

Aleksander Mądry

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RESEARCH POSITIONS

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Associate Professor of Computer Science (without tenure) July 2017–present
NBX Career Development Chair July 2015–present
Assistant Professor of Computer Science February 2015–June 2017
Principal Investigator in the Computer Science and Artificial
Intelligence Laboratory (CSAIL) February 2015–present
ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE
Assistant Professor of Computer Science July 2012–January 2015
MICROSOFT RESEARCH NEW ENGLAND
Postdoctoral Researcher July 2011–June 2012

EDUCATION

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Ph.D. in Computer Science June 2011
Dissertation: “From Graphs to Matrices, and Back: New Techniques for Graph Algorithms”
George M. Sprowls Dissertation Award and *ACM Doctoral Dissertation Award Honorable Mention*
M.Sc. in Computer Science September 2009
Master’s Thesis: “Faster Generation of Random Spanning Trees”
UNIVERSITY OF WROCLAW
Licencjat Degree (B.Sc. equivalent) **in Theoretical Physics** June 2007
Magister Degree (B.Sc.+M.Sc. equivalent) **in Computer Science** June 2006

FELLOWSHIPS, AWARDS, AND HONORS

Presburger Award 2018
Invited speaker at International Congress of Mathematicians (ICM) 2018
Google Research Award 2017
Alfred P. Sloan Research Fellowship 2016
NSF CAREER Award 2015
Open Mind Prize (awarded biennially to a junior Polish researcher for outstanding research in combinatorics) 2014
Best Paper Award at the IEEE Symposium on Foundations of Computer Science (FOCS) 2013
Best Paper Award at the IEEE Symposium on Foundations of Computer Science (FOCS) 2011
ACM Doctoral Dissertation Award Honorable Mention 2011
George M. Sprowls Dissertation Award (awarded to the best MIT doctoral theses in CS) 2011
Best Paper Award at the ACM Symposium on Theory of Computing (STOC) 2011
Best Paper Award at the ACM-SIAM Symposium on Discrete Algorithms (SODA) 2010

TEACHING

MASSACHUSETTS INSTITUTE OF TECHNOLOGY	
Instructor for 6.854 – <i>Advanced Algorithms</i>	Fall 2018
Instructor for 6.046 – <i>Design and Analysis of Algorithms</i>	Spring 2018
Instructor for 6.883 – <i>Science of Deep Learning: Bridging Theory and Practice</i>	Spring 2018
Instructor for 6.046 – <i>Design and Analysis of Algorithms</i>	Spring 2017
Instructor for 6.854 – <i>Advanced Algorithms</i>	Fall 2016
Instructor for 6.006 – <i>Introduction to Algorithms</i>	Spring 2016
Instructor for 6.S978 – <i>Graphs, Linear Algebra, and Optimization</i>	Fall 2015
ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE	
Instructor for CS-352 – <i>Theoretical Computer Science</i>	Fall 2014
Instructor for CS-251 – <i>Theory of Computation</i>	Spring 2014
Instructor for CS-352 – <i>Theoretical Computer Science</i>	Fall 2013
Instructor for CS-252 – <i>Advanced Theoretical Computer Science</i>	Spring 2013
Instructor for CS-621 – <i>Theory Gems</i>	Fall 2012

PUBLICATIONS (* denotes *non*-alphabetic ordering of authors)

- **How Does Batch Normalization Help Optimization? (It Is Not About Internal Covariate Shift)***, Shibani Santurkar, Dimitris Tsipras, Andrew Ilyas, Aleksander Mądry. In the *32nd Annual Conference on Neural Information Processing Systems (NIPS)*, 2018. **Oral presentation.**
- **Adversarially Robust Generalization Requires More Data***, Ludwig Schmidt, Shibani Santurkar, Dimitris Tsipras, Kunal Talwar, Aleksander Mądry. In the *32nd Annual Conference on Neural Information Processing Systems (NIPS)*, 2018. **Spotlight presentation.**
- **A Classification-Based Study of Covariate Shift in GAN Distributions***, Shibani Santurkar, Ludwig Schmidt, Aleksander Mądry. In the *35th International Conference on Machine Learning (ICML)*, 2018.
- **On the Limitations of First-Order Approximation in GAN Dynamics** (with Jerry Li, John Peebles, and Ludwig Schmidt). In the *35th International Conference on Machine Learning (ICML)*, 2018.
- **k-Server via Multiscale Entropic Regularization** (with Sebastien Bubeck, Michael B. Cohen, James R. Lee, and Yin Tat Lee). In the *50th ACM Symposium on Theory of Computing (STOC)*, 2018.
- **Round Compression for Parallel Matching Algorithms** (with Artur Czumaj, Jakub Łącki, Slobodan Mitrović, Krzysztof Onak, Piotr Sankowski). In the *50th ACM Symposium on Theory of Computing (STOC)*, 2018.
- **Towards Deep Learning Models Resistant to Adversarial Attacks** (with Aleksandar Makelov, Ludwig Schmidt, Dimitris Tsipras, and Adrian Vladu). In the *6th International Conference on Learning Representations (ICLR)*, 2018.
- **Matrix Scaling and Balancing via Box Constrained Newton’s Method and Interior Point Methods** (with Michael B. Cohen, Dimitris Tsipras, and Adrian Vladu). In the *58th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2017.
- **Negative-Weight Shortest Paths and Unit Capacity Minimum Cost Flow in $O(m^{10/7} \log W)$ Time** (with Michael B. Cohen, Piotr Sankowski, and Adrian Vladu). In the *28th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2017.
- **Computing Maximum Flow with Augmenting Electrical Flows.** In the *57th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2016. **Invited to the Special Issue.**

- **On the Resiliency of Randomized Routing Against Multiple Edge Failures** (with Marco Chiesa, Andrei Gurto, Slobodan Mitrović, Ilya Nikolaevskiy, Michael Schapira, and Scott Shenker). In the *43rd International Colloquium on Automata, Languages, and Programming (ICALP)*, 2016.
- **The Quest for Resilient (Static) Forwarding Tables** (with Marco Chiesa, Ilya Nikolaevskiy, Slobodan Mitrović, Aurojit Panda, Andrei Gurto, Michael Schapira, and Scott Shenker). In the *35th IEEE International Conference on Computer Communications (INFOCOM)*, 2016.
- **Fast Generation of Random Spanning Trees and the Effective Resistance Metric** (with Damian Straszak and Jakub Tarnawski). In the *26th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2015.
- **On the Configuration LP for Maximum Budgeted Allocation** (with Christos Kalaitzis, Alantha Newman, Lukáš Poláček, and Ola Svensson). In the *17th Conference on Integer Programming and Combinatorial Optimization (IPCO)*, 2014. *Mathematical Programming*, Volume 154 Issue 1, 2015.
- **Navigating Central Path with Electrical Flows: from Flows to Matchings, and Back.** In the *54th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2013. **Best Paper Award.**
- **Runtime Guarantees for Regression Problems** (with Hui Han Chin, Gary Miller, and Richard Peng). In the *4th Innovations in Theoretical Computer Science (ITCS)*, 2013.
- **A Polylogarithmic-Competitive Algorithm for the k-Server Problem** (with Nikhil Bansal, Niv Buchbinder, and Seffi Naor). In the *52nd Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2011. **Best Paper Award.** *Journal of the ACM*, Volume 62 Issue 5, 2015.
- **Electrical Flows, Laplacian Systems, and Faster Approximation of Maximum Flow in Undirected Graphs** (with Paul Christiano, Jonathan Kelner, Daniel Spielman, and Shang-Hua Teng). In the *43rd Annual ACM Symposium on Theory of Computing (STOC)*, 2011. **Best Paper Award.**
- **The Semi-stochastic Ski-rental Problem** (with Debmalya Panigrahi). In the *31st IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS)*, 2011.
- **Fast Approximation Algorithms for Cut-based Problems in Undirected Graphs.** In the *51st Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2010.
- **Faster Approximation Schemes for Fractional Multicommodity Flow Problems via Dynamic Graph Algorithms.** In the *42nd Annual ACM Symposium on Theory of Computing (STOC)*, 2010.
- **An $O(\log n / \log \log n)$ -approximation Algorithm for the Asymmetric Traveling Salesman Problem** (with Arash Asadpour, Michel Goemans, Shayan Oveis Gharan, and Amin Saberi). In the *21st Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2010. **Best Paper Award.** *Operations Research*, to appear.
- **Faster Generation of Random Spanning Trees** (with Jonathan Kelner). In the *50th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2009.
- **Maximum Bipartite Flow in Networks with Adaptive Channel Width** (with Yossi Azar, Thomas Moscibroda, Debmalya Panigrahi, Aravind Srinivasan). In the *36th International Colloquium on Automata, Languages and Programming (ICALP)*, 2009. *Theoretical Computer Science*, Volume 412 Issue 24, 2011. **Special issue.**
- **Susceptible Two-Party Quantum Computations** (with Andreas Jacoby and Maciej Liśkiewicz). In *International Conference on Information Theoretic Security (ICITS)*, 2008.
- **Geometric Aspects of Online Packet Buffering: An Optimal Randomized Algorithm for Two Buffers** (with Marcin Bienkowski). In the *8th Latin American Theoretical Informatics Symposium (LATIN)*, 2008.

- **Data Exchange: On the Complexity of Answering Queries with Inequalities.**
In *Information Processing Letters*, Vol. 94, Issue 6 (June 2005).

PROFESSIONAL	Program committee of the IEEE Symposium on Foundations of Computer Science (FOCS)	2018
SERVICE	PC of the ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)	2017
(SELECTED)	Co-chair of the “Bridging Continuous and Discrete Optimization” semester at the Simons Institute for the Theory of Computing	2017
	Program committee of the ACM Symposium on Theory of Computing (STOC)	2017
	Member of the Steering Committee of the European Symposium on Algorithms	2015–
	Member of the Steering Committee of the Highlights of Algorithms Conference	2015–
	Program committee of the Intl. Workshop on Randomization and Computation (RANDOM)	2015
	Co-founder of the Interest Group on Algorithmic Foundations of Information Technology	2014
	Co-organizer of the 1st European Meeting on Algorithmic Challenges of Big Data (ACBD 2014), University of Warsaw, Poland	May 2014
	Program committee of the IEEE Symposium on Foundations of Computer Science (FOCS)	2014
	Program committee of the Scandinavian Symposium and Workshops on Algorithm Theory	2014
	Program committee of the European Symposium on Algorithms (ESA)	2014
	Program committee of the ACM Symposium on Theory of Computing (STOC)	2013
	Program committee of the ACM-SIAM Symposium on Discrete Algorithms (SODA)	2013
	Co-organizer of the “Algorithmic Meeting” workshop, EPFL, Lausanne	February 2013
	Co-organizer of the “Algorithmic Frontiers” workshop, EPFL, Lausanne	June 2012