

# Morteza Zadimoghaddam

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- RESEARCH INTERESTS ◇ I intend to apply optimization techniques to various practical problems in order to find efficient algorithms. My main areas of research include modeling problems in computational advertising, game theory, learning theory, distributed systems, and finding efficient algorithms in each case:
- Computational Advertising and Online Allocation Problems
  - Approximation Algorithms and Combinatorial Optimization
  - Algorithmic Game Theory
  - Computational Learning Theory
  - Distributed Algorithms
- EDUCATION ◇ Massachusetts Institute of Technology, Cambridge, MA. September 2009 - present  
Ph.D. in Computer Science, CSAIL under supervision of Prof. Erik Demaine.
- ◇ Massachusetts Institute of Technology, Cambridge, MA. September 2009 - June 2010  
Master of Science in Computer Science, CSAIL under supervision of Prof. Erik Demaine.  
Thesis: *Scheduling to Minimize Power Consumption using Submodular Functions*
- ◇ Sharif University of Technology, Tehran, IRAN. September 2003 - April 2007  
B.S. in Computer Engineering under supervision of Prof. Mohammad Ghodsi.  
Thesis: *Scheduling and Power Consumption Problems with Parallel Machines*
- HONORS AND AWARDS ◇ Awarded **Yahoo! Key Scientific Challenges Scholarship 2012**: one of the three winners in computational advertising challenge among all worldwide graduate student applicants, March 2012. I won this award based on my works on addressing realistic and practical challenges in computational advertising which appeared in two conferences WINE 2011 and SODA 2012.
- ◇ Awarded **Neekeyfar Graduate Scholarship** one of the two winners among all graduate students in MIT, May 2011
- ◇ **First rank** National Graduate Entrance Exam in Computer Science among more than 10000 applicants (all graduates in Computer Science related fields), Tehran, Iran, 2007
- ◇ Awarded as **Outstanding Student** by Sharif university president, Tehran, Iran, 2003
- ◇ **Gold Medal** in Iranian National Olympiad in Informatics, 2002
- RESEARCH EXPERIENCE ◇ **Internship in Google Inc., New York, Market Algorithms and Optimization Group** Summer 2012  
Mentor: Vahab Mirrokni, Worked on Bicriteria Online Ad Allocation Algorithms that maximize both cardinality and weight of the allocation with applications in Display Ad problems.
- ◇ **Internship in Microsoft Research, New England Lab, Algorithms and Game Theory Group** Summer 2011  
Mentor: Professor Christian Borgs, Worked on Algorithms for Computational Advertising problems that work well in both adversarial and stochastic settings.
- ◇ **Internship in Microsoft Research, Cambridge Lab, Online Services and Advertising Group** Summer 2010  
Mentor: Dr. Yoram Bachrach, Worked on Algorithmic Game Theory Problems including the structure of coalitions in Game Theory settings.
- ◇ **Internship in Distributed Programming Laboratory, EPFL** Fall 2008, Winter and Spring 2009  
Mentor: Prof. Rachid Guerraoui, Worked on Algorithmic Problems in Distributed Systems including algorithms for recommendation systems, and classic renaming problem.

C stands for a conference paper, J for journal, CJ for both, and W for working paper.

◇ **Online Allocation Algorithms:**

**W:** Bicriteria Online Matching: Maximizing Weight and Cardinality  
(joint work with Nitish Korula, and Vahab Mirrokni).

**C:** Simultaneous Approximations for Adversarial and Stochastic Online Budgeted Allocation  
(joint work with Vahab Mirrokni and Shayan Oveis Gharan)  
appeared in *the Proceedings of the 23rd Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2012), Kyoto, Japan, January 2012.*

**C:** Online Stochastic Weighted Matching: Improved Approximation Algorithms  
(joint work with Bernhard Haeupler and Vahab Mirrokni)  
appeared in *the Proceedings of the 7th Workshop on Internet and Network Economics (WINE 2011), Nanyang Technological University, Singapore, December 2011.*

**C:** Submodular Secretary Problem and Extensions  
(joint work with MohammadHossein Bateni and MohammadTaghi Hajiaghayi)  
appeared in *the Proceedings of the 13th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX 2010), Barcelona, Spain, September 1-3, 2010.*

◇ **Learning Theory and Algorithms:**

**C:** Efficiently Learning from Revealed Preference  
(joint work with Aaron Roth), to appear in *the Proceedings of the 8th Workshop on Internet and Network Economics (WINE 2012), University of Liverpool, UK, December 2012.*

**C:** Learning Disjunctions: Near Optimal Trade-offs between Mistakes and “I dont know”s  
(joint work with Erik Demaine)  
to appear in *the Proceedings of the 24th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2013), New Orleans, USA, January 2013.*

**C:** Trading off Mistakes and Don’t Know Predictions  
(joint work with Amin Sayedi and Avrim Blum)  
appeared in *the Proceedings of the 24th Annual Conference on Neural Information Processing Systems (NIPS 2010), Vancouver, B.C., Canada, December 2010.* Accepted as a spotlight paper.

◇ **Approximation Algorithms:**

**C:**  $O(1)$  Approximation Algorithms for Maximum Movement Problems  
(joint work with Piotr Berman and Erik Demaine)  
appeared in *the Proceedings of The 14th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX 2011), Princeton, New Jersey, August 2011.*

**C:** Scheduling to Minimize Power Consumption using Submodular Functions  
(joint work with Erik Demaine)  
appeared in *the Proceedings of the 22nd ACM Symposium on Parallelism in Algorithms and Architectures (SPAA 2010), Santorini, Greece, June 2010, pages 21-29.*

**C:** Minimizing the Diameter of a Network Using Shortcut Edges  
(joint work with Erik Demaine)  
appeared in *the Proceedings of the 12th Scandinavian Symposium and Workshops on Algorithm Theory (SWAT 2010), June 21-23, Bergen, Norway*

**CJ:** Minimizing Movement

(joint work with E. Demaine, M. Hajiaghayi, H. Mahini, S. Oveis Gharan and A. Sayedi)  
appeared in *ACM Transactions on Algorithms, Volume 5, Number 3, July 2009, Article 30,* the preliminary version appeared in *the Proceedings of the 18th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2007), New Orleans, Louisiana, January 7-9, 2007, pages 258-267.*

**C:** Ordinal Embedding: Approximation Algorithms and Dimensionality Reduction  
(joint work with E. Demaine, M. Badoiu, M. Hajiaghayi and A. Sidiropoulos)  
appeared in *the Proceedings of the 11th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX 2008), Boston, Massachusetts, August 25-27, 2008, pages 2134.*

- C:** Scheduling to Minimize Gaps and Power Consumption  
(joint work with E. Demaine, M. Ghodsi, M. Hajiaghayi and A. Sayedi)  
appeared in *the Proceedings of the 19th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA 2007)*, San Diego, California, June 9-11, 2007, pages 46-54.
- J:** Spanning Trees with Minimum Weighted Degrees  
(joint work with M. Ghodsi, H. Mahini, K. Mirjalali, S. Oveis Gharan and A. Sayedi)  
appeared in *Information Processing Letters*, Volume 104, Issue 3, pp. 113-116, 31 Oct. 2007.
- ◇ **Algorithmic Game Theory:**
  - W:** Optimal Coalition Structures in Graph Games  
(joint work with Yoram Bachrach, Pushmeet Kohli and Vladimir Kolmogorov)
  - CJ:** The Price of Anarchy in Network Creation Games  
(joint work with E. Demaine, M. Hajiaghayi and H. Mahini)  
appeared in ACM Transactions on Algorithms, Volume 8, Number 2, 2012, Paper 13, the preliminary version appeared in *the Proceedings of the 26th Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PoDC 2007)*, Portland, Oregon, August 12-15, 2007, pages 292-298.
  - CJ:** Constant Price of Anarchy in Network Creation Games via Public Service Advertising  
(joint work with E. Demaine)  
appeared in Internet Mathematics, Volume 8, Issue 1-2, 2012, the preliminary version appeared in *the Proceedings of the 7th Workshop on Algorithms and Models for the Web Graph (WAW 2010)*, Stanford, CA, USA, December 2010.
  - CJ:** Permutation betting markets: singleton betting with extra information  
(joint work with M. Ghodsi, H. Mahini and V. Mirrokni)  
appeared in Algorithmica, Volume 60, Issue 4, August 2011, preliminary version appeared in *the Proceedings of the 9th ACM Conference on Electronic Commerce (EC 2008)*, Chicago, Illinois, July 8-12, 2008, pages 180-189.
  - J:** A Cooperative Approach to Collusion in Auctions  
(joint work with Yoram Bachrach and Peter Key)  
appeared in *SIGecom Eschanges*, Issue 10.1, March 2011.
  - C:** Collusion in VCG Path Procurement Auctions  
(joint work with Yoram Bachrach and Peter Key)  
appeared in *the Proceedings of the 6th Workshop on Internet and Network Economics (WINE 2010)*, Stanford, California, December 2010.
  - CJ:** The Price of Anarchy in Cooperative Network Creation Games  
(joint work with E. Demaine, M. Hajiaghayi and H. Mahini)  
appeared in *SIGecom Eschanges*, Issue 8.2, December 2009, the preliminary version appeared in *the Proceedings of the 26th International Symposium on Theoretical Aspects of Computer Science (STACS 2009)*, Freiburg, Germany, February 26-28, 2009, pages 301-312.
- ◇ **Distributed Algorithms:**
  - C:** Optimal-Time Adaptive Tight Renaming with Applications to Counting  
(joint work with Dan Alistarh, James Aspens, Keren Censor-Hillel, and Seth Gilbert)  
appeared in *the Proceedings of The 30th annual ACM SIGACT-SIGOPS symposium on Principles of distributed computing (PoDC 2011)*, San Jose, California, June 2011.
  - C:** How Efficient Can Gossip Be? (On the Message Complexity of Resilient Information Exchange)  
(joint work with Dan Alistarh, Seth Gilbert and Rachid Guerraoui)  
appeared in *the Proceedings of the 37th International Colloquium on Automata, Languages and Programming (ICALP 2010)*, Bordeaux, France, July 5-10, 2010.
  - C:** Collaborative Scoring with Dishonest Participants  
(joint work with Seth Gilbert, Rachid Guerraoui and Faezeh Malakouti)  
appeared in *the Proceedings of the 22nd ACM Symposium on Parallelism in Algorithms and Architectures (SPAA 2010)*, Santorini, Greece, June 2010, pages 41-49.
- ◇ **Information Theory, Network Tomography:**

- W:** Adaptive Binary Identification Under Graphical Constraints  
(joint work with Amin Karbasi)
- C:** Sequential Group Testing with Graph Constraints  
(joint work with Amin Karbasi)  
appeared in *the proceedings of Information Theory Workshop 2012 (ITW), Lausanne, Switzerland, September 2012*
- C:** Compression with Graphical Constraints: An Interactive Browser  
(joint work with Amin Karbasi)  
appeared in *the Proceedings of the 2011 IEEE International Symposium on Information Theory (ISIT 2011), Saint Petersburg, Russia, July 2011.*
- J:** On the Construction of Prefix-Free and Fix-Free Codes with Specified Codeword Compositions  
(joint work with Ali Kakhbod )  
appeared in *Discrete Applied Mathematics, Volume 159 Issue 18, December, 2011.*
- C:** Some notes on fix-free codes  
(joint work with A. Kakhbod, A. Nazari)  
appeared in *the Proceedings of the 42nd Conference on Information Sciences and Systems (CISS 2008), Princeton, NJ , March 19-21, 2008, pages 1015-1018.*

- SERVICE     ◇ **Referee for**  
SIAM Journal on Discrete Mathematics; Algorithmica; ACM Transactions on Algorithms (ACM TALG); IEEE Transactions on Robotics (IEEE T-RO); Journal of Networks JNW; Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2008, 2012, 2013); Innovations in Theoretical Computer Science (ITCS 2013); ACM international conference on Web Search and Data Mining (WSDM 2013); International Conference on Automata, Languages and Programming (ICALP 2011, 2012); International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX 2010, 2011); Annual International Computing and Combinatorics Conference (COCOON 2010);
- TEACHING     ◇ **Teaching Assistant, Advanced Algorithms, Instructor: Prof. David Karger, Massachusetts**  
EXPERIENCE   **Institute of Technology, Fall 2011**
- EXPERIENCE   ◇ **Teaching Assistant, Sharif University of Technology**
- Data Structure and Algorithms (Fall 2005, Fall 2006);
  - Design and Analysis of Algorithms (Spring 2006);
  - Graph Theory and its application (Spring 2006);
- REFERENCES ◇ Erik D. Demaine, Professor in Computer Science at the Massachusetts Institute of Technology, Cambridge, MA, USA.
- ◇ Vahab S. Mirrokni, Senior Research Scientist at Google Research New York, NY, USA.
- ◇ MohammadTaghi Hajiaghayi, Jack and Rita G. Minker Associate Professor of Computer Science Department at the University of Maryland at College Park.