Abhibhav Garg

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Education

Present | Master of Technology, Computer Science and Engineering (Dual Degree)
8/15 - 4/20 | Indian Institute of Technology Kanpur CPI - 10/10
Advisor: Prof. Nitin Saxena

Present | Bachelor of Technology, Computer Science and Engineering (Dual Degree)
8/15 - 4/20 | Indian Institute of Technology Kanpur CPI - 10/10

Research Interests

Algebraic complexity, Computational algebra, Computational complexity

Research Experience

8/20 - | **Complexity of the Nullstellensatz (Master's Thesis)**
Supervised by Prof. Nitin Saxena, CSE, IITK
• Studying the complexity of the Nullstellensatz in special cases independent of the characteristic.
• Found blackbox algorithms for radical membership which runs in time exponential in the transcendence degree of the inputs.
• Currently working on extending these to larger transcendence degrees.

8/19 - 6/20 | **Algebraic Independence Testing**
Supervised by Prof. Nitin Saxena, CSE, IITK and Prof. Ramprasad Saptharishi, STCS, TIFR
• Studied the algebraic independence problem for positive characteristic fields.
• Attempted the use of p-adic lifts and modified Jacobians.
• Reproved existing results using algebraic geometry in an attempt to generalize them.

Teaching Experience

8/19-4/20 | Tutor for Fundamentals of Computing (ESC101) at IIT Kanpur
Conducted weekly tutorials, set and graded lab assignments, midterm and endterm exams.

7/20-11/20 | Teaching Assistant for Algorithms - II (CS345) at IIT Kanpur
Graded assignments and quizzes

Coursework

Arithmetic Circuit Complexity
Techniques in Combinatorics
Algorithmic Information Theory
Linear Algebra Tools in TCS
Statistical Learning Theory
Computational Number Theory and Algebra
Randomized Methods in Complexity
Algebraic Topology
Model Theory
Measure Theory

Presentations and Talks

Talks as part of courses at IITK	• Succint hitting sets, *Arithmetic Circuit Complexity* • Existance of Bipartite Ramanujan Graphs, *Linear Algebra Tools* • Sketch of MRDP Theorem, *Model Theory* • Polynomial Spaces, *Techniques in Combinatorics*
Talks as part of SIGTACS	• Applications of Borsuk Ulam in combinatorics • Coding for sunflowers (presented the proof by Anup Rao)

Academic Achievements

2019	Selected for the VSRP, a summer research program in TIFR
2018	Dr. V. Rajaraman Scholarship, IIT Kanpur Best B.Tech final year student in the Computer Science and Engineering Dept. IIT Kanpur
2015-2018	Academic Excellence Awards, IIT Kanpur Top 10% among students for each academic year

Workshops

3-2019	Workshop on Algebraic Complexity Theory, *ICTS, Bangalore*
1-2018	Algorithms and Optimization, *ICTS, Banglore*