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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

UNIVERSITY OF WARSAW
Visiting Assistant Professor July 2014–August 2015

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

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 6.046 – *Design and Analysis of Algorithms* course Spring 2017

Taught an upperclass undergraduate algorithms class. Topics covered included advanced divide and conquer, greedy, and dynamic programming techniques, randomized algorithms, elements of continuous optimization, maximum flow algorithms, basics of linear programming, and streaming algorithms.

Instructor for 6.854 – *Advanced Algorithms* course Fall 2016

Teaching a capstone course in algorithms that surveys some of the most advanced algorithmic techniques and key computational models. Areas covered include data structures, algorithmic graph theory, streaming algorithms, online algorithms, parallel algorithms; computational geometry, external memory/cache oblivious algorithms, and continuous optimization.

Instructor for 6.006 – *Introduction to Algorithms* course Spring 2016

Taught an introductory algorithms class that covered classic algorithms, algorithmic paradigms, and data structures. Introduced a module on fundamentals of continuous optimization that covered basics of gradient descent and Newton’s method.

Instructor for 6.S978 – *Graphs, Linear Algebra, and Optimization* course Fall 2015

Designed an advanced graduate course that provides a tour through the ideas and techniques that underlie the emerging theme of developing fast graph algorithms via convex optimization and linear algebra methods. The course covers modern graph algorithmic techniques as well as basic techniques of convex optimization.

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Instructor for CS-352 – *Theoretical Computer Science* course Fall 2014

Taught an undergraduate course that provides an introduction to some of the more advanced ideas in theory of computation. The list of covered topics included basics of streaming algorithms, interactive proofs, zero-knowledge proofs, pseudorandomness, algorithmic game theory, spectral graph theory and quantum computing.

Instructor for CS-251 – *Theory of Computation* course Spring 2014

Redesigned and taught an undergraduate course that constitutes an introduction to theory of computation. It discusses the basic theoretical models of computing (logical circuits, finite automata, Turing machines), as well as provides a solid and mathematically precise understanding of their fundamental capabilities and limitations.

Instructor for CS-352 – *Theoretical Computer Science* course Fall 2013

Redesigned and taught an undergraduate course that was a new – renamed and broader in scope – version of the CS-252 course described below. It presented a suitably-crafted selection of more advanced topics in theoretical computer science at large. The list of covered topics included theoretical foundations of machine learning, algorithmic game theory, spectral graph theory, and the basics of approximation algorithms and inapproximability theory.

Instructor for CS-252 – *Advanced Theoretical Computer Science* course Spring 2013

Redesigned and taught an undergraduate course that provides an introduction to some of the more advanced ideas in theory of computation. The list of covered topics included probabilistic complexity classes, interactive proofs, zero-knowledge proofs, PCP theorem, pseudorandomness, and quantum computing.

Instructor for CS-621 – *Theory Gems* course Fall 2012

Designed a graduate course – aimed mostly at non-theory audience – that presents a bird’s-eye view on some of the key recent developments in theoretical computer science. Covered topics spanned spectral graph theory, algorithmic game theory, theoretical foundations of machine learning, modern cryptography and complexity theory, as well as streaming algorithms.

PUBLICATIONS

- **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	PC of the ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)	2017
SERVICE	Co-chair of the “Bridging Continuous and Discrete Optimization” semester at the Simons Institute	
(SELECTED)	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