

## Abhibhav Garg

Department of Computer Science, IIT Kanpur  
abhibhav@cse.iitk.ac.in

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### EDUCATION

**Indian Institute of Technology, Kanpur**, Kanpur, India  
*B.Tech, M.Tech Dual Degree*, Computer Science and Engineering, May 2020 (expected)  
Advisor: Dr. Nitin Saxena  
B.Tech CPA: 9.97  
M.Tech CPA: 10.0

### RESEARCH INTERESTS

Algebraic Complexity, Computational Algebra, Computational Number Theory

### RESEARCH EXPERIENCE

**Positive Characteristic Nullstellensatz** (Masters Thesis):

With Prof. Nitin Saxena

Aug '19 -

- We are studying the complexity of the Nullstellensatz for positive characteristic fields in special cases, such as certifying roots of polynomials with positive dimension zerosets.

**Algebraic Independence:**

With Prof. Nitin Saxena and Prof Ramprasad Saptharishi

Aug '18 - Jun '19

- We studied the algebraic independence problem for positive characteristic fields. We studied  $p$ -adic lifts, and modified Jacobians using various differentials to try and find an efficient algorithm for the problem (the problem is still open). We also further explored the relationship between the transcendence degree of the polynomials and the image of the polynomials as a map.

### SELECTED TALKS

Talks given as part of courses:

- Presented a paper on succinct hitting sets and algebraic circuit lower bound barriers as part of a course on arithmetic circuit complexity.
- Presented a paper on bipartite ramanujan graphs as part of a course on linear algebra tools in computer science.
- Presented a sketch of the proof of the MRDP theorem as part of a course in model theory.
- Presented a paper on polynomial spaces as part of a course in combinatorics.

Talks given in SIGTACS (Special Interest Group for Theoretical Computer Science):

- Applications of the Borsuk Ulam Theorem in combinatorics.
- Coding for sunflowers (presentation of the proof by Anup Rao).

### ACADEMIC ACHIEVEMENTS

Academic Excellence Award, IIT Kanpur, 2015-2019  
Dr. V. Rajaraman Scholarship, IIT Kanpur, 2018

### GRADUATE COURSEWORK

Arithmetic Circuit Complexity, Randomised Methods in Complexity, Computational Number Theory and Algebra, Algebraic Topology, Techniques in Combinatorics, Model Theory, Statistical Learning Theory, Algorithmic Information Theory.

### TEACHING EXPERIENCE

Tutor, Fundamentals of Computing, 2018-2019.  
Teaching Assistant, Advanced Algorithms, 2019-2020 Fall Semester.