

## Research Interests

Algorithms and theory for artificial intelligence and large-scale data analysis.

## Academic Appointments

- 2021–current **Assistant Professor of Computer Science**, *George Mason University*, Fairfax, VA
- 2023–2024 **Visiting Faculty**, *Stanford University*, Palo Alto, CA, Host: Moses Charikar
- 2020–2021 **Adjunct Assistant Professor of Computer Science**, *Indiana University*, Bloomington, IN
- 2019 **Visiting Researcher**, *Alan Turing Institute for Data Science and AI*, London, UK
- 2018–2020 **Adjunct Assistant Professor of Statistics**, *Indiana University*, Bloomington, IN
- 2017–2020 **Founding Director, Center for Algorithms and Machine Learning (CAML)**, *Indiana University*, Bloomington, IN, <http://caml.indiana.edu>
- 2016–2020 **Assistant Professor of Computer Science**, *Indiana University*, Bloomington, IN
- 2014–2016 **Warren Center Postdoctoral Fellow**, *University of Pennsylvania*, Philadelphia, PA, Departments of Computer and Information Sciences and Statistics at the Wharton Business School. Mentors: Michael Kearns (CIS) and Elchanan Mossel (Stat)
- 2013–2014 **ICERM Postdoctoral Fellow**, *Brown University*, Providence, RI, Mentor: Philip Klein

## Education

- 2010–2013 **Ph.D.**, *Pennsylvania State University*, State College, PA, Computer Science & Engineering  
Thesis: “Efficient Combinatorial Techniques in Sparsification, Summarization and Testing of Large Datasets.” Advisor: Sofya Raskhodnikova  
**Joined by invitation, didn’t apply to any other Ph.D. programs**
- 2008–2010 **M.Sc.**, *Academic University of the Russian Academy of Sciences*, St. Petersburg, Russia, Applied Math and Physics, 1<sup>st</sup> student in the pilot TCS class
- 2004–2008 **B.Sc.**, *St. Petersburg State Polytechnic University*, St. Petersburg, Russia, Physics and Technology, ranked 1<sup>st</sup> on the entry test for the department

## Research Internships

- Summer 2013 **Theory group, Microsoft Research**, Redmond, WA, Mentor: Konstantin Makarychev
- Fall 2012 **Theory group, Microsoft Research**, Mountain View, CA, Mentor: Alex Andoni
- Summer 2012 **Theory group, IBM Research**, Almaden, CA, Mentor: David Woodruff
- Summer 2011 **Database theory group, AT&T Labs–Research, Shannon Laboratory**, Florham Park, NJ, Mentors: Graham Cormode, Cecilia M. Procopiuc, Divesh Srivastava and Howard Karloff

## Selected Awards and Honors

- 2019 **NeurIPS’19 Highest-Scoring Reviewer (Top 400)**
- 2019 **Alan Turing Institute Visiting Researcher**, *London, UK*
- 2017 **Facebook Faculty Research Award**
- 2014–2016 **Warren Center Postdoctoral Fellowship**, *University of Pennsylvania*
- 2013–2014 **Institute Postdoctoral Fellowship**, *Brown University, ICERM*
- 2012 **Best Graduate Research Assistant Award at CSE Department**, *Penn State*
- 2010 **TopCoder Open Algorithm Competition Finalist (Top-24 worldwide)**

- 2010–2013 **College of Engineering Fellowship**, *Penn State*
- 2010–2011 **University Graduate Fellowship**, *Penn State*
- 2009–2010 **Yandex Personal Research Grant**, *Academic University of the RAS*
- 2008–2009 **Coach of the top team in St. Petersburg High-School Olympiad in Informatics**
- 2004 **Ranked 1<sup>st</sup> on the entry test for the Department of Physics and Technology**, *St. Petersburg State Polytechnic University*

## Media Coverage

For PNAS paper “Private Algorithms for the Protected in Social Network Search”:

- PBS Newshour “The secret things you give away through your phone metadata”
- Schneier on Security “Research on Balancing Privacy with Surveillance.”
- Association of American Universities “Penn Researchers Balance Privacy and Security in Network Analysis.”
- ACM Tech News / The Daily Pennsylvanian: “Penn Professor’s Computer Algorithm Could Fight Terrorism While Protecting Privacy.”
- Quartz: “There may be a way to allow mass surveillance and preserve our privacy at the same time.”
- Pacific Standard: “Searching Private Data, and Ensuring It Stays Private.”
- Wired (German): “Ein neuer Überwachungs-Algorithmus soll in Social Media nur auf Terroristen zielen.”
- Vice Motherboard: “Algorithms Claim to Hunt Terrorists While Protecting the Privacy of Others.”
- The Naked Scientists Podcast: “National Security Algorithm.”

## Selected Coverage in Books and Classes at Other Universities

STOC’14 paper “Parallel Algorithms for Geometric Graph Problems”:

- **Harvard** CS 229r, Fall’13, “Algorithms for Big Data”. Taught by Jelani Nelson.
- **Columbia** COMS 6998-9, Fall’15, “Algorithmic Techniques for Massive Data”. Taught by Alexandr Andoni.
- **ETH Zurich**, Spring’19, “Massively Parallel Algorithms”. Taught by Mohsen Ghaffari.

STOC’14 paper “ $L_p$ -Testing”:

- **MIT** 6.889, Fall’17, “Sublinear Time Algorithms”. Taught by Ronitt Rubinfeld.
- **Introduction to Property Testing**, by Oded Goldreich.
- **Encyclopedia of Algorithms**, article by Sofya Raskhodnikova.

SAT’09 paper “Finding Efficient Circuits using SAT-solvers”:

- **Stanford** CS354, Fall’11, Spring’14, Spring’16, “Topics in Circuit Complexity”. Taught by Ryan Williams.
- “**The Art of Computer Programming**”, **Volume 4**, by Donald E. Knuth.

## Funding

- 2017–2021 **NSF CRII Award**, “*Algorithms for Noise-Tolerant Function Testing with Applications to Deep Learning*”, Sole PI, award amount: \$175,000
- 2018–2020 **Google Cloud Platform Credit**, Award amount: \$15,000
- 2017 **Facebook Faculty Research Award**, Award amount: \$35,000

## Journal Papers

- PNAS 16 Private Algorithms for the Protected in Social Network Search, with M. Kearns, A. Roth and S. Wu, **Proceedings of the National Academy of Sciences**.

- Algo 16 Certifying Equality with Limited Interaction, with J. Brody, A. Chakrabarti, R. Kondapally and D. Woodruff, **Algorithmica, special issue on “Information Complexity and Applications**.
- TODS 14 Private Analysis of Graph Structure, with V. Karwa, S. Raskhodnikova and A. Smith, ACM Transactions on Database Systems.
- Comb 14 Steiner Transitive-Closure Spanners of Low-Dimensional Posets, with P. Berman, A. Bhattacharyya, E. Grigorescu, S. Raskhodnikova and D. Woodruff, *Combinatorica*.
- I&C 12 Approximation Algorithms for Spanner Problems and Directed Steiner Forest, with P. Berman, A. Bhattacharyya, K. Makarychev and S. Raskhodnikova, **Information and Computation, special issue for ICALP’11**.
- IPL 10 New upper bounds on the Boolean Circuit Complexity of Symmetric Functions, with E. Demenkov, A. Kojevnikov and A. Kulikov, *Information Processing Letters*.

## Peer-Reviewed Conference and Workshop Papers

Authors listed in alphabetical order unless marked with ★ for ordering by contribution:

- ICLR 24 Optimal Sample Complexity of Contrastive Learning, with N. Alon, D. Avdiukhin, D. Elboim and O. Fischer, 12th International Conference on Learning Representations, **Spotlight (5% acceptance rate)**.
- AAAI 24 Approximation Scheme for Weighted Metric Clustering via Sherali-Adams, with D. Avdiukhin, V. Chatziafratis and K. Makarychev, 38th AAAI Conference on Artificial Intelligence **Oral presentation**.
- IJCAI 23 HOUDINI: Escaping from Moderately Constrained Saddles, with D. Avdiukhin, 32nd International Joint Conference on Artificial Intelligence.
- AAAI 23 ★ Tree Learning: Optimal Algorithms and Sample Complexity, D. Avdiukhin, G. Yaroslavltssev, D. Vainstein, O. Fischer, S. Das, F. Mirza, 37th AAAI Conference on Artificial Intelligence.
- NeurIPS 21 Escaping Saddle Points with Compressed SGD, with D. Avdiukhin, 35th Conference on Neural Information Processing Systems.
- AAAI 21 ★ Objective-Based Hierarchical Clustering of Deep Embedding Vectors, S. Naumov, G. Yaroslavltssev and D. Avdiukhin, 35th AAAI Conference on Artificial Intelligence.
- AISTATS 20 Bisect and Conquer: Hierarchical Clustering via Max-Uncut Bisection, with S. Ahmadian, V. Chatziafratis, A. Epasto, E. Lee, K. Makarychev and M. Mahdian, 23rd International Conference on Artificial Intelligence and Statistics.
- AISTATS 20 ★ “Bring Your Own Greedy” + Max: Near-Optimal 1/2-Approximations for Submodular Knapsack, G. Yaroslavltssev, S. Zhou and D. Avdiukhin, 23rd International Conference on Artificial Intelligence and Statistics.
- SOSA@SODA 20 Fast Fourier Sparsity Testing, with S. Zhou, 3rd SIAM Symposium on Simplicity in Algorithms.
- OPT@NeurIPS 19 Escaping Saddle Points with Inequality Constraints via Noisy Sticky Projected Gradient Descent, with D. Avdiukhin and C. Jin, 11th OPT Workshop on Optimization for Machine Learning, **Oral + poster**.
- RANDOM 19 Approximate  $\mathbb{F}_2$ -Sketching of Valuation Functions, with S. Zhou, 23rd International Workshop on Randomization and Computation.
- CCC 19 Optimality of Linear Sketching under Modular Updates, with K. Hosseini and S. Lovett, 34th Conference on Computational Complexity.
- KDD 19 Adversarially Robust Submodular Maximization under Knapsack Constraints, with D. Avdiukhin, S. Mitrovic and S. Zhou, 25th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, Research Track, **Oral presentation (9.2% acceptance rate)**.
- VLDB 19 Multi-Dimensional Balanced Graph Partitioning via Projected Gradient Descent, with D. Avdiukhin and S. Pupyrev, 45th International Conference on Very Large Data Bases, Research Track.

- AISTATS 19 Hierarchical Clustering for Euclidean Data, with M. Charikar, V. Chatziafratis and R. Niazadeh, 22nd International Conference on Artificial Intelligence and Statistics.
- ICML 18 ★ Massively Parallel Algorithms and Hardness for Single-Linkage Clustering under  $\ell_p$ -Distances, G. Yaroslavtsev and A. Vadapalli., 35th International Conference on Machine Learning, **Long talk (8.6% acceptance rate)**.
- CCC 18 Linear Sketching over  $\mathbb{F}_2$ , with S. Kannan, E. Mossel and S. Sanyal, 33rd Conference on Computational Complexity.
- SODA 16 Tight Bounds on Linear Sketches of Approximate Matchings, with S. Assadi, S. Khanna and Y. Li, 27th Annual ACM-SIAM Symposium on Discrete Algorithms.
- ICALP 15 Amplification of One-Way Information Complexity via Codes and Noise Sensitivity, with M. Molinaro and D. Woodruff, 42nd International Colloquium on Automata, Languages and Programming.
- STOC 15 Near Optimal LP Rounding Algorithm for Correlation Clustering on Complete and Complete k-partite Graphs, with S. Chawla, K. Makarychev and T. Schramm, 47th ACM Symposium on the Theory of Computing.
- RANDOM 14 Certifying Equality with Limited Interaction, with J. Brody, A. Chakrabarti, R. Kondapally and D. Woodruff, 18th International Workshop on Randomization and Computation.
- PODC 14 Beyond Set Disjointness: The Communication Complexity of Finding the Intersection, with J. Brody, A. Chakrabarti, R. Kondapally and D. Woodruff, 33rd ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing.
- STOC 14 Parallel Algorithms for Geometric Graph Problems, with A. Andoni, K. Onak and A. Nikolov, 46th ACM Symposium on the Theory of Computing.
- STOC 14  $L_p$ -testing, with P. Berman and S. Raskhodnikova, 46th ACM Symposium on the Theory of Computing.
- CCC 14 Lower Bounds for Testing Properties of Functions over Hypergrid Domains, with E. Blais and S. Raskhodnikova, 29th IEEE Conference on Computational Complexity.
- ICDE 13 ★ Accurate and Efficient Private Release of Datacubes and Contingency Tables, G. Yaroslavtsev, G. Cormode, C. Procopiuc and D. Srivastava, 29th IEEE International Conference on Data Engineering.
- SODA 13 Beating the Direct Sum Theorem in Communication Complexity with Implications for Sketching, with Marco Molinaro and David Woodruff, 24th Annual ACM-SIAM Symposium on Discrete Algorithms, **Invited to a special issue of "Algorithmica" on "Information Complexity and Applications"**.
- SODA 13 Learning Pseudo-Boolean k-DNF and Submodular Functions, with S. Raskhodnikova, 24th Annual ACM-SIAM Symposium on Discrete Algorithms.
- APPROX 12 Primal-Dual Algorithms for Node-Weighted Network Design in Planar Graphs, with P. Berman, 15th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems.
- VLDB 11 Private Analysis of Graph Structure, with V. Karwa, S. Raskhodnikova and A. Smith, 37th International Conference on Very Large Data Bases, Research Track.
- ICALP 11 Improved Approximation for the Directed Spanner Problem, with P. Berman, A. Bhattacharyya, K. Makarychev and S. Raskhodnikova, 38th International Colloquium on Automata, Languages and Programming, **Runner-up for the Best Paper Award, invited to a special issue of a journal "Information and Computation"**.
- ICALP 11 Steiner Transitive-Closure Spanners of Low-Dimensional Posets, with P. Berman, A. Bhattacharyya, E. Grigorescu, S. Raskhodnikova and D. Woodruff, 38th International Colloquium on Automata, Languages and Programming.
- SAT 09 Finding Efficient Circuits using SAT-solvers, with A. Kojevnikov and A. Kulikov, 12th International Conference on Theory and Applications of Satisfiability Testing.

## Professional Activities

### ML and AI senior program committees (reviewer level)

- IJCAI (International Joint Conference on AI): 2023, 2021.

### ML and AI program committees (reviewer level)

- AAAI (AAAI Conference on Artificial Intelligence): 2024, 2023, 2022, 2021, 2020.
- “AI and Social good”@IJCAI (International Joint Conference on AI): 2023.
- AISTATS (International Conference on Artificial Intelligence and Statistics): 2024, 2023, 2022, 2021, 2020, 2019.
- “New in ML”@NeurIPS (Neural Information Processing Systems): 2021, 2019.
- NeurIPS (Neural Information Processing Systems): 2023, 2022, 2021, 2020, 2019, 2018, 2017, 2016.
- ICLR (International Conference on Learning Representations): 2024, 2023, 2022, 2021, 2020, 2019, 2018.
- ICML (International Conference on Machine Learning): 2023, 2022, 2021, 2020, 2019, 2018.
- UAI (Uncertainty in Artificial Intelligence): 2022, 2019.

### Theory program committees

- **32nd Annual ACM-SIAM Symposium on Discrete Algorithms (SODA’21).**
- 21st International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX’18).
- 5th Workshop on Algorithms and Systems for MapReduce and Beyond (BeyondMR’18) at SIGMOD/PODS’18.
- 23rd International Computing and Combinatorics Conference (COCOON’17).
- **28th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA’17).**
- 24th Annual European Symposium on Algorithms (ESA’16), Design and Analysis Track.
- 41st International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM’15), Foundations of Computer Science Track.

### Organization

- **Recent Trends in Clustering and Classification**  
3-day workshop at Toyota Technological Institute, Chicago, Sep 2019.  
<http://caml.indiana.edu/rtcc.html>
- **Seminar of the Center for Algorithms and Machine Learning**  
Weekly seminar on research in Algorithms and ML at Indiana University (2018 – 2020).  
<http://caml.indiana.edu/>
- **Linear Sketching as a Tool for Everything**  
1-day workshop at IEEE FOCS, Oct 2017.  
<http://caml.indiana.edu/linear-sketching.focs.html>
- **67th Midwest Theory Day**  
2-day workshop at Indiana University, Bloomington, Apr 2017.  
<http://caml.indiana.edu/mtd.html>
- **Big Data through the Lens of Sublinear Algorithms**  
2-day workshop at Rutgers University, DIMACS, Aug 2015.  
<http://grigory.us/mpc-workshop-dimacs.html>
- **Algorithmic Frontiers of Modern Massively Parallel Computation**  
1-day workshop at ACM FCRC/STOC, Jun 2015.  
<http://grigory.us/mpc-workshop-fcrc.html>
- **Sublinear Algorithms and Big Data Day**  
Brown University, ICERM, Apr 2014.  
<http://grigory.us/big-data-day.html>

- **Theory Seminar**

University of Pennsylvania Computer and Information Sciences Department (2014 – 2016).  
<http://theory.cis.upenn.edu/seminar/>

- **Theory Seminar**

Brown CS Department and ICERM (2013 – 2014).  
<http://grigory.us/theory-seminar-brown-spring14.html>

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## Other Service

### Service to federal funding agencies

- Panelist for grant proposals for NSF IIS core programs: 2020.
- Panelist for grant proposals for NSF CCF core programs: 2019, 2018, 2017.
- Reviewer for Israeli Science Foundation grant proposals: 2017.

### Internal service at Indiana University

- Founding head of the departmental Graduate Research Award committee ('16–'20)
- Graduate admission committee member ('16–'17, '18–'19)
- Graduate education committee member ('17–'18)
- Undergraduate education committee member ('18–'20)

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## Selected Talks

- May 2023 **Google Research**, New York, NY, Google Tech Talk. *Learning from Tuples*.
- May 2023 **New York University**, New York, NY, Theory Seminar. *Learning from Tuples*.
- May 2023 **Columbia University**, New York, NY, Theory Seminar. *Learning from Tuples*.
- Apr 2022 **University of Texas**, Austin, TX, Theory Seminar. *Hierarchical Clustering for Everyone*.
- Oct 2021 **University of Maryland**, College Park, MD, Capital Area Theory Seminar. *Hierarchical Clustering for Everyone*.
- May 2020 **University of California, Davis**, Davis, CA, Computer Science Colloquium (Virtual). *Hierarchical Clustering for Everyone*.
- May 2020 **University of Wisconsin-Madison**, Madison, WI, SILO Seminar (Virtual). *Advances in Gradient Descent Methods for Non-Convex Optimization*.
- Feb 2020 **Brown University**, Providence, RI, Computer Science Colloquium. *Hierarchical Clustering for Everyone*.
- Feb 2020 **George Mason University**, Fairfax, VA, Computer Science Colloquium. *Hierarchical Clustering for Everyone*.
- Jan 2020 **University of California, Davis**, Davis, CA, Math Colloquium. *Hierarchical Clustering for Everyone*.
- Oct 2019 **University of Illinois**, Urbana-Champaign, IL, CSL Seminar. *Advances in Hierarchical Clustering of Vector Data*.
- Oct 2019 **University of California, Riverside**, Riverside, CA, Departmental Colloquium, CSE. *Advances in Hierarchical Clustering of Vector Data*.
- Oct 2019 **California Institute of Technology**, Pasadena, CA, CMI Seminar. *Advances in Linear Sketching over Finite Fields*.
- Oct 2019 **University of California, San Diego**, San Diego, CA, Theory Seminar. *Advances in Hierarchical Clustering of Vector Data*.
- Oct 2019 **University of Southern California**, Los Angeles, CA, Theory Lunch. *Advances in Hierarchical Clustering of Vector Data*.
- Aug 2019 **Google Research**, Menlo Park, CA, Tech Talk. *Advances in Hierarchical Clustering of Vector Data*.

- Jun 2019 **University of Warwick**, Warwick, UK, Discrete Mathematics and Applications Seminar. *Advances in Hierarchical Clustering of Vector Data.*
- May 2019 **University of Oxford**, Oxford, UK, Algorithms and Complexity Seminar. *Advances in Hierarchical Clustering of Vector Data.*
- Mar 2019 **Facebook Core Data Science**, Menlo Park, CA, Tech Talk. *Advances in Hierarchical Clustering of Vector Data.*
- Mar 2019 **Johns Hopkins University**, Baltimore, MD, Algorithms and Complexity Seminar. *Advances in Hierarchical Clustering of Vector Data.*
- Mar 2019 **Northwestern University**, Evanston, IL, Computer Science Seminar. *Advances in Hierarchical Clustering of Vector Data.*
- Oct 2018 **Simons Institute for the Theory of Computing, UC Berkeley**, Berkeley, CA, Workshop on Interactive Complexity. *Advances in Linear Sketching over Finite Fields.*
- Aug 2018 **IBM Almaden Research Center**, San Jose, CA, Theory Seminar. *Massively Parallel Algorithms and Hardness for Single-Linkage Clustering under  $\ell_p$ -Distances.*
- Jun 2018 **Massachusetts Institute of Technology**, Cambridge, MA, 2nd Workshop on Local Algorithms. *Badger Rampage: Multidimensional Balanced Partitioning of Facebook-scale Graphs.*
- May 2018 **Stanford University**, Palo Alto, CA, Theory Seminar. *Massively Parallel Algorithms and Hardness for Single-Linkage Clustering under  $\ell_p$ -Distances.*
- Mar 2018 **University of Warwick**, Warwick, UK, Workshop on Data Summarization. *Massively Parallel Algorithms and Hardness for Single-Linkage Clustering under  $\ell_p$ -Distances.*
- Sep 2018 **University of Michigan**, Ann Arbor, MI, Theory Seminar. *Linear Sketching for Functions over the Boolean Hypercube.*
- Apr 2018 **Toyota Technological Institute**, Chicago, IL, 68th Midwest Theory Workshop. *Linear Sketching for Functions over the Boolean Hypercube.*
- Oct 2017 **IEEE FOCS**, Berkeley, CA, Workshop "Linear Sketching as a Tool for Everything". *Linear Sketching for Functions over the Boolean Hypercube.*
- Oct 2017 **Facebook**, Menlo Park, CA, Tech Talk. *Clustering on Clusters 2049: Massively Parallel Algorithms for Clustering Graphs and Vectors.*
- Jun 2017 **ITMO University**, St. Petersburg, Russia, Departmental Colloquium. *Computational and Communication Complexity in Massively Parallel Computing.*
- Jun 2017 **Higher School of Economics**, Moscow, Russia, Workshop on Complexity of Computation, Communication, Descriptions and Proofs. *Computational and Communication Complexity in Massively Parallel Computing.*
- Feb 2017 **Facebook**, Menlo Park, CA, Tech Talk. *Clustering on Clusters: Massively Parallel Algorithms for Clustering Graphs and Vectors.*
- May 2017 **St. Petersburg Department of Steklov Institute of Mathematics**, St. Petersburg, Russia, Theory Seminar. *Linear Sketching over  $F_2$ .*
- May 2017 **Moscow State University**, Moscow, Russia, Kolmogorov Seminar. *Linear Sketching over  $F_2$ .*
- Mar 2017 **BIRS Research Center**, Banff, Canada, Banff Workshop on Communication Complexity and Applications II. *Linear Sketching over  $F_2$ .*
- Nov 2016 **Columbia University**, New York, NY, Theory Seminar. *Linear Sketching over  $F_2$ .*
- Oct 2016 **University of Pennsylvania**, Philadelphia, PA, Theory Seminar. *Linear Sketching over  $F_2$ .*
- Sep 2016 **University of Utah**, Salt Lake City, UT, Theory Seminar. *Linear Sketching over  $F_2$ .*
- Aug 2016 **University of Illinois**, Urbana, IL, Theory Seminar. *Linear Sketching over  $F_2$ .*
- Jun 2016 **Microsoft Research**, Redmond, WA, Theory Seminar. *Linear Sketching over  $F_2$ .*



- Mar 2016 **Drexel University**, Philadelphia, PA, Departmental Colloquium. *What's New in "The Big Data Theory"?*.
- Feb 2016 **Georgetown University**, Washington, DC, Departmental Colloquium. *What's New in "The Big Data Theory"?*.
- Feb 2016 **Indiana University**, Bloomington, IN, Departmental Colloquium. *What's New in "The Big Data Theory"?*.
- Feb 2016 **University of Colorado**, Boulder, CO, Departmental Colloquium. *What's New in "The Big Data Theory"?*.
- Feb 2016 **Boston University**, Boston, MA, Departmental Colloquium. *What's New in "The Big Data Theory"?*.
- Feb 2016 **College of William and Mary**, Williamsburg, VA, Departmental Colloquium. *What's New in "The Big Data Theory"?*.
- Aug 2015 **University of Wisconsin**, Madison, WI, Theory Seminar. *Fast Fourier Sparsity Testing over the Boolean Hypercube*.
- Jul 2015 **ISMP'15**, Pittsburgh, PA, 22nd International Symposium on Mathematical Programming. *Parallel Algorithms for Geometric Problems*.
- May 2015 **Cornell University**, Ithaca, NY, Theory Seminar. *Near Optimal LP Rounding for Correlation Clustering*.
- Apr 2015 **Massachusetts Institute of Technology**, Cambridge, MA, Algorithms and Complexity Seminar. *Near Optimal LP Rounding for Correlation Clustering*.
- Mar 2015 **Microsoft Research**, Redmond, WA, Theory Seminar. *Near Optimal LP Rounding for Correlation Clustering*.
- Feb 2015 **Google Research**, New York, NY, Tech Talk. *Near Optimal LP Rounding for Correlation Clustering*.
- Jan 2015 **Rutgers University**, New Brunswick, NJ, Theory Seminar. *Near Optimal LP Rounding for Correlation Clustering*.
- Jan 2015 **Carnegie Mellon University**, Pittsburgh, PA, Theory Lunch. *Near Optimal LP Rounding for Correlation Clustering*.
- Jan 2015 **Pennsylvania State University**, State College, PA, Departmental Colloquium. *Near Optimal LP Rounding for Correlation Clustering*.
- Nov 2014 **Johns Hopkins University**, Baltimore, MD, Theory Seminar. *Parallel Algorithms for Geometric Problems*.
- Oct 2014 **University of Maryland**, College Park, MD, Capital Area Theory Seminar. *Parallel Algorithms for Geometric Problems*.
- Aug 2014 **University of Pennsylvania**, Philadelphia, PA, Theory Seminar. *Parallel Algorithms for Geometric Problems*.
- May 2014 **University of Massachusetts**, Amherst, MA, Theory Seminar. *Parallel Algorithms for Geometric Problems*.
- May 2014 **Massachusetts Institute of Technology**, Cambridge, MA, Theory of Distributed Systems Seminar. *Beyond Set Disjointness: The Communication Complexity of Finding the Intersection*.
- Mar 2014 **Google Research**, New York, NY, Tech Talk. *Parallel Algorithms for Geometric Problems*.
- Mar 2014 **Sandia Labs**, Livermore, CA, Special Seminar. *Parallel Algorithms for Geometric Problems*.
- Mar 2014 **Stanford University**, Palo Alto, CA, Theory Seminar. *Parallel Algorithms for Geometric Problems*.
- Mar 2014 **Georgia Tech**, Atlanta, GA, Departmental Colloquium. *Approximating Graph Problems: The Old and The New*.



- Feb 2014 **Massachusetts Institute of Technology**, Cambridge, MA, Algorithms and Complexity Seminar. *Approximating Graph Problems: The Old and The New.*
- Feb 2014 **Yahoo! Research**, New York, NY, Tech Talk. *Approximating Graph Problems: The Old and The New.*
- Feb 2014 **Toyota Technological Institute**, Chicago, IL, Departmental Colloquium. *Approximating Graph Problems: The Old and The New.*
- Nov 2014 **University of Pennsylvania**, Philadelphia, PA, Statistics Seminar.  *$L_p$ -Testing.*
- Oct 2014 **Columbia University**, New York, NY, Theory Seminar.  *$L_p$ -Testing.*
- Jan 2014 **Microsoft Research**, Redmond, WA, Theory Lunch.  *$L_p$ -Testing.*
- Nov 2014 **Harvard University**, Cambridge MA, Theory Seminar.  *$L_p$ -Testing.*
- Nov 2013 **Brown University**, Providence RI, Theory Seminar.  *$L_p$ -Testing.*
- Oct 2013 **IBM Almaden Research Center**, San Jose, CA, Theory Seminar.  *$L_p$ -Testing.*
- Sep 2013 **Massachusetts Institute of Technology**, Cambridge, MA, Algorithms and Complexity Seminar. *Property Testing and Communication Complexity.*
- Jun 2013 **Microsoft Research**, Redmond, WA, Theory Seminar. *Learning and Testing Submodular Functions.*
- May 2013 **Aarhus University**, Aarhus, Denmark, Theory Seminar. *Beating the Direct Sum in Communication Complexity with Implications for Sketching.*
- Apr 2013 **University of Melbourne**, Melbourne, Australia, Theory Seminar. *Learning and Testing Submodular Functions.*
- Apr 2013 **University of Sydney**, Sydney, Australia, Theory Seminar. *Advances in Directed Spanners.*
- Feb 2013 **UCLA**, Los Angeles, LA, Theory Seminar. *Learning and Testing Submodular Functions.*
- Dec 2012 **Massachusetts Institute of Technology**, Cambridge, MA, Algorithms and Complexity Seminar. *Beating the Direct Sum in Communication Complexity with Implications for Sketching.*
- Dec 2012 **Weizmann Institute of Science**, Rehovot, Israel, Theory Seminar. *Learning and Testing Submodular Functions.*
- Dec 2012 **Harvard University**, Cambridge, MA, Theory Seminar. *Learning and Testing Submodular Functions.*
- Dec 2012 **Carnegie Mellon University**, Pittsburgh, PA, Theory Lunch. *Learning and Testing Submodular Functions.*
- Dec 2012 **Carnegie Mellon University**, Pittsburgh, PA, Operations Research Seminar. *Learning and Testing Submodular Functions.*
- Nov 2012 **Princeton University**, Princeton, NJ, Theory Lunch. *Beating the Direct Sum in Communication Complexity with Implications for Sketching.*
- Nov 2012 **IBM T.J. Watson Research Center**, Yorktown Heights, NY, Integer Programming Seminar. *Learning and Testing Submodular Functions.*
- Nov 2012 **Columbia University**, New York, NY, Theory Seminar. *Learning and Testing Submodular Functions.*
- Oct 2012 **Microsoft Research Silicon Valley**, Mountain View, CA, Lab Seminar. *Parallel Algorithms for Geometric Problems.*
- Oct 2012 **Microsoft Research Silicon Valley**, Mountain View, CA, Theory Seminar. *Learning and Testing Submodular Functions.*
- May 2012 **IBM Almaden Research Center**, San Jose, CA, Theory Seminar. *Learning and Testing Submodular Functions.*
- Nov 2011 **Carnegie Mellon University**, Pittsburgh, PA, Theory Lunch. *Advances in Directed Spanners.*

- Nov 2011 **University of Maryland**, College Park, MD, Capital Area Theory Seminar. *Advances in Directed Spanners*.
- Aug 2011 **AT&T Labs – Research, Shannon Laboratory**, Florham Park, NJ, Lab Seminar. *Private Analysis of Graph Structure*.
- Jun 2011 **AT&T Labs – Research, Shannon Laboratory**, Florham Park, NJ, Mathematics Research Colloquium and Informal Seminar. *Improved Approximation for the Directed Spanner Problem*.
- May 2011 **Moscow State University**, Moscow, Russia, Combinatorial Optimization Seminar. *Improved Approximation for the Directed Spanner Problem*.
- Apr 2011 **IBM T.J. Watson Research Center**, Yorktown Heights, NY, Integer Programming Seminar. *Improved Approximation for the Directed Spanner Problem*.
- Dec 2010 **ITMO University**, St. Petersburg, Russia, Algorithms Seminar. *Improved Approximation for the Directed Spanner Problem*.
- Apr 2010 **Pennsylvania State University**, State College, PA, Theory Seminar. *Linear Bounds on Circuit Complexity and Feebly One-Way Permutations*.

## Teaching

- **“Analysis of Algorithms” (M.Sc. level)**  
George Mason University, CS 583, Fall 2022.
- **“Advanced Algorithms” (Ph.D. level)**  
George Mason University, CS 630, Spring 2022.
- **“Analysis of Algorithms” (M.Sc. level)**  
George Mason University, CS 583, Fall 2021.
- **“Data Structures” (Undergraduate level)**  
(Honors) Indiana University, Bloomington, CSCI-H343, Spring 2018 and 2019.  
Indiana University, Bloomington, CSCI-C343, Fall 2018.
- **“Applied Algorithms” (M.Sc. level)**  
Indiana University, Bloomington, CSCI-B505, Fall 2017 and 2019, Spring 2020.
- **“Foundations of Data Science” (Ph.D. level)**  
Indiana University, Bloomington, CSCI-B609, Fall 2016 and 2017.
- **“Algorithms for Big Data” (Ph.D. level)**  
University of Pennsylvania, CIS 700, Fall 2015.
- **“Computational Learning Theory” (All levels)**  
University of Pennsylvania, CIS 625, Spring 2015 (co-teaching with Michael Kearns).
- **“Sublinear Algorithms for Big Data” (All levels)**  
University of Buenos Aires, Argentina. 15-hour crash course. July–August 2014.

## Tutorials

- **“Algorithms for MapReduce and Beyond”** (with Sergei Vassilvitskii, Google)  
24th International Conference on Information and Knowledge Management (CIKM 2015), Melbourne, Australia.

## Guest lecturer at undergraduate classes

- CIS 399, “Foundations of Data Science”, University of Pennsylvania, Spring 2016.
- CMPSC 464, “Introduction to the Theory of Computing”, Pennsylvania State University, Fall 2010.

## Extracurricular education for high-school students

- Prepared training contests for the **United States Team in the International Olympiad in Informatics**, 2011.
- Co-founder and coordinator of St. Petersburg network of extracurricular education in informatics for high-school students (<http://spbtc.ru>) (2009-2010).

## Short Visits and Consulting

- **Facebook**, Menlo Park, CA. Consultant, Spring'17–Spring'19. (Host: Sergey Pupyrev)
- **Google Research**, New York, NY. Weekly visitor in Fall'14–Spring'15. (Host: Silvio Lattanzi)
- **Microsoft Research**, Redmond, WA. 03/08/15–03/14/15, 01/08/14–01/12/14. (Host: Konstantin Makarychev)
- **IBM T.J. Watson Research Center**, Yorktown Heights, NY. 04/19/11–04/21/11, 11/13/12–11/15/12. (Hosts: Konstantin Makarychev, Vishwanath Nagarajan)
- **AT&T Labs – Research, Shannon Laboratory**, Florham Park, NJ. 11/18/11–11/25/11. (Host: Howard Karloff)
- **Weizmann Institute of Science**, Rehovot, Israel. 12/27/12–01/04/13. (Host: Robert Krauthgamer)
- **University of Melbourne**, Australia. 04/12/13–04/20/13. (Host: Anthony Wirth)
- **Aarhus University**, Denmark. 05/17/13–05/25/13. (Host: Joshua Brody)

## Mentorship and Supervision

### Postdocs supervised at Indiana University

- Samson Zhou, 2018–2019 → postdoc at Carnegie Mellon University.

### Ph.D. students supervised at Indiana University

- Dmitrii Avdyukhin, 2017–2023. → McCormick Fellow at Northwestern, Computer Science
- Adithya Vadapalli, 2016–2018, joint paper in ICML'18.
- Nikolai Karpov, 2017.

### Undergraduate interns mentored

- Farid Arthaud (ENS Paris-Ulm), 2019. → Ph.D. student, MIT CSAIL
- Jakub Boguta (University of Warsaw), 2019.
- Stanislav Naumov (St. Petersburg ITMO University), 2019. → CEO, Topflow

### Ph.D. students mentored while a postdoc

- Sepehr Assadi (University of Pennsylvania), joint paper in SODA'16. → Assistant Professor at Rutgers, Computer Science.
- Yang Li (University of Pennsylvania), joint paper in SODA'16. → Research Scientist at Facebook, NYC
- Steven Wu (University of Pennsylvania), joint paper in PNAS'16. → Assistant Professor at University of Minnesota, Computer Science
- Tselil Schramm (UC Berkeley), joint paper in STOC'15. → Assistant Professor at Stanford University, Statistics
- Eli Fox-Eppstein (Brown University).
- David Meierfrankenfeld (Brown University).

## Patents

- “A Communication and Message-Efficient Protocol for Computing the Intersection Between Different Sets of Data”, with David P. Woodruff. U.S. patent #9438704. IBM Almaden Research Center, San Jose, CA.

## Reviewing

### Theory conferences

- STOC (ACM Symposium on the Theory of Computing): 2021, 2019, 2018, 2017, 2016, 2015.

- FOCS (IEEE Symposium on Foundations of Computer Science): 2023, 2019, 2017, 2015, 2014, 2013, 2012.
- SODA (ACM Symposium on Discrete Algorithms): 2020, 2019, 2018, 2016, 2013, 2012.
- ICALP (International Colloquium on Automata, Languages and Programming): 2018, 2017, 2015, 2014, 2013.
- CCC (Conference on Computational Complexity): 2018, 2016.
- ITCS (Innovations in Theoretical Computer Science): 2018.
- RANDOM (Workshop on Randomization and Computation): 2017, 2015, 2014.
- APPROX (Workshop on Approximation Algorithms for Combinatorial Optimization Problems): 2012.
- ESA (European Symposium on Algorithms): 2015.
- MFCS (Symposium on Mathematical Foundations of Computer Science): 2013, 2010.

### Learning theory conferences

- COLT (Conference on Learning Theory): 2016.
- ALT (Conference on Algorithmic Learning Theory): 2014.

### Databases and large-scale data processing conferences

- PODS (ACM Symposium on Principles of Database Systems): 2018, 2017, 2016.
- SPAA (ACM Symposium on Parallelism in Algorithms and Architectures): 2017.
- VLDB (Conference on Very Large Databases): 2012.
- CIKM (ACM International Conference on Information and Knowledge Management): 2014.

### Journals

- SICOMP (SIAM Journal on Computing)
- CSUR (ACM Computing Surveys)
- I&C (Information and Computation)
- TKDE (IEEE Transactions on Knowledge and Data Engineering)
- ToC (Theory of Computing)
- RSA (Random Structures and Algorithms)
- Algorithmica

## References

### Sofya Raskhodnikova

Ph.D. advisor

**Professor and Assc Chair of the Faculty  
Boston University**

Dept. of Computer Science

### Michael Kearns

Postdoctoral mentor

**Professor and National Center Chair  
University of Pennsylvania**

Dept. of Computer and Information Science  
+ Economics (Wharton)  
+ Statistics (Wharton)  
+ Operations, Information & Decisions (Wharton)

### Elchanan Mossel

Postdoctoral mentor

**Professor**

**Massachusetts Institute of Technology**

Dept. of Mathematics

### Moses Charikar

Collaborator

**Donald E. Knuth Professor  
Stanford University**

Dept. of Computer Science  
+ Mathematics

**David Woodruff**

Internship mentor

**Associate Professor (with tenure)**

**Carnegie Mellon University**

Dept. of Computer Science

**Sampath Kannan**

Postdoctoral mentor

**Henry Salvatori Professor**

**University of Pennsylvania**

Dept. of Computer and Information Science