

Nicole Immerlica

PERSONAL INFORMATION Northwestern University
2133 Sheridan Road
Evanston, IL 60208
Voice: +1 401 688 9133
E-mail: nickle@eecs.northwestern.edu
Web: <http://www.ece.northwestern.edu/~nickle>

RESEARCH INTERESTS Algorithmic Game Theory, Auction Design, E-Commerce
Structure, Formation, and Design of Social Networks
Approximation Algorithms, Network Design, Clustering

EDUCATION **Massachusetts Institute of Technology**, Cambridge, Massachusetts.

Ph.D., June 2005

Thesis: "Computing with Strategic Agents"

Advisors: Prof. D. Karger and Prof. E. Demaine

Massachusetts Institute of Technology, Cambridge, Massachusetts.

Masters of Engineering in Computer Science, December 2001

Thesis: "Data Acquisition System Design for the Alpha Magnetic Spectrometer"

Advisor: Prof. P. Fisher

Massachusetts Institute of Technology, Cambridge, Massachusetts.

B.Sc. in Electrical Engineering and Computer Science, June 2000

B.Sc. in Mathematics, June 2000

AWARDS AND GRANTS

- ◇ Beyond Search - Semantic Computing and Internet Economics (Microsoft Grant)
- ◇ Best Student Paper Award, SODA 2005
- ◇ National Science Foundation (NSF) Fellowship (Sept. 2002 - Sept. 2005)
- ◇ Presidential Fellowship, MIT (Sept. 2001 - Sept. 2002)

RESEARCH EXPERIENCE **Assistant Professor, Northwestern University**, Fall 2008 - present.

Member of the computer science theory division of the McCormick School of Engineering with a courtesy appointment in Managerial Economics and Decision Sciences, Kellogg Graduate School of Management.

PostDoc, Centrum voor Wiskunde en Informatica (CWI), Fall 2007 - Fall 2008.

Member of the algorithms, combinatorics, and optimization group. Working on problems in algorithmic game theory and combinatorial optimization.

PostDoc, Microsoft Research Redmond, April 2005 - July 2008.

Worked on problems in algorithmic game theory with a focus on issues arising in the design of ad auctions such as bid optimization, budget constraints, and click fraud.

SERVICE

- ◇ Research team co-leader, OurCS Conference for Undergraduate Women in Computer Science, Carnegie Mellon University, October 2007.
- ◇ Designed and co-taught tutorial entitled *Mechanism Design for Online Advertisement*, ACM Conference on Electronic Commerce (EC) 2006.
- ◇ Designed and taught 3-day mini-course entitled *Hot Topics in Algorithmic Game Theory*, IPM School of Mathematics, Tehran, Iran 2008.

- ◇ Program committee member: ACM Symposium on Theory of Computing (STOC) 2009; Conference on Auctions, Market Mechanisms, and Their Applications (AMMA) 2009; ACM Conference on Electronic Commerce (EC) 2008; Scandinavian Workshop on Algorithm Theory (SWAT) 2008; ACM-SIAM Symposium on Discrete Algorithms (SODA) 2008; International World Wide Web Conference (WWW) 2008, Internet Monetization Track; International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2008; Symposium on Algorithmic Game Theory (SAGT) 2008; International Computer Science Symposium in Russia (CSR) 2008; ACM Conference on Electronic Commerce (EC) 2007; European Symposium on Algorithms (ESA) 2007; National Conference on Artificial Intelligence (AAAI) 2007.
- ◇ Local arrangements: ACM Conference on Electronic Commerce (EC) 2008

CONFERENCE
PUBLICATIONS

1. M. Babaioff, M. Dinitz, A. Gupta, N. Immorlica, and K. Talwar. *Secretary Problems: Weights and Discounts*, ACM-SIAM Symposium on Discrete Algorithms (SODA) 2009.
2. C. Borgs, J. Chayes, N. Immorlica, A. Kalai, V. Mirrokni, and C. Papadimitriou, *The Myth of the Folk Theorem*, ACM Symposium on the Theory of Computing (STOC) 2008.
3. U. Feige, N. Immorlica, V. Mirrokni, and H. Nazerzadeh, *A Combinatorial Allocation Mechanism for Banner Advertisement with Penalties*, World Wide Web Conference (WWW) 2008.
4. N. Immorlica, A. Karlin, M. Mahdian, and K. Talwar, *Balloon popping with applications to ascending auctions*, IEEE Foundations of Computer Science (FOCS) 2007.
5. M. Babaioff, N. Immorlica, D. Kempe, R. Kleinberg, *A Knapsack Secretary Problem with Applications*, International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX) 2007.
6. N. Immorlica, J. Kleinberg, M. Mahdian, and T. Wexler, *The Role of Compatibility in the Diffusion of Technology through Social Networks*, ACM Conference on Electronic Commerce (EC) 2007.
7. C. Borgs, J. Chayes, O. Etesami, N. Immorlica, K. Jain, and M. Mahdian, *Dynamics of bid optimization in online advertisement auctions*, World Wide Web Conference (WWW) 2007.
8. M. Babaioff, N. Immorlica, and R. Kleinberg, *Matroids, Secretary Problems, and Online Mechanisms*, ACM-SIAM Symposium on Discrete Algorithms (SODA) 2007.
9. N. Immorlica, K. Jain, and M. Mahdian, *Designing Hyperlink Structures: Optimization and Game-Theoretic Questions*, International Workshop on Internet and Network Economics (WINE) 2006.
10. N. Immorlica, R. Kleinberg, and M. Mahdian, *Secretary Problems with Competing Employers*, International Workshop on Internet and Network Economics (WINE) 2006.
11. B. Dean, M. Goemans, and N. Immorlica, *Finite Termination of “Augmenting Path” Algorithms in the Presence of Irrational Problem Data*, EATCS European Symposium on Algorithms (ESA) 2006.
12. B. Dean, M. Goemans, and N. Immorlica, *The Unsplittable Stable Marriage Problem*, IFIP World Computer Congress, International Conference on Theoretical Computer Science (IFIP TCS) 2006.

13. N. Immorlica, L. Li, V. Mirrokni, and A. Schulz, *Coordination Mechanisms for Selfish Scheduling*, International Workshop on Internet and Network Economics (WINE) 2005.
14. N. Immorlica, K. Jain, M. Mahdian, and K. Talwar, *Click Fraud Resistant Methods for Learning Click-Through Rates*, International Workshop on Internet and Network Economics (WINE) 2005.
15. G. Aggarwal, A. Fiat, N. Immorlica, A. Goldberg, J. Hartline, and M. Sudan, *De-randomization of Auctions*, ACM Symposium on the Theory of Computing (STOC) 2005.
16. C. Borgs, J. Chayes, N. Immorlica, M. Mahdian, and A. Saberi, *Multi-Unit Auctions with Budget-Constrained Bidders*, ACM Conference on Electronic Commerce (EC) 2005.
17. N. Immorlica, D. Karger, E. Nikolova, and R. Sami, *First-Price Path Auctions*, ACM Conference on Electronic Commerce (EC) 2005.
18. S. Chien and N. Immorlica, *Semantic Similarity between Search Engine Queries Using Temporal Correlation*, World Wide Web Conference (WWW) 2005.
19. R. Bhatia, N. Immorlica, T. Kimbrel, V.S. Mirrokni, S. Naor, B. Schieber, *Traffic Engineering of Management Flows by Link Augmentations on Confluent Trees*, ACM Symposium on Parallelism in Algorithms and Architectures (SPAA) 2005.
20. N. Immorlica, M. Mahdian, and V.S. Mirrokni, *Cycle Cover with Short Cycles*, Symposium on Theoretical Aspects of Computer Science (STACS) 2005.
21. N. Immorlica, M. Mahdian, and V.S. Mirrokni, *The Limitations of Cross-monotonic Cost Sharing Schemes*, ACM-SIAM Symposium on Discrete Algorithms (SODA) 2005.¹
22. N. Immorlica, and M. Mahdian, *Marriage, Honesty, and Stability*, ACM-SIAM Symposium on Discrete Algorithms (SODA) 2005.
23. L. Zhou, L. Zhang, F. McSherry, N. Immorlica, and S. Chien, *A First Look at Peer-to-Peer Worms: Threats and Defenses*, International Workshop on Peer-To-Peer Systems (IPTPS) 2005.
24. N. Immorlica, D. Karger, M. Minkoff, and V.S. Mirrokni. *On the Costs and Benefits of Procrastination: Approximation Algorithms for Stochastic Combinatorial Optimization Problems*, ACM-SIAM Symposium on Discrete Algorithms (SODA) 2004.
25. M. Datar, N. Immorlica, P. Indyk, and V.S. Mirrokni. *Locality-Sensitive Hashing Scheme Based on p -Stable Distributions*, Annual Symposium on Computational Geometry (SoCG) 2004.
26. E. D. Demaine and N. Immorlica *Correlation Clustering with Partial Information*, International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX) 2003.
27. Y. Bejerano, N. Immorlica, S. Naor, and M. Smith. *Location Area Design in Cellular Networks*, MOBICOM 2003. Full version: *Efficient Location Area Planning for Personal Communication Systems*, *IEEE/ACM Transactions on Networking*, volume 14, number 2, April 2006, pages 438-450.
28. M. Hajiaghayi, N. Immorlica, and V.S. Mirrokni. *Power Optimization in Fault-Tolerant Topology Control Algorithms for Wireless Multi-hop Networks*, MOBICOM 2003. Full version to appear in *IEEE/ACM Transactions on Networking*.

¹Winner of the best student paper award.

JOURNAL
PUBLICATIONS

1. C. Borgs, J. Chayes, N. Immorlica, A. Kalai, V. Mirrokni, and C. Papadimitriou, *The Myth of the Folk Theorem*, to appear in *Games and Economic Behavior*.
2. N. Immorlica, L. Li, V. Mirrokni, and A. Schulz, *Coordination Mechanisms for Selfish Scheduling*, to appear in *Theoretical Computer Science*.
3. N. Immorlica, M. Mahdian, and V.S. Mirrokni, *The Limitations of Cross-monotonic Cost Sharing Schemes*, in *ACM Transactions on Algorithms*, volume 4, number 1, April 2008.
4. R. Bhatia, N. Immorlica, T. Kimbrel, V.S. Mirrokni, S. Naor, B. Schieber, *Traffic Engineering of Management Flows by Link Augmentations on Confluent Trees*, in *Theory of Computing Systems*, volume 41, number 1, January 2008, pages 2-26.
5. E. D. Demaine, D. Emanuel, A. Fiat, and N. Immorlica, *Correlation clustering in general weighted graphs*, *Theoretical Computer Science*, volume 361, number 2-3, September 2006, pages 172-187. Special issue on approximation and online algorithms.
6. Y. Bejerano, M. Smith, S. Naor, and N. Immorlica, *Efficient Location Area Planning for Personal Communication Systems*, *IEEE/ACM Transactions on Networking*, volume 14, number 2, April 2006, pages 438-450.
7. M. Hajiaghayi, N. Immorlica, and V.S. Mirrokni. *Power Optimization in Fault-Tolerant Topology Control Algorithms for Wireless Multi-hop Networks*, *IEEE/ACM Transactions on Networking*, volume 15, issue 6, December 2007, pages 1345-1358.

SURVEYS AND
BOOK
CHAPTERS

1. M. Babaioff, N. Immorlica, D. Kempe, and R.D. Kleinberg. *Online Auctions and Generalized Secretary Problems*, *SIGecom Exchanges*, volume 7, number 2, June 2008.
2. N. Immorlica and A. Wirth, "Clustering with qualitative information", in *Constrained Clustering: Advances in Algorithms, Theory, and Applications*; T. Darrell, P. Indyk, and G. Shakhnarovich (eds.), MIT Press, 2006.
3. A. Andoni, M. Datar, N. Immorlica, P. Indyk, and V.S. Mirrokni, "Locality-sensitive hashing using stable distributions", in *Nearest Neighbor Methods in Learning and Vision: Theory and Practice*; T. Darrell, P. Indyk, and G. Shakhnarovich (eds.), MIT Press, 2006.

INVITED TALKS

- ◇ International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM), January 2009 (Prague, Czech Republic)
- ◇ STIET Research Seminar Series, University of Michigan, October 2008 (Detroit, MI)
- ◇ Maryland Theoretical Computer Science Day, University of Maryland, October 2008 (College Park, MD)
- ◇ DIAMANT/EIDMA Symposium, May 2008 (Leiden, The Netherlands)
- ◇ Various invited talks at universities, research labs, and workshops throughout the United States and around the world.

PATENTS

- ◇ 9 US patent applications have been filed.