

# Madhusudhan Reddy Pittu

## Curriculum Vitae

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### Interests

I am broadly interested in Theoretical Computer Science. My primary areas of interest are Algorithms, Combinatorics, and Optimization. Most of my work involves designing approximation algorithms for geometric and combinatorial problems.

Recently, I have also been exploring the intersection of algorithms and Machine Learning, specifically focusing on understanding and improving the performance of Large Language Models (LLMs).

### Research and Education

2025–2026 **Postdoctoral Associate**, *Courant Institute, New York University*, New York.  
Host: Prof. Anupam Gupta

2021–2025 **Ph.D. in Computer Science**, *Carnegie Mellon University*, Pittsburgh.  
Advisor: Prof. Anupam Gupta, and Prof. David P. Woodruff

2017–2021 **B.Tech. in Computer Science and Engineering**, *Indian Institute of Technology Kharagpur*, India.  
Advisor: Asst. Prof. Palash Dey

### Technical Skills

Languages Python, C++. Capable of rapidly adapting to new programming languages and frameworks as project necessities dictate.

Generative AI Hands-on experience with Large Language Models (LLMs). Experience includes tweaking pretrained models, augmenting model architectures, and implementing end-to-end training and testing pipelines.

### Publications

#### **Combinatorial Optimization using Comparison Oracles.**

with Vincent Cohen-Addad, Tommaso d’Orsi, Anupam Gupta, Guru Guruganesh, Euiwoong Lee, Renato Paes Leme, Debmalya Panigrahi, Jon Schneider, and David P. Woodruff  
To Appear at the ACM Symposium on Theory of Computing (**STOC**), 2026

#### **An Algorithmic Upper Bound for Permanents via a Permanental Schur Inequality.**

with Aditi Laddha  
Arxiv, 2025

#### **Max-Cut with Multiple Cardinality Constraints.**

with Yury Makarychev, and Ali Vakilian  
**APPROX**, 2025

**Guessing Efficiently for Constrained Subspace Approximation.**

with Aditya Bhaskara, Sepideh Mahabadi, Ali Vakilian, and David P. Woodruff  
International Colloquium on Automata, Languages, and Programming (ICALP), 2025

**Approximation Algorithms for the Weighted Nash Social Welfare via Convex and Non-Convex Programs.**

with Adam Brown, Aditi Laddha and Mohit Singh  
ACM-SIAM Symposium on Discrete Algorithms (SODA), 2024

**The Price of Explainability for Clustering.**

with Anupam Gupta, Ola Svensson and Rachel Yuan  
IEEE Symposium on Foundations of Computer Science (FOCS), 2023

**Efficient Determinant Maximization for All Matroids.**

with Adam Brown, Aditi Laddha and Mohit Singh  
Arxiv, 2022

**Determinant Maximization via Matroid Intersection Algorithms.**

with Adam Brown, Aditi Laddha, Mohit Singh and Prasad Tetali.  
IEEE Symposium on Foundations of Computer Science (FOCS), 2022

**A 3-Approximation Algorithm for Maximum Independent Set of Rectangles.**

with Waldo Gálvez, Arindam Khan, Mathieu Mari, Tobias Mömke and Andreas Wiese.  
ACM-SIAM Symposium on Discrete Algorithms (SODA), 2022

**A  $(2+\epsilon)$ -Approximation Algorithm for Maximum Independent Set of Rectangles.**

with Waldo Gálvez, Arindam Khan, Mathieu Mari, Tobias Mömke and Andreas Wiese.  
Arxiv, 2021

**On Guillotine Separability of Squares and Rectangles.**

with Arindam Khan.  
APPROX-RANDOM, 2020

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## Visits/Internships

- Spring 2025 **Student Researcher**, *Google*.  
Hosts: Sreenivas Gollapudi, Kostas Kollias
- Summer 2023 **Non-Degree Visiting Student**, *Toyota Technological Institute at Chicago*.  
Hosts: Ali Vakilian, Yury Makarychev, Julia Chuzhoy
- Fall 2022 **Visiting Graduate Student**, *Simons Institute for the Theory of Computing*.  
Data-Driven Decision Processes program
- Summer 2020 **Visiting Student Research Internship (Remotely)**, *Georgia Tech*, Atlanta, USA.  
Hosts: Prasad Tetali and Mohit Singh
- Summer 2019 **Narendra Internship**, *Indian Institute of Science*, Bengaluru.  
Host: Arindam Khan

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## Awards and Achievements

- Secured **Bronze Medal** representing India at the 57<sup>th</sup> **International Mathematical Olympiad (IMO)**, 2016
- IITKGP Foundation-USA International Internship Award**, 2020
- Infosys award** for excellent performance in International Olympiads, 2016
- Best Solution Award** in IMO training camp 2015