

# ROHIT GURJAR

Postdoctoral Fellow  
Center for the Mathematics of Information  
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## Research Interests

Computational Complexity, Parallel Algorithms, Derandomization, Polyhedral Combinatorics

## Research Experience and Education

<b>California Institute of Technology</b> Postdoctoral Fellow Advisor: Dr. Chris Umans	Sep'17-Aug'18
<b>Tel Aviv University</b> Postdoctoral Researcher Advisor: Dr. Amir Shpilka	Oct'16-Aug'17
<b>Ulm University</b> Postdoctoral Researcher Advisor: Dr. Thomas Thierauf	Sep'15-Sep'16
<b>Indian Institute of Technology Kanpur</b> PhD, Computer Science and Engineering Advisors: Dr. Manindra Agrawal and Dr. Nitin Saxena PhD Thesis: Derandomizing PIT for ROABP and Isolation Lemma for Special Graphs CPI: 9.5/10	2010-2015
<b>Indian Institute of Technology Kanpur</b> B.Tech. & M.Tech. Dual Degree, Computer Science and Engineering Advisor: Dr. Piyush P. Kurur M.Tech. Thesis: Matching in Planar Graphs CPI: 9.1/10 (UG), 10/10 (PG)	2005-2010

## Awards

- ACM India Doctoral Dissertation Award 2017
- TCS Research Fellowship 2011

## Publications

- Isolating a Vertex via Lattices: Polytopes with Totally Unimodular Faces with *Thomas Thierauf and Nisheeth Vishnoi* (under submission)
- Pseudorandom Bits for Oblivious Branching Programs with *Ben Lee Volk* (under submission)

- Guest Column: Parallel Algorithms for Perfect Matching  
with *Stephen A. Fenner and Thomas Thierauf*  
ACM SIGACT News (ACM Special Interest Group on Algorithms and Computation Theory) 2017
- Linear Matroid Intersection is in quasi-NC  
with *Thomas Thierauf*  
Symposium on Theory of Computing (STOC) 2017
- Bipartite Perfect Matching is in quasi-NC  
with *Stephen A. Fenner and Thomas Thierauf*  
Symposium on Theory of Computing (STOC) 2016  
Invited to STOC 2016 special issue in SIAM Journal on Computing
- Identity Testing for constant-width, and commutative, read-once oblivious ABPs  
with *Arpita Korwar and Nitin Saxena*  
Computational Complexity Conference (CCC) 2016  
Invited to special issue of the journal Theory of Computing for CCC 2016
- Derandomizing Isolation Lemma for  $K_{3,3}$ -free and  $K_5$ -free Bipartite Graphs  
with *Rahul Arora, Ashu Gupta and Raghunath Tewari*  
International Symposium on Theoretical Aspects of Computer Science (STACS 2016)
- Deterministic Identity Testing for Sum of Read Once ABPs  
with *Arpita Korwar, Nitin Saxena and Thomas Thierauf*  
Computational Complexity Conference (CCC) 2015  
Journal of Computational Complexity 2016
- Hitting-sets for ROABP and Sum of Set-Multilinear Circuits  
with *Manindra Agrawal, Arpita Korwar and Nitin Saxena*  
SIAM Journal of Computing (SICOMP) 2015
- Exact Perfect Matching in Complete Graphs  
with *Arpita Korwar, Jochen Messner and Thomas Thierauf*  
ACM Transactions on Computation Theory (TOCT) 2017
- Planarizing Gadgets for Perfect Matching do not Exist  
with *Arpita Korwar, Jochen Messner, Simon Straub and Thomas Thierauf*  
37th International Symposium on Mathematical Foundations of Computer Science (MFCS), 2012  
ACM Transactions on Computation Theory (TOCT) 2016

## Other Reports

- On Two-Level Poset Games  
with *Stephen A. Fenner, Arpita Korwar and Thomas Thierauf*

## Talks

- Derandomizing Isolation Lemma: a geometric approach
  - Workshop on Proving and Using Pseudorandomness, Simons Institute, UC Berkeley (Mar 2017)

- Dagstuhl seminar on Computational Complexity of Discrete Problems (Mar 2017)
- Ulm University (Mar 2017)
- Hebrew University (Apr 2017)
- Linear Matroid Intersection is in quasi-NC.
  - Symposium on the Theory of Computing (STOC) (Jun 2017)
  - Theory of Computation Seminar, Tel Aviv University (Nov 2016)
  - Dagstuhl Seminar on Algebraic Methods in Computational Complexity (Oct 2016)
- Bipartite Matching is in quasi-NC.
  - Mysore Park Theory Workshop (Aug 2016)
  - Symposium on the Theory of Computing (STOC) (Jun 2016)
  - IISc Bangalore (March 2016)
  - Workshop on Algebraic Complexity Theory (Feb 2016)
  - Dagstuhl Seminar on Circuits, Logic and Games (Sep 2015)
- Identity Testing for constant-width, and commutative, read-once oblivious ABPs
  - Computational Complexity Conference (CCC) (May 2016)
- Deterministic Identity Testing for Sum of Read Once ABPs
  - Computational Complexity Conference (CCC) (Jun 2015)
- Hitting Set for Read Once Arithmetic Branching Programs
  - Dagstuhl Seminar on Algebra in Computational Complexity (Sep 2014)
- SIGTACS seminar series, CSE, IIT Kanpur
  - Derandomizing Isolation Lemma for  $K_{3,3}$ -free and  $K_5$ -free bipartite graphs (Jan 2015)
  - Small bias spaces and pseudorandomness for branching programs (Jan 2014)
  - Polynomial identity testing via Rank condensers (Dec 2013)
  - Planar Matching Polytope (Mar 2013)
  - Compact Linear Programming Formulations (Jan 2013)
  - Planar Graph Isomorphism (Nov 2012)
  - POSET Games and Sprague-Grundy Theorem (Aug 2012)
  - Perfect Matching in bipartite planar graphs (Mar 2012)
  - A deterministic algorithm for k-SAT (Jan 2012)

## Research Visits

- Simons institute for the Theory of Computing, UC Berkeley Mar 2017
  - Workshop on Proving and Using Pseudorandomness
- École Polytechnique Fédérale de Lausanne (EPFL, with Nisheeth Vishnoi) Feb 2017
  - Studied number of short vectors in lattices.
- Indian Institute of Science, Bangalore (with Chandan Saha) March 2016 and May 2014
  - Studied reconstruction of iterated matrix products
  - Studied polynomials computed by a sum of set-multilinear circuits.
- Microsoft Research India (with Nisheeth Vishnoi) Feb 2013
  - Studied connections between computational complexity and extension complexity of polytopes.
- University of Ulm (with Thomas Thierauf) July 2012 and Jul-Aug 2011
  - Worked on bipartite matching and two-level Poset games.
  - Worked on Planarizing gadgets for perfect matching and exact matching in complete graphs.

## Teaching Assistantship

At IIT Kanpur:

Computational Algebra and Number Theory	Randomized Algorithms
Riemann Hypothesis and Its Applications	Computational Complexity
Discrete Mathematics	Algorithms
Introduction to Mathematical Logic	Principles of Programming Languages
Fundamentals of Computing	