

Nima Anari

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📍 Gates Computer Science 484
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RESEARCH INTERESTS Geometry of Polynomials and Applications in Algorithms, Combinatorics, and Probability
Approximate Sampling and Counting
Spectral Graph Theory and Spectral Algorithms
Algorithmic Game Theory and Mechanism Design

ACADEMIC POSITIONS **Stanford University** 1/2018 - present
Researcher in Computer Science.
Simons Institute for the Theory of Computing 8/2017 - 12/2017
Research Fellow.
Stanford University 1/2016 - 8/2017
Postdoctoral Scholar in Management Science & Engineering.

EDUCATION **University of California, Berkeley** 8/2010 - 12/2015
Ph.D. in Computer Science. Advisor: Satish Rao.
Dissertation: New Approaches to the Asymmetric Traveling Salesman and Related Problems.
Sharif University of Technology 9/2006 - 6/2010
B.Sc. in Computer Engineering and B.Sc. in Pure Mathematics.
Thesis: Resource-Constrained Routing and Network Design Problems.

PREPRINTS AND MANUSCRIPTS [21] **Log-Concave Polynomials III: Mason's Ultra-Log-Concavity Conjecture for Independent Sets of Matroids** *Manuscript*
Nima Anari, Kuikui Liu, Shayan Oveis Gharan, and Cynthia Vinzant.
CoRR abs/1811.01600 (2018).
[20] **Log-Concave Polynomials II: High-Dimensional Walks and an FPRAS for Counting Bases of a Matroid** *Manuscript*
Nima Anari, Kuikui Liu, Shayan Oveis Gharan, and Cynthia Vinzant.
CoRR abs/1811.01816 (2018).
[19] **A Tight Analysis of Bethe Approximation for Permanent** *Manuscript*
Nima Anari and Alireza Rezaei.
CoRR abs/1811.02933 (2018).

- [18] **Nearly Optimal Pricing Algorithms for Production Constrained and Laminar... Bayesian Selection** *Manuscript*
Nima Anari, Rad Niazadeh, Amin Saberi, and Ali Shameli.
 CoRR abs/1807.05477 (2018).
- [17] **Robust Submodular Maximization: Offline and Online Algorithms** *Manuscript*
Nima Anari, Nika Haghtalab, Joseph (Seffi) Naor, Sebastian Pokutta, Mohit Singh, and Alfredo Torrico.
 CoRR abs/1710.04740 (2017).
- [16] **The Kadison-Singer Problem for Strongly Rayleigh Measures and Applications to Asymmetric TSP** *Manuscript*
Nima Anari and Shayan Oveis Gharan.
 CoRR abs/1412.1143 (2014).
- PUBLICATIONS [15] **Smoothed Analysis of Discrete Tensor Decomposition and Assemblies of Neurons** *NIPS 2018*
Nima Anari, Constantinos Daskalakis, Wolfgang Maass, Christos Papadimitriou, Amin Saberi, and Santosh Vempala.
 Advances in Neural Information Processing Systems (2018).
- [14] **Log-Concave Polynomials I: Entropy and a Deterministic Approximation Algorithm for Counting Bases of Matroids** *FOCS 2018*
Nima Anari, Shayan Oveis Gharan, and Cynthia Vinzant.
 Proceedings of the 59th IEEE Annual Symposium on Foundations of Computer Science (2018).
- [13] **Planar Graph Perfect Matching is in NC** *FOCS 2018*
Nima Anari and Vijay V. Vazirani.
 Proceedings of the 59th IEEE Annual Symposium on Foundations of Computer Science (2018).
 Invited to special issue of SIAM Journal on Computing.
- [12] **Budget Feasible Procurement Auctions** *Oper. Res. 66*
Nima Anari, Gagan Goel, and Afshin Nikzad.
 Operations Research 66 (2018).
- [11] **Graph Clustering using Effective Resistance** *ITCS 2018*
Vedat Levi Alev, Nima Anari, Lap Chi Lau, and Shayan Oveis Gharan.
 Proceedings of the 9th Conference on Innovations in Theoretical Computer Science (2018).
- [10] **Approximating the Largest Root and Applications to Interlacing Families** *SODA 2018*
Nima Anari, Shayan Oveis Gharan, Amin Saberi, and Nikhil Srivastava.
 Proceedings of the 29th Annual ACM-SIAM Symposium on Discrete Algorithms (2018).
- [9] **Nash Social Welfare for Indivisible Items under Separable, Piecewise-Linear Concave Utilities** *SODA 2018*
Nima Anari, Tung Mai, Shayan Oveis Gharan, and Vijay V. Vazirani.
 Proceedings of the 29th Annual ACM-SIAM Symposium on Discrete Algorithms (2018).
- [8] **Simply Exponential Approximation of the Permanent of Positive Semidefinite Matrices** *FOCS 2017*
Nima Anari, Leonid Gurvits, Shayan Oveis Gharan, and Amin Saberi.
 Proceedings of the 58th IEEE Annual Symposium on Foundations of Computer Science (2017).

- [7] **A Generalization of Permanent Inequalities and Applications in Counting ...** *STOC 2017 and Optimization*
Nima Anari and Shayan Oveis Gharan.
 Proceedings of the 49th Annual ACM SIGACT Symposium on Theory of Computing (2017).
- [6] **Nash Social Welfare, Matrix Permanent, and Stable Polynomials** *ITCS 2017*
Nima Anari, Shayan Oveis Gharan, Amin Saberi, and Mohit Singh.
 Proceedings of the 8th Conference on Innovations in Theoretical Computer Science (2017).
 Elevated to invited paper.
- [5] **Monte Carlo Markov Chain Algorithms for Sampling Strongly Rayleigh Dis-...** *COLT 2016 tributions and Determinantal Point Processes*
Nima Anari, Shayan Oveis Gharan, and Alireza Rezaei.
 Proceedings of the 29th Conference on Learning Theory (2016).
- [4] **Effective-Resistance-Reducing Flows, Spectrally Thin Trees, and Asymmetric ...** *FOCS 2015 TSP*
Nima Anari and Shayan Oveis Gharan.
 Proceedings of the 56th IEEE Annual Symposium on Foundations of Computer Science (2015).
 Invited to special issue of SIAM Journal on Computing.
- [3] **Mechanism Design for Crowdsourcing: An Optimal $1 - 1/e$ Competitive ...** *FOCS 2014 Budget-Feasible Mechanism for Large Markets*
Nima Anari, Gagan Goel, and Afshin Nikzad.
 Proceedings of the 55th IEEE Annual Symposium on Foundations of Computer Science (2014).
- [2] **Euclidean Movement Minimization** *CCCG 2011*
Nima Anari, MohammadAmin Fazli, Mohammad Ghodsi, and MohammadAli Safari.
 Journal of Combinatorial Optimization 32 (2016).
 Proceedings of the 23rd Annual Canadian Conference on Computational Geometry (2011).
- [1] **Equilibrium Pricing with Positive Externalities** *WINE 2010*
Nima Anari, Shayan Ehsani, Mohammad Ghodsi, Nima Haghpanah, Nicole Immorlica, Hamid Mahini, and Vahab S. Mirrokni.
 Theoretical Computer Science 476 (2013).
 Proceedings of the 6th International Workshop on Internet and Network Economics (2010).

WORK AND
TEACHING
EXPERIENCE

- University of California, Berkeley** 9/2012 - 12/2015
 Graduate Student Researcher.
 Graduate Student Instructor for Discrete Mathematics and Probability Theory.
 Graduate Student Instructor for Efficient Algorithms and Intractable Problems.
- Microsoft Research, Redmond** 5/2015 - 8/2015
 Intern at Theory Group.
- Google, New York** 5/2014 - 8/2014
 Intern at Algorithms Research Group.
- Jane Street, New York** 5/2013 - 8/2013
 Research Intern.
- Facebook, Menlo Park** 5/2012 - 8/2012
 Software Engineering Intern.

D.E. Shaw & Co., New York 6/2011 - 8/2011
Quantitative Analyst Intern.

Farzanegan High School, Tehran 10/2007 - 8/2008
Mentored a Team of Students.
The project, Computation of the Minimum and Maximum Area Shadows of Convex Polyhedra, received First Prize at Khwarizmi Award for Young Researchers.

SERVICE

Co-organized reading group “Algorithmic Toolbox: Counting and Sampling” during spring 2018 at Stanford university.

Co-organized workshop on “Approximating Traveling Salesman Problems using Algebraic Techniques” at FOCS 2016.

Reviewer for FOCS, STOC, SODA, WINE, WSDM, SoCG, ICALP, ITCS, STACS, ESA, and SICOMP.

HONORS AND AWARDS

Microsoft Research Fellow 1/2019 - 5/2019
Simons Institute for the Theory of Computing.
Program on Geometry of Polynomials.

Simons-Berkeley Research Fellow 8/2017 - 12/2017
Simons Institute for the Theory of Computing.
Program on Bridging Continuous and Discrete Optimization.

Berkeley Fellowship for Graduate Studies 8/2010 - 8/2012
University of California, Berkeley.

Grant for Undergraduate Studies 9/2006 - 6/2010
Iranian National Elites Foundation.

Outstanding Student Award 2007, 2008, and 2009
Sharif University of Technology.

Ranked 14th Team ACM ICPC 2009
ACM International Collegiate Programming Contest World Finals, Stockholm.

First Prize IMC 2007 and 2008
International Mathematics Competition, Blagoevgrad.

Ranked 13th Team ACM ICPC 2008
ACM International Collegiate Programming Contest World Finals, Banff.

Gold Medal 2006 and 2007
Iranian Mathematical Society Collegiate Competition, Tehran.

Silver Medal IOI 2006
International Olympiad in Informatics, Merida.

Gold Medal IMO 2006
International Mathematical Olympiad, Ljubljana.

Gold Medal 2006
Iranian National Olympiad in Informatics, Tehran.

Silver Medal *IMO 2005*
International Mathematical Olympiad, Merida.

Gold Medal *2004 and 2005*
Iranian National Mathematical Olympiad, Tehran.

RECENT
TALKS

Bernoulli Center, EPFL 11/12/2018
Log-Concave Polynomials: Counting and Sampling Matroid Bases and Beyond.
Workshop on “Applications of Partition Functions”.

Stanford University 10/29/2018
Log-Concave Polynomials: Counting and Sampling Matroid Bases and Beyond.
Probability Seminar.

MIT 10/24/2018
Log-Concave Polynomials and Matroids: Algorithms and Combinatorics.
Algorithms and Complexity Seminar.

University of California, Irvine 10/18/2018
Planar Graph Perfect Matching is in NC.
Algorithms, Combinatorics, and Optimization Seminar.

Stanford University 10/9/2018
Log-Concave Polynomials: Combinatorics and Algorithms.
Theory Lunch.

Bernoulli Center, EPFL 10/1/2018
Counting Bases of Matroids, Entropy, and Log-Concave Polynomials.
Workshop on “Theoretical Challenges in Partition Functions”.

Banff International Research Station 9/25/2018
Thin Trees and the Asymmetric Traveling Salesman.
BIRS Workshop on “The Traveling Salesman Problem: Algorithms & Optimization”.

Harvard University 9/24/2018
Log-Concave Polynomials: Combinatorics, Counting, and Optimization.

Banff International Research Station + Casa Matemática Oaxaca 8/14/2018
Counting Algorithms over Matroids.
BIRS-CMO Workshop on “Analytic Techniques in Theoretical Computer Science”.

University of California, Los Angeles 5/24/2018
Entropy, Log-Concavity, and a Deterministic Approximation Algorithm for Counting Bases of Matroids.

Georgia Tech 4/30/2018
Entropy, Log-Concavity, and a Deterministic Approximation Algorithm for Counting Bases of Matroids.
Algorithms and Randomness Center Colloquium.

TCS+	3/14/2018
Planar Graph Perfect Matching is in NC.	
Stanford University	2/14/2018
Matroids, Entropy, and Log Concavity. Theory Lunch.	
University of Washington	1/23/2018
Planar Graph Perfect Matching is in NC.	
Stanford University	1/22/2018
Planar Graph Perfect Matching is in NC. Theory Seminar.	
Visa Research	11/21/2017
Nash Social Welfare, Matrix Permanent, and Stable Polynomials.	
Simons Institute for the Theory of Computing	11/8/2017
Counting and Optimization Using Stable Polynomials. Workshop on "Hierarchies, Extended Formulations and Matrix-Analytic Techniques".	
Simons Institute for the Theory of Computing	9/15/2017
Approximating the Permanent of Positive Semidefinite Matrices. Workshop on "Discrete Optimization via Continuous Relaxation".	
University of California, Berkeley	9/6/2017
Strongly Rayleigh Measures in Counting and Optimization. Theory Lunch.	
Google Research, Mountain View	8/29/2017
Strongly Rayleigh Measures in Counting and Optimization.	
TOCA-SV	5/12/2017
Algorithm Design Using Stable Polynomials.	