

Nitin Saurabh

CONTACT INFORMATION

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RESEARCH INTEREST

Theoretical Computer Science: more specifically, Boolean complexity, Analysis of Boolean functions, Algebraic complexity theory, and lower bounds.

EMPLOYMENT

Technion - IIT, Haifa, Israel

Postdoctoral Fellow (November 2019 - till present)
Host: [Prof. Yuval Filmus](#)

Max Planck Institut für Informatik, Saarbrücken, Germany

Postdoctoral Fellow (January 2018 - August 2019)
Department 1: Algorithms and Complexity
Host: [Dr. Christian Ikenmeyer](#).

Charles University, Prague, Czech Republic

Postdoctoral Fellow (September 2016 - November 2017)
Host: [Prof. Michal Koucký](#).

EDUCATION

The Institute of Mathematical Sciences, Chennai, India

Integrated Ph.D. (Theoretical Computer Science) (August 2010 - July 2016)
Thesis: [Analysis of Algebraic Complexity Classes and Boolean Functions](#) (Defended: December 2016)
Advisor: [Prof. Meena Mahajan](#).

Chennai Mathematical Institute, Chennai, India

Bachelor of Science (Hons. in Mathematics and Computer Science) (Aug 2007 - April 2010)

ACADEMIC VISITS

Centrum Wiskunde & Informatica (CWI), Amsterdam, July-August 2017. My host here was [Prof. Ronald de Wolf](#).

Swedish Summer School in Computer Science, Stockholm, Sweden, July 2017.

Chebyshev Laboratory, St. Petersburg State University, St. Petersburg, Russia, May-June 2016.

Department of Computer Science, Tel Aviv University, Tel Aviv, Israel, Feb 2016.

Department of Computer Science, Simon Fraser University, Vancouver, Canada, Jan-July 2013. My host here was [Prof. Valentine Kabanets](#).

Mathematical Computer Science group, Aarhus university, Aarhus, Denmark, August 2011. My host here was [Prof. Kristoffer Arnsfelt Hansen](#).

Microsoft Research India, Research Intern, May-July 2011. My host here was [Dr. Satya Lokam](#).

PUBLICATIONS

On the complexity of detecting hazards

Balagopal Komarath and Nitin Saurabh.

To appear in Information Processing Letters (IPL) 2020.

Algebraic Branching Programs, Border Complexity, and Tangent Spaces

Markus Bläser, Christian Ikenmeyer, Meena Mahajan, Anurag Pandey and Nitin Saurabh.

To appear in 35th Computational Complexity Conference (CCC) 2020.

Lower bounds for Linear Decision Lists

Arkadev Chattopadhyay, Meena Mahajan, Nikhil Mande and Nitin Saurabh.

Chicago Journal of Theoretical Computer Science (CJTCS) 2020(1), 2020.

Improved bounds on Fourier entropy and Min-entropy

Srinivasan Arunachalam, Sourav Chakraborty, Michal Koucký, Nitin Saurabh and Ronald de Wolf.

Preliminary version in 37th International Symposium on Theoretical Aspects of Computer Science (STACS) 2020.

Space-optimal quasi-Gray codes with logarithmic read complexity

Diptarka Chakraborty, Debarati Das, Michal Koucký and Nitin Saurabh.

Preliminary version in 26th European Symposium on Algorithms (ESA) 2018.

Fourier entropy-Influence Conjecture for random Linear Threshold Functions

Sourav Chakraborty, Sushrut Karmalkar, Srijita Kundu, Satya Lokam and Nitin Saurabh.

Preliminary version in 13th Latin American Theoretical Informatics Symposium (LATIN) 2018.

Some Complete and Intermediate polynomials in algebraic complexity theory

Meena Mahajan and Nitin Saurabh.

Theory of Computing Systems (TOCS), 62(3), 2018. *Special issue of CSR* 2016.

Preliminary version in 11th International Computer Science Symposium in Russia (CSR), 2016.

Winner of the **Best Paper Award** at CSR 2016.

VNP=VP in the multilinear world

Meena Mahajan, Nitin Saurabh and Sébastien Tavenas.

Information Processing Letters (IPL), 116(2), 2016.

Upper bounds on Fourier entropy

Sourav Chakraborty, Raghav Kulkarni, Satya Lokam and Nitin Saurabh.

Theoretical Computer Science (TCS), vol. 654, 2016. *Special issue of COCOON* 2015.

Preliminary version in 21st International Computing and Combinatorics Conference (COCOON), 2015.

Homomorphism polynomials complete for VP

Arnaud Durand, Meena Mahajan, Guillaume Malod, Nicolas de Rugy-Altherre and Nitin Saurabh.

Chicago Journal of Theoretical Computer Science (CJTCS) 2016(3), 2016.

Preliminary version in 34th Foundations of Software Technology and Theoretical Computer Science Conference (FSTTCS), 2014.

An improved deterministic #SAT algorithm for small de Morgan formulas

Ruiwen Chen, Valentine Kabanets and Nitin Saurabh.

Algorithmica 76(1), 2016.

Preliminary version in 39th International Symposium on Mathematical Foundations of Computer Science (MFCS), 2014.

Counting paths in planar width 2 branching programs

Meena Mahajan, Nitin Saurabh and KartEEK SreenivasaiAH.

Preliminary version in 18th Computing: the Australasian Theory Symposium (CATS), 2012.

TALKS

“Improved upper bounds on Fourier entropy”, **Workshop on Sensitivity, Query Complexity, Communication Complexity and Fourier Analysis of Boolean Function**, ISI, Kolkata, February 2020.

“On Fourier entropy-influence conjecture”, **MPI-INF and MPI-MiS joint workshop on Theoretical Computer Science and Algebraic Geometry**, Saarbrücken, January 2019.

“Space-Optimal Quasi-Gray Codes with Logarithmic Read Complexity”, **MPII**, Saarbrücken, February 2018.

“Upper bounds on Fourier entropy”, **MPII**, Saarbrücken, August 2017.

“Some Complete and Intermediate polynomials in Algebraic complexity theory”, **CSR**, St. Petersburg, June 2016.

“Upper bounds on Fourier entropy”, **Charles University**, Prague, March 2016.

“Homomorphism Polynomials Complete for VP”, **FSTTCS**, Delhi, Dec 2014.

“Deterministic #SAT algorithm for de Morgan formulas”, **MFCS**, Budapest, Aug 2014.

“Deterministic #SAT algorithm for de Morgan formulas”, **IMSc**, Chennai, Aug 2014.

“Counting paths in planar width 2 branching programs”, **CATS**, Melbourne, Feb 2012.

“Counting paths in planar width 2 branching programs”, **IMSc**, Chennai, Jan 2012.

AWARDS AND HONOURS

Winner of the **best paper award** at CSR 2016.

<https://people.mpi-inf.mpg.de/~nsaurabh/CSR.pdf>

Recipient of the **Canadian Commonwealth Scholarship Program** 2012-13 by the Canadian Bureau for International Education. This enabled me to visit Simon Fraser University, Canada, where I was working under the guidance of [Prof. Valentine Kabanets](#).

<https://people.mpi-inf.mpg.de/~nsaurabh/CCSP-award-letter.pdf>

One of the two recipients of the **student travel award** by ACM India to attend ACM Turing centenary celebration, San Francisco, June 2012.

<https://people.mpi-inf.mpg.de/~nsaurabh/ACMPressRelease.pdf>

Recipient (2007-2010) of **Scholarship for Higher Education** (SHE), an INSPIRE Scholarship given by the Department of Science and Technology, Government of India.

Secured the **first** place in the **Regional Mathematics Olympiad** (RMO), 2006, in the State of Jharkhand, India.

TEACHING EXPERIENCE

Introduction to Boolean Function Complexity (Advanced Course).

Course Lecturer – Max Planck Institut für Informatik, Saarbrücken (April - July 2019).

Discrete Mathematics (Graduate Course).

Teaching Assistant – The Institute of Mathematical Sciences, Chennai (August - December 2014).

Incidence Theorems and their Applications (Reading Group).

jointly organized with Swaroop N P, Syed Meesum and Meena Mahajan – The Institute of Mathematical Sciences, Chennai (January - April 2014).

Linear Programming and Combinatorial Optimization (Graduate Course).

Teaching Assistant – The Institute of Mathematical Sciences, Chennai (August - December 2012).

PROFESSIONAL
ACTIVITIES

Participation in conferences and workshops (selected)

- Workshop on Sensitivity, Query Complexity, Communication Complexity and Fourier Analysis of Boolean Function. Kolkata, India (February 2020).
- Complexity, Algorithms, Automata and Logic Meet. Chennai, India (January 2019).
- MPI-INF and MPI-MiS joint workshop on Theoretical Computer Science and Algebraic Geometry, Saarbrücken (January 2019).
- Summer School on Algorithms and Lower Bounds. Prague, Czechia (July 2018).
- S3CS: Swedish Summer School in Computer Science. Stockholm, Sweden (July 2017).
- Perspectives on Complexity Theory and Cryptography. Bangalore, India (January 2017).
- 11th Computer Science Symposium in Russia. St. Petersburg, Russia (June 2016).
- Special semester program on Complexity Theory. St. Petersburg, Russia (May-June 2016).
- Workshop on Algebraic Complexity Theory (Saarbrücken 2014, Tel Aviv 2016, Paris 2018, Bangalore 2019).
- Foundations of Software Technology and Theoretical Computer Science Conference (December 2014, 2012, 2011 and 2010).
- Workshop on Computational Complexity at Banff International Research Station. Banff, Canada (July 2013).
- Mysore Park workshop on *Recent trends in Algorithms and Complexity* at Infosys Mysore, India, in 2012, 2011, and 2010.
- ACM A.M. Turing Centenary Celebration. San Francisco, USA (June 2012).
- ICM-2010 satellite conference on Algebraic and Probabilistic Aspects of Combinatorics and Computing at IISc Bangalore 2010.

Review Service

- **Journal:** Journal of Computer and System Sciences (JCSC).
- **Conferences:** FOCS, CCC, SODA, ICALP, STACS, FSTTCS, CSR, RANDOM, ISSAC, FAW, ISAAC, CIAC, SWAT.

REFERENCES

Dr. Meena Mahajan

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The Institute of Mathematical Sciences, Chennai

E-mail: meena@imsc.res.in

Dr. Michal Koucký

Professor

Charles University, Prague

E-mail: koucky@iuuk.mff.cuni.cz

Dr. V. Arvind

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The Institute of Mathematical Sciences, Chennai

E-mail: arvind@imsc.res.in

Nitin Saurabh, Curriculum Vitae

Dr. Satya V. Lokam

Researcher

Microsoft Research India, Bangalore

E-mail: Satya.Lokam@microsoft.com

Dr. Sourav Chakraborty

Associate Professor

Indian Statistical Institute, Kolkata

E-mail: sourav@isical.ac.in

Dr. Christian Ikenmeyer

Senior Lecturer

University of Liverpool

E-mail: christian.ikenmeyer@liverpool.ac.uk