Conference on Economics and Computation, 2018 (Poster)

### Randomness and Fairness in Two-Sided Matching with Limited Interviews

- Northwestern University, 2019
- Princeton University, 2017

### Effect of Selfish Choices in Deferred Acceptance with Short Lists

- MATCH-UP Workshop, 2017
- New York Computer Science and Economics Day, 2017 (Poster)
- INFORMS, 2017

### Effect of Strategic Grading and Early Offers in Matching Markets

- Symposium on Algorithmic Game Theory, 2015
- New York Computer Science and Economics Day, 2014 (Poster)

## OUTREACH

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**Panelist.** Rising Stars, An academic career workshop in EECS, MIT.

2025

**Reviewer for Early Research Scholars Program (ERSP) Applications,** UMass Amherst, A program designed to provide structured research opportunities for early undergraduate students, particularly those from underrepresented backgrounds in computing.

2024

**Team Mentor.** OurCS, Carnegie Mellon University. A research-focused workshop aiming to improve gender balance in computing research.

2022

**Mentor.** Economics and Computation (EC) Mentoring Workshop

2020-2022

**Panelist.** *Is a PhD for Me? Common Questions When Applying to Grad School*, Workshop for undergraduate students, Northwestern University

2020

**Member.** Research Inclusion Social Event (RISE) at Princeton University, meetings on diversity and inclusion issues in Computer Science.

2017-2019

## EXTERNAL SERVICE

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### **Program Committee.**

ACM Conference on Economics and Computation (EC). 2026

### **Program Committee.**

ACM Conference on Economics and Computation (EC). 2025

### **Program Committee.**

ACM Conference on Equity and Access in Algorithms, Mechanisms, and Optimization (EAAMO). 2024

### **Program Committee.**

ACM Conference on Economics and Computation (EC). 2023

Workshop on Learning with Strategic Agents (LSA)

at International Conference on Autonomous Agents and Multiagent Systems (AAMAS). 2022

ACM Conference on Economics and Computation (EC). 2022

Conference on Web and Internet Economics (WINE). 2021

ACM Conference on Economics and Computation (EC). 2021

ACM Conference on Economics and Computation (EC). 2020

### **Journal Referee.**

Management Science. 2021

Mathematics of Operations Research. 2021

Games and Economic Behavior. 2020

Operations Research. 2020

### **Conference External Reviewer.**

ACM Symposium on Theory of Computing (STOC). 2026

ACM-SIAM Symposium on Discrete Algorithms (SODA). 2026

ACM Symposium on Theory of Computing (STOC). 2025

ACM-SIAM Symposium on Discrete Algorithms (SODA). 2024

ACM-SIAM Symposium on Discrete Algorithms (SODA). 2023

Innovations in Theoretical Computer Science (ITCS). 2022

ACM-SIAM Symposium on Discrete Algorithms (SODA). 2022

Innovations in Theoretical Computer Science (ITCS). 2021

ACM-SIAM Symposium on Discrete Algorithms (SODA). 2021

ACM-SIAM Symposium on Discrete Algorithms (SODA). 2020

International Conference on Distributed Artificial Intelligence (DAI). 2019

European Symposium on Algorithms (ESA). 2019

Conference on Web and Internet Economics (WINE). 2019

ACM Conference on Economics and Computation (EC). 2019

Innovations in Theoretical Computer Science (ITCS). 2019

Conference on Web and Internet Economics (WINE). 2018

ACM Conference on Economics and Computation (EC). 2018

## INTERNAL SERVICE

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**Member.** Annual Faculty Review Committee, UMass Amherst CS. 2025

**Faculty Sponsor.** UMass Theory Club. 2025

**Member.** PhD Admission Committee, UMass Amherst CS. 2024

**Co-organizer.** Seminal Theoretical research in Economics, AI and Machine learning (STEAM) reading group, Carnegie Mellon University. 2022-2023

**Talk Award Committee.** TTIC Student Workshop. 2021

**Co-organizer.** Junior Theorists Workshop, Northwestern University CS. 2020

**Member.** PhD Admission Committee, Northwestern University CS.

*2020*

**Member.** Faculty Recruiting Grad Committee, Princeton University CS.

*2019*