

# Rachit Nimavat

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## CONTACT INFORMATION

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## RESEARCH INTERESTS

As a Ph.D. graduate in Theoretical Computer Science, my research focuses on combinatorial optimization problems involving graphs. I specialize in the design and analysis of efficient algorithms for such problems across various models of computation. Additionally, I investigate the inherent limitations of the quality of such algorithm through hardness of approximation proofs. My academic background include graduate-level coursework in Machine Learning and Learning Theory.

## EDUCATION

***Toyota Technological Institute at Chicago (TTIC)***  
*Ph.D. in Theoretical Computer Science* 2015 - 2023  
Advised by Prof. Julia Chuzhoy  
Thesis: *Graph Theory and its Uses in Graph Algorithms and Beyond*  
GPA: 3.9/4

***Indian Institute of Technology Kanpur (IITK)***  
*B.Tech, Computer Science and Engineering* 2011 - 2015  
GPA: 9.6/10  
Received Academic Excellence Award for every academic year

## PUBLICATIONS AND MANUSCRIPTS

*On Streaming Algorithms for Longest Increasing Subsequence and Non-Crossing Matchings in Graphs.*  
Julia Chuzhoy, Sanjeev Khanna, and Rachit Nimavat.  
Preprint.

*Large Minors in Expanders.*  
Julia Chuzhoy and Rachit Nimavat.  
Preprint.

*Improved Approximation Algorithm for Node-Disjoint Paths in Grid Graphs with Sources on Grid Boundary.*  
Julia Chuzhoy, David H. K. Kim and Rachit Nimavat.  
In **ICALP 2018**.

*Almost Polynomial Hardness of Node-Disjoint Paths in Grids.*  
Julia Chuzhoy, David H. K. Kim and Rachit Nimavat.  
In **STOC 2018**. Gave a talk about this result at *Workshop on Approximation algorithms and Hardness of Approximation*, Banff, CA, Nov, 2017.

*New Hardness Results for Routing on Disjoint Paths.*  
 Julia Chuzhoy, David H. K. Kim and *Rachit Nimavat*.  
 In **STOC 2017**. Invited to the **SICOMP STOC 2017** special issue.

INTERNSHIPS	<b>Microsoft Research, Redmond</b>	
	<i>Mentored by Dr. Jonathan de Halleux</i>	Summer, 2014
	Worked on a system for synthesizing automation scripts from natural language descriptions	
	<b>Indian Institute of Science, Bangalore</b>	
	<i>Mentored by Prof. L. Sunil Chandran</i>	Summer, 2013
	Studied Rainbow Matchings and Rainbow Connection Numbers for edge-colored graphs	
RELEVANT PROJECTS	<i>Improper Learning Equals Refutation</i>	
	<i>Theory of Machine Learning Course Project</i>	2018
	<i>Knock, Knock, Neo! – Spawning Knock-Knock Jokes</i>	
	<i>Natural Language Processing Course Project</i>	2016
	Used NLP techniques to generate jokes with a fixed rigid structure	
TEACHING EXPERIENCE	<i>Study of Low Stretch Spanning Trees and Tree Metrics</i>	
	B.Tech Project mentored by Prof. Surender Baswana	2014
	<b>Summer Course:</b> Co-taught a short course on <i>Probability and Machine Learning</i> in TTI-Japan	Summer 2018
	<b>TTIC:</b> TA for	
	- <i>Statistical and Computational Learning Theory</i>	Fall 2018
	- <i>Approximation Algorithms</i>	Winter 2018
	- <i>Algorithms</i>	Winter 2017
	<b>IITK:</b> TA/Academic Mentor for	
	- <i>Data Structure and Algorithms</i>	2014-15
	- <i>Fundamentals of Computing</i>	2014-15 & 2011-12
RELEVANT COURSES	- <i>Mathematics I and II</i>	2012-13
	<b>Graduate-level:</b> Statistical Machine Learning, Natural Language Processing, Learning Theory, Quantum Computing, Computational Geometry, Game Theory, Randomized Algo., Approximation Algo.	
	<b>Undergraduate-level:</b> Computer Architecture, Compiler Design, Operating Systems, Databases, Computer Networks	
MISCELLANEOUS	- Secured All India Rank 203 in IIT-JEE 2011	
	- Secured 8 <sup>th</sup> rank in ACM-ICPC Regional 2013	
	- Participated and won in various Hackathons, 2011-14	
	- Secretary, Programming Club, IITK, 2012-13	
	- Webmaster, Students' Gymkhana, IITK, 2012-13	
	- Black Belt in Karate	