

# Grigory Yaroslavtsev, <http://grigory.us>

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CONTACT 121 South Main Street, #1023  
INFORMATION Providence, RI, 02903

Cell phone: +1 (814) 713-1096  
E-mail: [grigory@grigory.us](mailto:grigory@grigory.us)

RESEARCH Approximation and sublinear time algorithms for big data: sparsification, summarization,  
INTERESTS private data release, property testing.

2013-2014 **Brown University ICERM**, Providence, RI.

Postdoctoral Research Fellow in Mathematics and Computer Science.

2010-2013 **Pennsylvania State University**, State College, PA (Joined by invitation, didn't apply to any other Ph.D. programs)

Ph.D., Thesis: "Efficient Combinatorial Techniques in Sparsification, Summarization and Testing of Large Datasets."

2008-2010 **Academic University of the Russian Academy of Sciences**, St. Petersburg, Russia

M.S. in Applied Mathematics and Physics (1<sup>st</sup> student in the pilot class, joint with Steklov Institute), GPA: 4.9/5.0.

2004-2008 **St. Petersburg State Polytechnic University**, St. Petersburg, Russia

B.S. in Physics and Technology. (1<sup>st</sup> result in the admission test for the department).

## RESEARCH

INTERNSHIPS **Microsoft Research, Redmond**, May 2013 – August 2013.

**Theory group**, mentored by [Konstantin Makarychev](#).

- Research in approximation algorithms for scheduling and clustering problems (with N. Devanur, K. Makarychev and D. Panigrahi).

**Microsoft Research, SVC**, August 2012 – October 2012.

**Theory group**, mentored by [Alexandr Andoni](#).

- Parallel algorithms for large-scale geometric problems (with A. Andoni, A. Nikolov and K. Onak, in submission to STOC'14).

**IBM Research, Almaden**, May 2012 – July 2012.

**Theory group**, mentored by [David P. Woodruff](#).

- Optimal direct-sum theorem for one-way communication complexity, showing that parallel repetition is optimal for solving multiple instances of problems, such as augmented indexing (with M. Molinaro and D. Woodruff, SODA'13).
- A communication protocol and lower bounds for computing the intersection (join) of distributed databases (with D. Woodruff, in submission to CCC'14, U.S. patent pending).

**AT&T Labs — Research**, May 2011 — August 2011.

**Database theory group**, mentored by [Graham Cormode](#), [Cecilia M. Procopiuc](#), [Divesh Srivastava](#) and [Howard Karloff](#).

- Design and implementation of efficient differentially private mechanisms for linear queries (with G. Cormode, M. Procopiuc and D. Srivastava, ICDE'13)
- Approximation algorithms for finding overlapping clusters using qualitative information (with H. Karloff and A. Wirth, in submission).

## ACHIEVEMENTS

### AND AWARDS

- Travel awards: ICDE'13, SODA'13, FOCS'12, STOC'12, STOC'11, ICALP'11, SAT'09.
- Best Graduate Research Assistant Award at Computer Science and Engineering Department (2012).
- [TopCoder Open Algorithm Competition onsite finalist \(Top 24 worldwide, handle "griffon"\)](#), 2010.
- College of Engineering Fellowship by the Pennsylvania State University, Fall 2010 — Spring 2013.
- University Graduate Fellowship by the Pennsylvania State University, Fall 2010 — Spring 2011.
- Yandex personal research grant, 2009-2010.
- Diploma for coaching the best team in St. Petersburg Olympiad in Informatics and Programming for high-school students, 2008.
- 2<sup>nd</sup> place in St. Petersburg State Polytechnic University Olympiad in Mathematics, 2005.
- Best result in the admissions test for the Department of Physics and Technology in St. Petersburg State Polytechnic University, 2004.

### JOURNAL PAPERS

- **Private Analysis of Graph Structure**, with Vishesh Karwa, Sofya Raskhodnikova and Adam Smith.  
ACM Transactions on Database Systems, to appear.
- **Steiner Transitive-Closure Spanners of Low-Dimensional Posets**, with Piotr Berman, Arnab Bhattacharyya, Elena Grigorescu, Sofya Raskhodnikova and David Woodruff.  
Combinatorica, to appear.
- **Approximation Algorithms for Spanner Problems and Directed Steiner Forest**, with Piotr Berman, Arnab Bhattacharyya, Konstantin Makarychev and Sofya Raskhodnikova.  
Information and Computation, special issue for ICALP'11. Volume 222, 2013, pp. 93-107.
- **[New upper bounds on the Boolean Circuit Complexity of Symmetric Functions](#)**, with Eugeny Demenkov, Arist Kojevnikov and Alexander Kulikov.  
Information Processing Letters, 110, pp. 264-267, Elsevier, 2010.

### SUBMITTED

- **Parallel Algorithms for Geometric Graph Problems**, with Alexandr Andoni, Krzysztof Onak and Aleksandar Nikolov.  
In submission to the 46th ACM Symposium on the Theory of Computing, (STOC 2014). Draft: [PDF](#). Tech report: [ArXiv:1401.0042](#).
- **Testing with Respect to  $L_p$  Distances**, with Piotr Berman and Sofya Raskhodnikova.  
In submission to the 46th ACM Symposium on the Theory of Computing, (STOC 2014). Draft: [PDF](#).
- **The Communication Complexity of Certifying Equality and Finding the Intersection**, with Joshua Brody, Amit Chakrabarti, Ranganath Kondapally and David Woodruff.  
In submission to the 29th IEEE Conference on Computational Complexity, (CCC 2014). Draft: [PDF](#).
- **Lower Bounds for Testing Properties of Functions over Hypergrid Domains**, with Eric Blais and Sofya Raskhodnikova.  
In submission to the 29th IEEE Conference on Computational Complexity, (CCC 2014). Draft: [PDF](#). Tech report: [ECCC TR13-036](#).

CONFERENCE  
PAPERS

- **Correlation Clustering with Overlaps**, with Howard Karloff and Anthony Wirth.  
In submission. Draft: [PDF](#).
- <sup>1</sup>**Accurate and Efficient Private Release of Datacubes and Contingency Tables**. Grigory Yaroslavltssev, Graham Cormode, Cecilia M. Procopiuc and Divesh Srivastava.  
29th IEEE International Conference on Data Engineering (ICDE 2013). Available as [ArXiv:1207.6096](#).
- **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 (SODA 2013).
- **Learning Pseudo-Boolean k-DNF and Submodular Functions**, with Sofya Raskhodnikova.  
24th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2013).
- **Primal-dual algorithms for Node-Weighted Network Design in Planar Graphs**, with Piotr Berman.  
15th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX 2012).
- **Private Analysis of Graph Structure**, with Vishesh Karwa, Sofya Raskhodnikova and Adam Smith.  
37th International Conference on Very Large Data Bases (VLDB 2011), Research track.
- **Improved Approximation for the Directed Spanner Problem**, with Piotr Berman, Arnab Bhattacharyya, Konstantin Makarychev and Sofya Raskhodnikova.  
38th International Colloquium on Automata, Languages and Programming (ICALP 2011), Track A.  
**Runner-up for the Best Paper Award, invited to a special issue of a journal "Information and Computation"**.
- **Steiner Transitive-Closure Spanners of Low-Dimensional Posets**, with Piotr Berman, Arnab Bhattacharyya, Elena Grigorescu, Sofya Raskhodnikova and David Woodruff.  
38th International Colloquium on Automata, Languages and Programming (ICALP 2011), Track A.
- **Finding Efficient Circuits using SAT-solvers**, with Arist Kojevnikov and Alexander Kulikov.  
12th International Conference on Theory and Applications of Satisfiability Testing (SAT 2009), LNCS 5584, pp. 32-44, 2009.

RESEARCH  
VISITS

- Microsoft Research, Redmond. 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, 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)

## LONG TALKS

### + POSTERS

- Testing Properties Under  $L_p$  Distances
  - Microsoft Research, Redmond. Theory Lunch. January 2014.
  - Harvard University, Boston, MA. Theory Seminar. November 2013.
  - Brown University, Providence RI. Theory Seminar. November 2013.
  - IBM Almaden Research Center, San Jose, CA. October 2013.
- Property Testing and Communication Complexity
  - MIT, Boston, MA. Algorithms and Complexity seminar. September 2013.
- Accurate and Efficient Private Release of Data Cubes and Contingency Tables
  - Cornell University, CDI project meeting. May 2013.
- Beating the Direct Sum in Communication Complexity with Implications for Sketching.
  - Aarhus University, Denmark. Theory seminar. May 2013.
  - MIT, Boston, MA. Algorithms and Complexity seminar. December 2012.
  - Princeton University, Princeton, NJ. Theory lunch. November 2012.
  - FOCS 2012, Rutgers University, NJ. Poster session. October 2012.
- Overlapping Clustering with Qualitative Information
  - FOCS 2012, Rutgers University, NJ. Poster session. October 2012.
- Parallel Algorithms for Geometric Problems
  - Microsoft Research SVC, Mountain View, CA. Group meeting. October 2012.
  - FOCS 2012, Rutgers University, NJ. Poster session. October 2012.
- Learning and Testing Submodular Functions.
  - Microsoft Research, Redmond. Theory seminar. June 2013.
  - University Of Melbourne, Theory seminar, April 2013.
  - UCLA, Los Angeles, LA. Theory seminar. February 2013.
  - Weizmann Institute of Science, Rehovot, Israel. Theory seminar. December 2012.
  - New York Computer Science and Economics Day (NYCE), New York, NY. Poster session. December 2012.
  - Harvard University, Boston, MA. Theory seminar. December 2012.
  - Carnegie-Mellon University, Pittsburgh, PA. Theory lunch, December 2012.
  - Carnegie-Mellon University, Pittsburgh, PA. OR seminar. December 2012.
  - IBM T.J. Watson Research Center, Yorktown Heights, NY. IP for lunch. November 2012.
  - Columbia University, New York, NY. October 2012.
  - FOCS 2012, Rutgers University, NJ. Poster session. October 2012.
  - Microsoft Research SVC, Mountain View, CA. Theory seminar. October 2012.
  - EPFL, Lausanne, Switzerland. Algorithmic Frontiers Workshop, poster session. June 2012.
  - STOC 2012, New York, NY. Poster session. May 2012.
  - IBM Almaden Research Center, San Jose, CA. Theory seminar. May 2012.
- [Advances in Directed Spanners](#).
  - University of Sydney, Theory seminar, April 2013.
  - Carnegie-Mellon University, Theory Lunch, November 2011.
  - University of Maryland, Capital Area Theory Seminar, November 2011.
- [Private Analysis of Graph Structure](#)
  - EPFL, Lausanne, Switzerland. Algorithmic Frontiers Workshop, poster session. June 2012.
  - AT&T Labs — Research, Florham Park, NJ. August 2011.
- Introduction to Property Testing
  - St. Petersburg Department of V.A. Steklov Institute of Mathematics of the Russian Academy of Sciences. December 2012.
  - St. Petersburg Institute of Fine Mechanics and Optics. Theory seminar. December 2012.
- [Introduction to Differential Privacy](#) (based on slides by Adam D. Smith).
  - St. Petersburg Department of Steklov Institute of Mathematics, Computer Science

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<sup>1</sup>This is the only paper with non-alphabetical ordering of authors

club, May 2011.

- Property Testing and Communication Complexity
  - Moscow State University. Kolmogorov seminar. May 2011.
- [Improved Approximation for the Directed Spanner Problem](#)
  - AT&T Labs — Research, Florham Park, NJ. Mathematics Research Colloquium and Informal Seminar. June 2011.
  - Princeton, NJ, June 2011. Workshop on Approximation Algorithms, Open Problem Session: [\[Slides\]](#), [\[Notes by Rajesh Chitnis\]](#).
  - STOC 2011, San Jose, CA. Poster session. June 2011.
  - Moscow State University. Combinatorial optimization seminar. May 2011.
  - IBM T.J. Watson Research Center, Yorktown Heights, NY. IP for lunch. April 2011.
  - St. Petersburg Institute of Fine Mechanics and Optics. Theory seminar. December 2010.
- [Linear bounds on circuit complexity and feebly one-way permutations](#)
  - Pennsylvania State University, State College, PA. Theory seminar. April 2010.

## PATENTS

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

## SERVICE

Organized [Theory Seminar](#) at Brown CS Department (2013 – 2014).

PC member for “Graph Theory and Applications” CSEDays 2012, Ekaterinburg, Russia.

Reviewer for:

- Journals: SIAM Journal on Computing (SICOMP), SIAM Journal on Discrete Mathematics (SIDMA), Information and Computation (I&C), IEEE Transactions on Knowledge and Data Engineering (TKDE), Theory of Computing (ToC).
- Conferences: FOCS’13, MFCS’13, ICALP’13, SODA’13, APPROX’12, FOCS’12, COCOA’12, SWAT’12, SODA’12, VLDB’12, WADS’11, MFCS’10, SAT’10.

Organized a theory reading group at Penn State:

- Spring 2013: “Computer Science for the Information Age”, based on an eponymous book by John Hopcroft and Ravi Kannan.
- Fall 2011: Selected lectures from classes [Analysis of Boolean Functions](#) by Ryan O’Donnell and [The PCP Theorem and Hardness of Approximation](#) by Venkatesan Guruswami and Ryan O’Donnell at CMU.
- Spring 2011: “[A Theorist’s Toolkit](#)”, based on notes for a class taught by Sanjeev Arora at Princeton.

Extracurricular education for high-school students:

- Prepared training contests for the United States team in 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).
- Judge for Baltic Science and Engineering Contest (Intel ISEF semifinals), 2010.

PROFESSIONAL MEMBERSHIP ACM SIGACT, IEEE

TECHNICAL SKILLS C/C++, STL, Java, Windows/Linux, L<sup>A</sup>T<sub>E</sub>X, CPLEX/Gurobi/AMPL.