# Mahsa Derakhshan

Email: mah.derakhshan@gmail.com

Website: khoury.northeastern.edu/~derakhshan

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## Academic Positions

◇ **Assistant Professor**

Khoury College of Computer Sciences, Northeastern University          Aug 2022 - present

◇ **FODSI Fellow**

University of California, Berkeley          Dec 2021 - Aug 2022

◇ **Postdoctoral Researcher**

Department of Computer Science, Princeton University          June 2021 - Dec 2021

## Education

◇ **PhD in Computer Science**          Jan 2016 - Aug 2021

Computer Science Department, University of Maryland

  – *Advisor*: Prof. MohammadTaghi Hajiaghayi

◇ **B.S. in Computer Software Engineering**          Sep 2011 - Feb 2016

Computer Engineering Department, Sharif University of Technology

  – *Advisor*: Prof. Mohammad Ghodsi

## Research Interests

◇ I am broadly interested in the design and analysis of algorithms. Mainly, I study algorithms under uncertainty. A few sources of such uncertainty in my research are having stochastic data, limited access to information, and the presence of strategic behavior. My primary focus is on problems with direct applications to markets, such as matching markets and auctions.

## Honors and Awards

◇ Honorable mention for the **ACM SIGecom Dissertation Award**          2021

◇ 2020 **Google PhD Fellowship** for Algorithms, Optimizations, and Markets.          2020

◇ Selected as a **Rising Stars** at the TCS Women Spotlight workshop.          2020

◇ **Ann G. Wylie Dissertation Fellowship.**          2019

◇ Ranked 56th at the **ACM-ICPC Programming Contest World Finals 2017**.          2017

  · Participants selected from more than 10000 teams worldwide.

◇ Awarded as Outstanding Student by the University president at Sharif University of Technology.          2011

◇ Recipient of the grant for undergraduate studies from the Iranian National Elites Foundation,

  for **Outstanding Academic Success**.          2011 - 2015

◇ **Gold Medal** in the 19$^{\text{th}}$ Iranian National Olympiad in Informatics.

  · Young Scholars Club, Tehran, Iran.          2010

## Visits and Internships

◇ Research internship at **Toyota Technological Institute at Chicago (TTIC)**    Summer 2020
  · Mentor: Avrim Blum

◇ Research internship at **Microsoft Research**    Summer 2019
  · Mentors: Alex Slivkins, David Pennock

◇ Research internship at **Microsoft Research**    Spring 2019
  · Mentors: Alex Slivkins, David Pennock

◇ Visiting Graduate Student at the **Simons Institute, UC Berkeley**    Fall 2018
  · Programs: Foundations of Data Science

◇ Research internship at **Google**    Summer 2018
  · Mentors: Negin Golrezaei, Renato Paes Lemme

◇ Visiting Graduate Student at the **Simons Institute, UC Berkeley**    Spring 2018
  · Programs: The Brain and Computation, Real-Time Decision Making

◇ Software engineering internship at **Google**    Summer 2017

## Conference Publications

◇ *Online Learning in Multi-unit Auctions*
  S. Brnzei, M. Derakhshan, N. Golrezaei, Y. Han
  In Proceedings of the 37th Conference on Neural Information Processing Systems .    **NeurIPS 2023**
  *to appear*

◇ *Stochastic Minimum Vertex Cover in General Graphs: a 3/2-Approximation*
  M. Derakhshan, N. Durvasula, N. Haghtalab
  In Proceedings of the 55th Annual ACM Symposium on Theory of Computing.    **STOC 2023**
  Pages: 242–253

◇ *Beating $(1-1/e)$-Approximation for Weighted Stochastic Matching*
  M. Derakhshan, A. Farhadi
  In Proceedings of the 34th Annual ACM-SIAM Symposium on Discrete Algorithms.    **SODA 2023**
  Pages: 1931–1961

◇ *Max-Weight Online Stochastic Matching: Improved Approximations Against the Online Benchmark*
  M. Braverman, M. Derakhshan, A. Lovett
  In Proceedings of the 23rd ACM Conference on Economics and Computation.    **EC 2022**
  Pages: 967–985

◇ *Stochastic Vertex Cover with Few Queries*
  A. Blum, S. Behnezhad, M. Derakhshan
  In Proceedings of the 33th Annual ACM-SIAM Symposium on Discrete Algorithms.    **SODA 2022**
  Pages: 1808–1846

◇ *Beating Greedy For Approximating Reserve Prices in Multi-Unit VCG Auctions*
M. Derakhshan, D. Pennock, A. Slivkins
In Proceedings of the 32nd Annual ACM-SIAM Symposium on Discrete Algorithms.                    **SODA 2021**
Pages: 1099–1118

◇ *Stochastic Weighted Matching: $(1 - \epsilon)$-Approximation*
S. Behnezhad, M. Derakhshan
In Proceedings of the 61st Annual IEEE Symposium on Foundations of Computer Science.           **FOCS 2020**
Pages: 1392–1403

◇ *Product Ranking on Online Platforms*
M. Derakhshan, N. Golrezaei, V. Manshadi, V. Mirrokni
In Proceedings of the 21st ACM Conference on Economics and Computation.                         **EC 2020**
Pages: 459–459

◇ *Stochastic Matching with Few Queries: $(1 - \epsilon)$-Approximation*
S. Behnezhad, M. Derakhshan, M. Hajiaghayi
In Proceedings of the 52nd Annual ACM Symposium on Theory of Computing.                         **STOC 2020**
Pages: 1111–1124

◇ *Fully Dynamic Maximal Independent Set with Polylogarithmic Update Time*
S. Behnezhad, M. Derakhshan, M. Hajiaghayi, C. Stein, M. Sudan
In Proceedings of the 60th Annual IEEE Symposium on Foundations of Computer Science.           **FOCS 2019**
Pages: 382–405

◇ *LP-based Approximation for Personalized Reserve Prices*
M. Derakhshan, N. Golrezaei, R. Paes Leme
In Proceedings of the 20th ACM Conference on Economics and Computation.                         **EC 2019**
Pages: 589–589

◇ *Optimal Strategies of Blotto Games: Beyond Convexity*
S. Behnezhad , A. Blum , M. Derakhshan, M. Hajiaghayi , C. Papadimitriou , S. Seddighin
In Proceedings of the 20th ACM Conference on Economics and Computation.                         **EC 2019**
Pages: 597–616

◇ *Streaming and Massively Parallel Algorithms for Edge Coloring*
S. Behnezhad, M. Derakhshan, M. Hajiaghayi, M. Knittel, H. Saleh
In Proceedings of the 27th Annual European Symposium on Algorithms.                             **ESA 2019**
Pages: 15:1–15:14 (Also appeared as a brief announcement at DISC 2019.)

◇ *Stochastic Matching on Uniformly Sparse Graphs*
S. Behnezhad, M. Derakhshan, A. Farhadi, M. Hajiaghayi, N. Reyhani
In Proceedings of the 12th International Symposium on Algorithmic Game Theory.                  **SAGT 2019**
Pages: 357–373

◇ *Massively Parallel Computation of Matching and MIS in Sparse Graphs*
S. Behnezhad S. Brandt, M. Derakhshan, M. Fischer, M. Hajiaghayi, R. Karp, J. Uitto

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In Proceedings of the 38th ACM Symposium on Principles of Distributed Computing. **PODC 2019**
Pages: 481–490

◇ *Spatio-Temporal Security Games Beyond One Dimension*
S. Behnezhad, M. Derakhshan, M. Hajiaghayi, S. Seddighin
In Proceedings of the 19th ACM Conference on Economics and Computation. **EC 2018**
Pages: 697–714

◇ *Brief Announcement: MapReduce Algorithms on Massive Trees*
M.H. Bateni, S. Behnezhad, M. Derakhshan, M. Hajiaghayi, V. Mirrokni
In Proceedings of the 45th International Colloquium on Automata,
Languages, and Programming. Pages: 162:1–162:4 **ICALP 2018**

◇ *From Battlefields to Presidential Elections: Winning Strategies of Blotto and Auditing Games*
S. Behnezhad, A. Blum, M. Derakhshan, M. Hajiaghayi, M. Mahdian, C. Papadimitriou,
R. Rivest, S. Seddighin, P. Stark
In Proceedings of the 29th Annual ACM-SIAM Symposium on Discrete Algorithms. **SODA 2018**
Pages: 2291–2310

◇ *Affinity Clustering: Hierarchical Clustering at Scale*
M.H. Bateni, S. Behnezhad, M. Derakhshan, M. Hajiaghayi, R. Kiveris, S. Lattanzi, V. Mirrokni
In Proceedings of the 31st Annual Conference on Neural Information Processing Systems. **NIPS 2017**
Pages: 6864–6874

◇ *A Polynomial Time Algorithm For Spatio-Temporal Security Games*
S. Behnezhad, M. Derakhshan, M. Hajiaghayi, A. Slivkins
In Proceedings of the 18th ACM Conference on Economics and Computation. **EC 2017**
Pages: 697–714

◇ *Graph Matching in Massive Datasets*
S. Behnezhad, M. Derakhshan, H. Esfandiari, M. Hajiaghayi, E. Tan, H. Yammi
In Proceedings of the 29th ACM Symposium on Parallelism in Algorithms and Architectures. **SPAA 2017**
Pages: 133–136

◇ *Faster and Simpler Algorithm for Optimal Strategies of Blotto Game*
S. Behnezhad, S. Dehghani, M. Derakhshan, S. Seddighin, M. Hajiaghayi
In Proceedings of the 31st AAAI Conference on Artificial Intelligence. **AAAI 2017**
Pages: 369–375

## Journal Publications

◇ *LP-based Approximation for Personalized Reserve Prices*
M. Derakhshan, N. Golrezaei, R. Paes Leme
**Management Science – Special Issue on Data-Driven Prescriptive Analytics**
Conference version in Proceedings of EC 2019.

◇ *Product Ranking on Online Platforms*
M. Derakhshan, N. Golrezaei, V. Manshadi, V. Mirrokni

**Management Science**.
Conference version in Proceedings of EC 2020.

⋄ *Faster and Simpler Algorithm for Optimal Strategies of Blotto Game*
S. Behnezhad, S. Dehghani, M. Derakhshan, S. Seddighin, M. Hajiaghayi.
**Operations Research**.
Conference version in Proceedings of AAAI 2017.

## Academic Services

⋄ Program Committee of STOC 2024

⋄ Program Committee of SODA 2024

⋄ Program Committee of ESA 2022

⋄ Program Committee of ITCS 2022

⋄ Reviewing Committee of ICML 2020

⋄ Reviewing Committee of NeurIPS 2019

⋄ Reviewer for the journal of Management Science

⋄ Reviewer for the following conferences: SODA, EC, WWW, ESA, SIGMETRICS, PODC, DISC, AAAI, IJCAI, TheWebConf, ICALP

## Invited Talks

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| ⋄ Mini-Symposium on Algorithmic Game Theory at CanaDAM | 2023 |
| ⋄ Sublinear Algorithms Workshop at EPFL | 2022 |
| ⋄ Google Research, Mountain View | 2022 |
| ⋄ Stanford's TOCA-SV Workshop | 2022 |
| ⋄ Rutgers Theory Seminar | 2022 |
| ⋄ Rotman School of Management Reading Club | 2021 |
| ⋄ Courant Institute of Mathematical Sciences, NYU | 2021 |
| ⋄ Department of Computer Science, Carnegie Mellon University | 2021 |
| ⋄ Khoury College of Computer Sciences, Northeastern University | 2021 |
| ⋄ Computing + Mathematical Sciences (CMS) Department, Caltech | 2021 |
| ⋄ Department of Computer Science, Purdue University | 2021 |
| ⋄ Computer Science Department, Stony Brook University | 2021 |
| ⋄ Toyota Technological Institute at Chicago (TTIC) | 2021 |
| ⋄ H. Milton Stewart School of Industrial and Systems Engineering, Georgia Tech | 2021 |
| ⋄ University of Chicago Booth School of Business | 2021 |

◇ Informs Annual Meeting, Learning in Online Markets Session                              2020

◇ Rising Stars Talk at the TCS Women Spotlight workshop                                   2020

◇ Informs Annual Meeting, Mechanism Design, Networks, and New Markets Session             2019

◇ University of Maryland Theory Seminar                                                   2019

## Teaching Experience

◇ **Instructor**, Northeastern University

   – Algorithms and Data                                                   Spring 2023

   – Advanced Algorithms                                                    Fall 2022

◇ **Teaching Assistant**

   – University of Maryland: Introduction to Algorithms, Data Structures     2016 - 2017

   – Sharif University of Technology: Data Structures, Design of Algorithms   2013 - 2015