Soroush Ebadian

website: ebadian.org
email: soroush@cs.toronto.edu

Education

- **Ph.D. in Computer Science** Sep. 2020 – Nov. 2025 (Expected)
  University of Toronto, Canada GPA: 4.0+/4.0
  Advisor: Nisarg Shah
- **B.Sc. in Computer Engineering** Sep. 2015 – Aug. 2020
  Sharif University of Technology, Tehran, Iran GPA: 18.68/20

Experience

- **Machine Learning Research Intern, Borealis AI**, Toronto, CA Sep. 2024 – Present
  Conducting research on multi-task deep learning models for time series data.
- **Research Assistant, University of Toronto**, Toronto, CA Sep. 2020 – Present
  Presented my work in top-tier AI, ML, and Econ-CS conferences such as EC, NeurIPS, IJCAI, AAMAS.
- **Visiting Researcher, Harvard University**, Boston, USA Sep. – Dec. 2023
  Worked on various problems in social choice and AI Alignment. Host: Ariel D. Procaccia.
- **Research Intern, Institute of Science and Technology Austria**, Austria Jul. – Sep. 2019
  Designed and implemented verification techniques for concurrent programs. Host: Thomas A. Henzinger.
- **Technical Manager,** CafeBazaar, Tehran, Iran Jan. 2017 – Sep. 2020
  - *CafeBazaar Cloud*: Led 10-20 software engineers in three teams to develop six cloud infrastructure services — providing storage, database, and big data management services to tech companies with tens of millions of users.
  - *Divar*: Released a multi-device buyer-seller chat on three platforms for Divar online classified ads with 16M users.
- **Software Engineer,** CafeBazaar, Tehran, Iran Apr. 2015 – Jan. 2017
  - Developed a buyer-seller messaging feature on iOS client of Divar with 2M+ iOS users.
  - Redesigned the backend architecture and scaled a large-scale system accepting 100M+ requests per day from 25M.

Selected Honors and Awards

- **Gold medal** in the **National Olympiad in Informatics**, Iran. 2014
- **2nd place** in the **ACM-ICPC** West Asia Regional Contest, Tehran, Iran. 2015
- **Ontario Graduate Scholarship** (C$15000) 2023
  Government of Ontario and University of Toronto
- Alfred B. Lehman Graduate Scholarship in Computer Science (C$5000) 2023 and 2024
  Dept. of Computer Science, University of Toronto
- Computer Science 50th Anniversary Graduate Scholarship (C$2000) 2022
  Dept. of Computer Science, University of Toronto
- **4th place** in the **National Scientific Olympiad in Computer Science and Engineering**, Iran 2019

Peer-reviewed Conference Publications

C11. **S. Ebadian**, R. Freeman, N. Shah, "Harm Ratio: A Novel and Versatile Fairness Criterion", *in Proc. of 4th ACM Conf. on Equity and Access in Algorithms, Mechanisms, and Optimization* (**EAAMO'24**), 2024. Forthcoming.

C10. **S. Ebadian**, D. Halpern, E. Micha, "Metric Distortion with Elicited Pairwise Comparisons", *in Proc. of 33rd Int. Joint Conf. on Artificial Intelligence* (**IJCAI'24**), pp. 2791–2798, 2024.

C9. **S. Ebadian**, A. Filos-Ratsikas, M. Latifian, N. Shah, "Computational Aspects of Distortion," *in Proc. of 23rd Int. Conf. on Autonomous Agents and MultiAgent Systems* (**AAMAS'24**), pp. 499–507, 2024.

C8. **S. Ebadian**, A. Filos-Ratsikas, M. Latifian, N. Shah, "Explainable and Efficient Randomized Voting Rules," *in Proc. of 37th Annual Conf. on Neural Information Processing Systems* (**NeurIPS'23**), pp. 23034-23046, 2023.

C7. **S. Ebadian**, M. Latifian, N. Shah, "The Distortion of Approval Voting with Runoff," *in Proc. of 22nd Int. Conf. on Autonomous Agents and MultiAgent Systems* (**AAMAS'23**), pp. 1752–1760, 2023.

C6. **S. Ebadian**, G. Kehne, E. Micha, A. D. Procaccia, and N. Shah, "Is Sortition Both Representative and Fair?," *in Proc. of 36th Annual Conf. on Neural Information Processing Systems* (**NeurIPS'22**), pp. 3431–3443, 2022.

C5. **S. Ebadian**, A. Kahng, D. Peters, and N. Shah, "Optimized Distortion and Proportional Fairness in Voting," *in Proc. of 23rd ACM Conf. on Economics and Computation* (**EC'22**), pp. 563–600, 2022.

C4. **S. Ebadian**, R. Freeman, and N. Shah, "Efficient Resource Allocation with Secretive Agents," *in Proc. of 31st Int. Joint Conf. on Artificial Intelligence* (**IJCAI'22**), pp. 272–278, 2022.

C3. **S. Ebadian**, D. Peters, and N. Shah, "How to Fairly Allocate Easy and Difficult Chores," *in Proc. of 21st Int. Conf. on Autonomous Agents and MultiAgent Systems* (**AAMAS'22**), pp. 372–380, 2022.

C2. **S. Ebadian** and X. Huang, "Fast Algorithm for k-Truss Discovery on Public-Private Graphs," *in Proc. of 28th Int. Joint Conf. on Artificial Intelligence* (**IJCAI'19**), pp. 2258–2264, 2019.

C1. **S. Ebadian** and H. Zarrabi-Zadeh, "A Simple Randomized Algorithm for All Nearest Neighbors," *in Proc. of 31st Canadian Conf. on Computational Geometry* (**CCCG'19**), pp. 94–98, 2019.
Invited to the special issue of the journal of Computational Geometry.

Journal Publication

J1. **S. Ebadian**, A. Kahng, D. Peters, and N. Shah, "Optimized Distortion and Proportional Fairness in Voting," *in ACM Transactions on Economics and Computation,* (**TEAC**), Vol. 12, Issue 1, pp. 1–39, 2024.

Working Papers

W1. P. A. Alamdari, **S. Ebadian**, A. D. Procaccia, "Policy Aggregation", 2024. *(Submitted to NeurIPS'24)*

W2. **S. Ebadian** and E. Micha, "Boosting Sortition via Proportional Representation", 2024.
(Submitted to NeurIPS'24)

W3. **S. Ebadian**, N. Shah, "Every Bit Helps: Achieving the Optimal Distortion with a Few Queries", 2024.*
(Submitted to AAAI'25)

W4. S. Barman, **S. Ebadian**, M. Latifian, N. Shah, "Fair Division with Market Values", 2024.*
(Submitted to AAAI'25)

W5. B. Cookson, **S. Ebadian**, N. Shah, "Temporal Fair Division", 2024.* *(Submitted to AAAI'25)*

W6. B. Cookson, **S. Ebadian**, N. Shah, "Constrained Fair and Efficient Allocations", 2024.*
(Submitted to AAAI'25)

(*Manuscript available upon request.)

Technical Skills

- **Programming Languages**: Python, C/C++, Java, Swift, C#, Bash
- **Technologies:** PyTorch, Redis NoSQL, PostgreSQL, Django, Scikit-learn, Pandas, NumPy

Professional Service

- **PC Member:** AAAI 2025, NeurIPS 2024, AIES 2024, AAAI 2024, AIES 2023, AAAI 2023

- **Reviewer (Journal)**: Journal of Artificial Intelligence (AIJ), Games and Economic Behavior (GEB), ACM Transactions on Economics and Computation (TEAC), SIAM Journal on Discrete Mathematics (SIDMA), Journal of Mathematical Social Sciences (JMSS)
- **Reviewer (Conference):** EC 2024, SODA 2024, SAGT 2021

Teaching Experience

- **Teaching Assistant,** CS Department, University of Toronto
  - CSC2421 Mathematical Foundations of algorithmic fairness — Winter 2024
  - CSC473 Advanced Algorithm Design — Winter 2024
  - CSC2412 Algorithms for Private Data Analysis — Winter 2023
  - CSC373 Algorithm Design, Analysis and Complexity — Fall 2021, Summer 2022, Fall 2023
  - CSC303 Social and Economics Networks — Winter 2021, Winter 2023
  - CSC304 Algorithmic Game Theory and Mechanism Design — Fall 2022
  - CSC2556 Algorithms for Collective Decision Making — Winter 2022
  - CSC263 Data Structures and Analysis — Summer 2021, Fall 2024
- **Teaching Assistant,** CE Department, Sharif University of Technology
  - Design and Analysis of Algorithms — Fall 2017, 2018, 2019
  - Discrete Structures — Spring 2019
  - Algorithmic Game Theory — Spring 2019
  - System Analysis and Design — Fall 2018, Spring 2019
  - Data Structures and Algorithms — Spring 2016
- **Instructor**, INOI Summer Camp — 2016, 2017, and 2020
  Taught advanced topics in Algorithms, Data Structures, and Algorithmic Graph Theory to students preparing for IOI.
- **Lecturer**, Allameh Helli High-School — 2015 – 2016, Fall 2019
  Taught Algorithms and Data Structures to students preparing for the Iranian National Olympiad in Informatics (INOI).

Other Activities

- **Lead Engineer, Spliddit** — 2023 – Present
  Migrated the legacy code to newer versions of Ruby on Rails. Deployed and maintained the service on AWS. Implemented a new algorithm for fair task division and improved the performance of the goods division algorithm.
- **Task Preparation System** for **IOI 2017** [Technical Report, GitHub] — 2016 – 2017
  Developed a system for preparing IOI tasks by Scientific Committee. Used at IOI 2017 and 2019.
- **Member of the Scientific Committee** of National Programming Contests
  Designed programming contests and authored problems with an algorithmic theme.
  - West Asia ACM ICPC Regional Contest — 2018 – 2019
  - Iran's IOI Team Selection Exams — 2016 – 2019
  - INOI Summer Camp Programming Exams — 2015 – 2017
- **Executive Director** of the **3rd Winter Seminar Series (WSS)** at Sharif University of Tech. — Fall 2017
  A four-day event including 28 talks and 7 workshops in computer science and engineering with near 400 participants.
  - Raised $25,000 funding through sponsorship. Led 50 volunteer staffs in about 15 teams.