

# ANIKET MURHEKAR

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## RESEARCH INTERESTS

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Algorithmic Game Theory, Discrete Optimization, Computational Social Choice, and Machine Learning

## EDUCATION

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### University of Illinois at Urbana-Champaign

Ph.D., Computer Science, 2020 - 2025

4.0/4.0

M.S., Computer Science, 2018 - 2020

4.0/4.0

### Indian Institute of Technology (IIT), Bombay

B.Tech. (Honors) in Computer Science and Engineering, 2014 - 2018

9.18/10

## INTERNSHIPS

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**Google Research:** Discrete Algorithms Group, Mountain View, USA

May 2024 – Nov 2024

*“Algorithms for Job Scheduling with Time-Varying Capacity”*

**Adobe Research:** Real-time Algorithms Lab, San Jose, USA

May 2022 – Aug 2022

*“Algorithms for Resource Allocation on the Cloud”*

**Adobe Research:** Big Data Experience Lab, Bangalore, India

May 2017 – Aug 2017

*“Deep Learning for Automatic Text Summarization”*

## AWARDS & HONORS

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Invited to the **Chicago Junior Theorists Workshop** 2024

**Mavis Future Faculty Fellowship** 2024

Selected as a participant to attend the 10<sup>th</sup> Global Young Scientists Summit, Singapore 2021

Narotam Sekhsaria Post Graduate Scholar: Awarded to 15 Indian students annually 2020

**Siebel Scholarship:** Awarded to 90 graduate students from 16 select schools globally (**\$35000 prize**) 2019

**Institute Academic Prize**, IIT Bombay for exceptional academic performance 2015

**All India Rank 19** in IIT-JEE Advanced, among 1.3 million candidates 2014

**Silver Medal at the International Chemistry Olympiad** 2014

Infosys Award: Awarded to International Olympiad Medal Winners 2014

**Gold Medal at the Indian National Mathematics Olympiad** 2013

KVPY Fellowship, Government of India 2013

NTSE Scholarship, Government of India 2010

## PUBLICATIONS

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Author names are in alphabetical order in as per the TCS tradition

20. [ICML’24] B. Chaudhary\*, [A. Murhekar\\*](#), Z. Yuan\*, B. Li, R. Mehta, A. Procaccia. “Fair Federated Learning via the Proportional Veto Core.” *International Conference on Machine Learning (ICML)*, 2024. [\[pdf\]](#)
19. [IJCAI’24] J. Garg, [A. Murhekar](#), J. Qin. “Weighted EF1 and PO Allocations with Few Types of Agents or Chores.” *International Joint Conference on Artificial Intelligence (IJCAI)*, 2024. [\[pdf\]](#)
18. [NeurIPS’23] [A. Murhekar](#), B. Chaudhary, Z. Yuan, B. Li, R. Mehta. “Incentives in Federated Learning: Equilibria, Dynamics, and Mechanisms for Welfare Maximization.” *Neural Information Processing Systems (NeurIPS)*, 2023. [\[pdf\]](#)

17. [SPAA'23] [A. Murhekar](#), D. Arbour, T. Mai, A. Rao. "Dynamic Vector Bin Packing for Resource Allocation on the Cloud." *Symposium on Parallelism in Algorithms and Architectures (SPAA)*, 2023. [\[pdf\]](#)
16. [IJCAI'23] J. Garg, [A. Murhekar](#), J. Qin. "New Algorithms for the Fair and Efficient Allocation of Indivisible Chores." *International Joint Conference on Artificial Intelligence (IJCAI)*, 2023. [\[pdf\]](#)
15. [FSTTCS'23] [A. Murhekar](#), E. Sharma. "Nash Equilibria in Two Player Games Repeated Until Collision." *Foundations of Software Technology and Theoretical Computer Science (FSTTCS)*, 2023. [\[pdf\]](#)
14. [WINE'22] J. Garg, E. Husic, [A. Murhekar](#), L. Vegh. "Tractable Fragments of the Maximum Nash Welfare Problem." *Conference on Web and Internet Economics (WINE)*, 2022. [\[pdf\]](#)
13. [AAAI'22] J. Garg, [A. Murhekar](#), J. Qin. "Fair and Efficient Allocations of Bivalued Chores." *AAAI Conference on Artificial Intelligence (AAAI)*, 2022. [\[pdf\]](#)
12. [AAMAS'22] V. Livanos, R. Mehta, [A. Murhekar](#). "(Almost) Envy-Free, Proportional and Efficient Allocations of an Indivisible Mixed Manna." *Autonomous Agents and Multi-Agent Systems (AAMAS)*, 2022. [\[pdf\]](#)
11. [AAAI'21] J. Garg, [A. Murhekar](#). "On Fair and Efficient Allocations of Indivisible Goods." *AAAI Conference on Artificial Intelligence (AAAI)*, 2021. Accepted to **Journal of Artificial Intelligence**. [\[pdf\]](#)
10. [SAGT'21] J. Garg, [A. Murhekar](#). "Computing Fair and Efficient Allocations with Few Utility Values." *Symposium on Algorithmic Game Theory (SAGT)*, 2021. **Invited to Theoretical Computer Science**. [\[pdf\]](#)
9. [FSTTCS'21] J. Garg, P. Kulkarni, [A. Murhekar](#). "On Fair and Efficient Allocations of Indivisible Public Goods." *Foundations of Software Technology and Theoretical Computer Science (FSTTCS)*, 2021. [\[pdf\]](#)
8. [AAMAS'20] [A. Murhekar](#), R. Mehta. "Approximate Nash Equilibria of Imitation Games: Algorithms and Complexity." *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2020. [\[pdf\]](#)
7. [STACS'20] S. Akshay, N. Balaji, [A. Murhekar](#), R. Varma, N. Vyas. "Near-optimal complexity bounds for fragments of the Skolem Problem." *Symp. on Theoretical Aspects of Computer Science (STACS)*, 2020. [\[pdf\]](#)
6. [COLING'18] K. Krishna, [A. Murhekar](#), S. Sharma, B. V. Srinivasan. "Vocabulary Tailored Summary Generation." *International Conference on Computational Linguistics (COLING)*, 2018. [\[pdf\]](#)
5. [CAV'17] K. Chatterjee, H. Fu, [A. Murhekar](#). "Automated Recurrence Analysis for Almost-Linear Expected-Runtime Bounds." *Computer Aided Verification (CAV)*, 2017. [\[pdf\]](#)

## PREPRINTS

4. J. Garg, [A. Murhekar](#), J. Qin. "Constant-Factor EFX Exists for Chores." *Under submission at STOC'25*. [\[pdf\]](#)
3. H. Akrami, B. Chaudhary, J. Garg, [A. Murhekar](#). "On the Theoretical Foundations of Data Exchange Economies." *Under submission at STOC'25*. [\[pdf\]](#)
2. [A. Murhekar](#), J. Song, B. Chaudhary, R. Mehta. "You Get What You Give: Reciprocal Fair Federated Learning." *Planned submission to ICML'25*. [\[pdf\]](#)
1. [A. Murhekar](#), M. Purohit, Z. Svitkina, E. Vee, J. Wang. "Non-preemptive Throughput Scheduling under Time-Varying Capacity." *In preparation*.

## PATENTS

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"*Generating a Targeted Summary of Textual Content Tuned to a Target Audience Vocabulary*", Saumitra Sharma, Kundan Krishna, Balaji Vasani Srinivasan, [Aniket Murhekar](#), 2019. [\[link\]](#)

## SELECTED TALKS

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"*Constant-Factor EFX Exists for Chores*"

- Chicago Junior Theorists Workshop 2024 (*invited*) December 2024
- Harvard EconCS Seminar October 2024
- UIUC Theory Seminar September 2024
- Google Algorithms Seminar August 2024

"*Fairness, Efficiency, and Incentives in Federated Learning via Game Theory and Social Choice*"

- Federated Learning and Optimization at INFORMS Annual Meeting (*invited*) October 2024  
*“Fair and Efficient Allocation of Indivisible Items: Recent Advances”*
- Algorithmic Frontiers of Fairness Workshop at FSTTCS (*invited*) December 2023

## MENTORSHIP

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- Promoting Undergraduate Research in Engineering (PURE), UIUC** 2024 - 2025  
 Mentoring undergraduate students in developing *FairShare*: a mobile app for fair allocation.  
*Students: Aditya Dora, Anushka Sankaran, Parithimaal Karmehan, and Srikar Pisupati*
- Mentoring Undergraduates in Science and Engineering (MUSE) Program, UIUC** 2020 - 2021  
 Mentored a student on fair allocation algorithms. *Student: Amey Venkataraman*
- Department Academic Mentorship Program (DAMP), IIT Bombay** 2017 - 2018  
 Mentored eight sophomore students.

## TEACHING

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- Graduate Teaching Assistant, UIUC**  
 Discrete Structures: Fall 2018, Fall 2019, Spring 2020, Fall 2021, Spring 2022, and Fall 2020 as **Head TA**
- Undergraduate Teaching Assistant, IIT Bombay**  
 Automata Theory (Spring 2018), Electromagnetism (Spring 2016), Quantum Physics (Fall 2015)

## SERVICE

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- Program Committee Member:** AAAI '25, AAMAS '25, AAAI '24, AAMAS '24, AAAI '23
- Reviewer:** SODA '25, ITCS '25, FOCS '23, SODA '22, AAAI '22, WWW '22, MFCS '22, SAGT '22, EC '21-22
- Head, BitStream:** Computer Science Departmental Newsletter, IIT Bombay 2016 - 2017
- Academic Resource Person, 46<sup>th</sup>** International Physics Olympiad, Mumbai 2015