Eklavya Sharma

Curriculum Vitae

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sharmaeklavya2 | sharmaeklavya2

Research Interests

Economics and computation, Data markets, Multi-agent systems, Fair resource allocation, Approximation algorithms

Education

Aug 2021 – present: **PhD**, *Department of Industrial & Enterprise Systems Engineering (ISE), University of Illinois Urbana-Champaign (UIUC)*, IL, USA, GPA: 4.0 / 4.0
Research on data markets and fair allocation. Advised by Prof. Jugal Garg.

July 2019 – July 2021: **M.Tech. (Research)**, *Computer Science and Automation (CSA), Indian Institute of Science (IISc)*, Bangalore, GPA: 9.7 / 10.0
Research on approximation algorithms for variants of bin packing and knapsack. Advised by Prof. Arindam Khan.

Aug 2014 – June 2018: **B.E. (Hons) Computer Science**, *Birla Institute of Technology and Science (BITS)*, Pilani, India, GPA: 9.14 / 10.00

Publications

Submitted to STOC'27: RARE: Response-aware rational equilibrium in budget-constrained pricing games, with Bhaskar Ray Chaudhury, Jugal Garg, and Xin Huang

ArXiv: Revenue-optimal data pricing with budget-constrained buyers
with Bhaskar Ray Chaudhury, Jugal Garg, and Jiaxin Song

NeurIPS'26: Non-linear pricing restores tractability for a data seller
with Bhaskar Ray Chaudhury, Jugal Garg, and Jiaxin Song

ICML'26 (oral): Equilibrium pricing for oligopolistic data markets
with Bhaskar Ray Chaudhury, Jugal Garg, and Jiaxin Song

AAMAS'26 (oral): Exploring relations among fairness notions in discrete fair division
with Jugal Garg

AAMAS'26 (oral): Proportional and Pareto-optimal allocation of chores with subsidy
with Jugal Garg and Xiaowei Wu

EC'24: Improving approximation guarantees for maximin share
with Hannaneh Akrami, Jugal Garg, and Setareh Taki

IJCAI'23 New fairness concepts for allocating indivisible items
with Ioannis Caragiannis, Jugal Garg, Nidhi Rathi, and Giovanna Varricchio

IJCAI'23 Simplification and improvement of MMS approximation
with Hannaneh Akrami, Jugal Garg, and Setareh Taki

FSTTCS'23 Two-player matrix games repeated until collision
with Aniket Murhekar

ArXiv Automating the search for small hard examples to approximation algorithms

FSTTCS'22 Approximation algorithms for multidimensional packing
with Arindam Khan and K.V.N. Sreenivas

Algorithmica, APPROX'21 Tight approximation algorithms for geometric bin packing with skewed items, with Arindam Khan

FSTTCS'21 Harmonic algorithms for packing d-dimensional cuboids into bins

Fellowships and Achievements

Aug 2024 **Mavis Future Faculty Fellowship, UIUC**
A program that trains fellows on various aspects of an academic career through workshops, seminars, and activities.

April 2024 **William A. Chittenden II Award, UIUC**
Given to an outstanding graduate student at ISE.

July 2023 **Dr. MNS Swamy Medal for Best M.Tech. (Research) Thesis, IISc**

April 2023 **Sharp Outstanding Graduate Student Award, UIUC**

Aug 2021 – July 2022 **Samuel Brainin Engineering Fellowship, UIUC**

March 2018 **Graduate Aptitude Test in Engineering (GATE), India**
Rank 86 (out of ∼100,000 candidates) in the 'Computer Science and IT' test.

Aug 2014 – Dec 2015 **BITS Pilani Merit Scholarship**
Scored GPA among top 2% of students in the first three semesters of my Bachelors.

Invited Talks

26 June 2026 **Equilibrium Pricing in Oligopolistic Data Markets**
Workshop at Northwestern University: "Emerging Markets: Data, Models, Tokens"

27 Oct 2023 **Fair allocation of indivisible items**
Capital Area Theory Seminar, University of Maryland, College Park

22 Dec 2022 **Existence and computation of epistemic EFX allocations**
Indian Institute of Science, Bangalore

Professional Service

Program committee member for EC'26, WINE'26, AAMAS'26, AAAI'26, EC'25, AAMAS'25, AAMAS'24.

Conference reviewer for STOC'27, SODA'27, WWW'27, NeurIPS'26 (top reviewer), ICML'26, IJCAI'25, EC'24, ICALP'24, EC'23, ESA'23, IJCAI'23, FCT'23, STOC'22, SAGT'22, MFCS'21.

Journal reviewer for ACM Transactions on Economics and Computing (2026) and Optimization Letters (2024).

Implementation Projects

June 2026 – ongoing **Formalizing my research in Lean**
github.com/sharmaeklavya2/data-mkt-oligo-nash-eq-lean
github.com/sharmaeklavya2/dm-rare
Successfully guided Claude to formalize a 12-page-long proof from my ICML'26 paper on data markets, and the main results of my RARE paper.

April 2024 – Dec 2024 **Exploring relations among fairness notions in discrete fair division**
Published in AAMAS'26, code at github.com/sharmaeklavya2/cpigjs
Wrote a program in JavaScript that helped prove many new results for the problem of fairly allocating indivisible items among multiple agents. These results help arrange fairness notions in a hierarchy.

Sept 2023 – March 2024 **Automating the search for hard examples to approximation algorithms.** *code:* github.com/sharmaeklavya2/code2dtree, *used in IJCAI'23 paper.*
Wrote a python library that converts any function to a decision tree (for a fixed input size). Then wrote a program to find tight hard examples for approximation algorithms by running a linear program for each leaf of the algorithm's decision tree. A preliminary version of this work was used to find tight hard examples for the then-best-known approximate-MMS algorithm for fairly allocating goods. We published these examples in IJCAI'23.

May 2020 **Interactive app for rectangular bin packing**
code: github.com/sharmaeklavya2/packing-game

Teaching and Mentoring

Fall 2026 **Guest Lecturer**, *IE 405: Computing for ISE*, UIUC
Introduced graphs and graph algorithms. Observed by UIUC's Center for Innovation in Teaching and Learning (CITL).

Fall 2026, Spring 2026 **Teaching Assistant**, *IE 300: Analysis of Data*, UIUC
Role: rewrote lab tutorials, revised lab assignments, standardized the programming environment and first-lab onboarding across TA sections, ran programming labs, held office hours, graded homework and lab assignments.

Spring 2025, Spring 2024 **Teaching Assistant**, *IE 300: Analysis of Data*, UIUC
Role: ran programming labs, office hours, recorded instructional videos for labs.

Sept 2024 – April 2025 **Project Mentor**, Illinois Science and Technology Coalition (ISTC)
Volunteered at ISTC to mentor a high-school student. Helped him turn a high-level idea (can humans outperform machines at complex puzzles?) into an experiment comparing human subjects against fast approximation algorithms for 2D geometric bin packing.

Spring 2023 **Teaching Assistant**, *IE 310: Deterministic models in optimization*, UIUC
Role: graded homework, held office hours.

Fall 2022 **Teaching Assistant**, *IE 300: Analysis of Data*, UIUC
Role: co-ran programming labs, graded homework.

Fall 2020 **Teaching Assistant**, *Design and Analysis of Algorithms*, IISc Bangalore
Role: graded homework, held office hours.

Industry Experience

Aug 2018 – July 2019 **Software Engineer**, *media.net*, Bangalore, India
Topics: machine learning, large-scale systems.
media.net is an advertisement-technology company. I worked on improving their machine-learning-based algorithm for bidding in real-time ad auctions.

Jan 2018 – June 2018 **Intern**, *American Express*, Gurgaon, India
Topics: neural networks, machine learning, big data.
Trained a neural network to predict credit-card defaulting. The input format was unconventional, so I devised a custom architecture. Its performance was at par with the production model, which was tuned over many years.

May 2017 – July 2017 **Intern**, *Directi*, Mumbai, India
Topics: machine learning.
Made Directi's news article classification algorithm recognize more categories.

May 2016 – Aug 2016 **Google Summer of Code (GSoC) Student**, *Zulip*
Topics: software development.
Zulip is an open-source group chat application. 3 students were selected from over 100 applicants to work on Zulip as part of the GSoC program.
- Annotated python code ($\sim$ 50,000 lines) for use with a static type-checker.
- Migrated code to Python 3 by switching to newer dependencies, using automated code conversion, standardizing string types, and fixing bugs.

Computer Skills

LaTeX, Python, Lean, HTML, CSS, JavaScript, C/C++.