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Maneesha Papireddygari

Research Interests

Micro-economic Theory, Algorithmic Economics, Contract Theory, Online Learning Algorithms, Information Elicitation and Aggregation

Education

2020 - 2025* **PhD, Theoretical Computer Science**, *University of Colorado Boulder*, Boulder, *Aggregate*: 3.76/4.

- Research Advisor : Prof. Bo Waggoner

2018 - 2020 **Master of Arts, Economics**, *Delhi School of Economics, (DSE)*, Delhi, *Aggregate*: 75.07/100.

- Research Advisor : Prof. Abhijit Banerji

2011 - 2015 **Bachelor of Technology - Major in Computer Science Engineering**, *International Institute of Information Technology (IIIT) Hyderabad*, India, *Aggregate*: 82.9/100.

- Project Advisor : Prof. Rajan K.S.

2009 - 2011 **Higher Secondary Examination (Standard 12th)**, *Sri Chaitanya Junior College*, Hyderabad, India, *Aggregate*: 94/100.

Papers

Contracts with Information Acquisition, via Scoring Rules EC 2022 - Maneesha Papireddygari and Bo Waggoner. Link - https://dl.acm.org/doi/abs/10.1145/3490486.3538261

Scholastic Merits

2022 Recipient of Casey Feldman Memorial Scholarship for volunteer work.

2018-2019 Ranked 7th among 250 students (top 3 %) at Delhi School of Economics.

2018 Recipient of Smt. Shanti Sharma Memorial Scholarship at Delhi School of Economics.

2018 Secured All-India 5th rank in DSE entrance exam, 2018.

2012 Recipient of Dean's List of Academic Excellence Award for 2nd semester at IIIT Hyderabad.

2011 Ranked All India 84 (top 99.99 %) over a million students in All India Engineering Entrance Exam (AIEEE)

2011 Ranked All India 2267 (top 99.56 %) out of about 400k students in IIT Joint Entrance Exam (IIT-JEE)

2011 Among the 300 students in India selected for National Physics Olympiad.

2011 Among the 300 students in India selected for National Astronomy Olympiad.

Research And Professional Experience

May - July 2019 **Research Intern**, *Indian Statistical Institute(ISI), Kolkata*, India.

Theoretical research - Did exploratory work on single sided stable matching algorithms, equivalence of these mechanisms(RSD,random TTC etc) under uniform distribution.

Jan - March 2019 **Research Assistant**, *University of York*, UK.
Applied - Worked with Prof. Anindya Bhattacharya on automating data refinement and scraping

July 2015 - Nov 2016 **Software Developer**, *Citrix R&D India Pvt. Ltd*, Hyderabad, India.
Worked on Apache CloudStack - an open source software designed to deploy and manage large networks of virtual machines, as a highly available, highly scalable Infrastructure as a Service (IaaS) cloud computing platform.

May - July 2013 **Undergraduate Summer Intern**, *Progress Software.*, Hyderabad, India.

Service

Sub-reviewer Symposium on Discrete Algorithms (SODA) 2023.

Volunteer Economics and Computation (EC) 2022, Boulder, 12-15 July, 2022.

Volunteer Conference of Learning Theory (COLT) 2021, Boulder, 15-19 August, 2021.

Volunteer Winter School 2019, Delhi School of Economics, 10-13 December, 2019.

Volunteer Winter School 2018, Delhi School of Economics, 10-13 December, 2018.

Projects

March 2022 - ongoing **An Axiomatic and Elicitation Perspective on Market Makers for Decentralized Exchanges**, *with Prof. Bo Waggoner, Prof. Rafael Frongillo* , University of Colorado, Boulder.
We introduce axioms for general asset market making, and apply them to study automated maker makers for decentralized exchanges. Our first result is a characterization of constant-function market makers (CFMMs) without transaction fees. We then give a general conceptual bridge between asset market making and prediction markets for ratios of expectations. As a special case, we derive a precise equivalence between CFMMs and cost-function market makers from the prediction markets literature. We then use this conceptual bridge to port ideas from prediction markets, giving a variety of new market makers for decentralized exchanges.

March 2022 - ongoing **Information Aggregation in wagering mechanisms when agents have immutable beliefs**, *with Prof. Bo Waggoner, Prof. Rafael Frongillo , Robin Bowers*, University of Colorado, Boulder.
We look into how to aggregate immutable beliefs of agents in a wagering mechanism when the agents are Bayesian. This model has been previously discussed in Lambert et. al. 2015 but their model doesn't beat the $O(\frac{1}{m})$ worst-case bound for aggregation that just the revelation of truthful reports achieves. In order to achieve perfect aggregation, we look into giving agents a small bonus to overcome no-trade theorem instead of assuming an intrinsic utility to gamble. The hope is to tweak the bonus so agent's best response to wager reveals their confidence in the prediction, which can then be used to aggregate optimally. We also aim to generalize this aggregation mechanism to more information structures.

May 2020 - Feb 2022 **Contracts with Information Acquisition, via Scoring Rules**, *with Prof. Bo Waggoner*, University of Colorado, Boulder, Submitted to ACM Conference on Economics and Computation (EC), 2022.
We consider a principal-agent problem where the agent may privately choose to acquire relevant information prior to taking a hidden action. This model generalizes two special cases: a classic moral hazard setting, and a more recently studied problem of incentivizing information acquisition (IA). We show that all of these problems can be reduced to the design of a proper scoring rule. Under a limited liability condition, we consider the special cases separately and then the general problem. We give novel results for the special case of IA, giving a closed form "pointed polyhedral cone" solution for the general multidimensional problem. We also describe a geometric, scoring-rules based solution to the case of the classic contracts problem.Finally, we give an efficient algorithm for the general problem of Contracts with Information Acquisition.

June-July 2019 **On Equivalence of Single-Sided Matching Mechanisms**, *with Prof. Souvik Roy*, Indian Statistical Institute, Kolkata.

The equivalence of many one-sided matching mechanisms for indivisible objects has been discussed in papers like Pathak(2008), Carroll(2014), Sethuraman & Lee(2011). But the equivalence had only been discussed under the assumption of uniform distribution of priority structures. We looked into the conditions of the distribution for which the equivalence further holds.

2015-2016 **Citrix CloudPlatform (powered by Apache CloudStack)**, *Apache CloudStack*.

Apache CloudStack is an open source software designed to deploy and manage large networks of virtual machines, as a highly available, highly scalable Infrastructure as a Service (IaaS) cloud computing platform. CloudStack is used by a number of service providers to offer public cloud services, and by many companies to provide an private cloud offering, or as part of a hybrid cloud solution.I had worked on areasscaping across the product like its support for vmware,job monitoring,kubernetes etc..

2014 **Distributed Key-Value Store**, *with Prof. Vasudeva Verma*, IIIT Hyderabad.

Built a distributed key value store which provides an interface to store data and efficiently search on primary key and/or multiple secondary keys unlike traditional key-value stores which provides search only on primary variables. The system guarantees strong consistency by trading off little of availability. This System works on two basic concepts of Hyperspace Hashing and Value-dependent Chaining.

2013-2014 **Behavioural understanding of Spatial Data**, *with Prof. K.S.Rajan*, IIIT Hyderabad.

Project involved developing a spatial understanding, by accumulating and analyzing big data related to students' movement in campus and outside. Aim is to derive social and behavioral patterns from the data, thus converting useless information into meaningful insights such as effects of road blockages, appropriate change in timings to control traffic in frequently used areas etc.

Computer Skills

Scientific Computing - Matlab **Programming** - C, C++, Python, Java.
Others - MySQL, Web2py, HTML **Operating Systems** - MacOS, Linux (Ubuntu), Windows.

Teaching Experience

Fall 2021 **Teaching Assistant**, CSCI 3104, "Algorithms", CU Boulder.

My responsibilities included taking recitation sessions, preparing homework problems and recitation worksheet, holding office hours and grading exams.

Spring 2014,2015 **Teaching Assistant**, CS101, "Data Structures", IIIT - Hyderabad.

My responsibilities included taking recitation sessions, assisting students in lab sessions,holding office hours, grading homeworks and exams.

Fall 2014 **Teaching Assistant**, CS102, "Algorithms", IIIT - Hyderabad.

My responsibilities included taking recitation sessions, holding office hours, grading homeworks and exams.

Languages

Telugu (Native) - Fluent, English - Fluent, Hindi - Fluent

Volunteer Work

- Volunteered for local food rescue to serve graduate students with food-insecurities.

- Volunteered for a week (40 hours) at Catalina island conservancy. Participated in conservancy activities like trail building, invasive plant removal, building enclosure etc.
- Volunteer member for resident council which worked to better graduate residents living experience
- Volunteered for a semester with a local non-profit to teach math to underprivileged kids
- Engaged in making baked goods for children in the foster system through the Cakes4kids's North Colorado chapter

Extracurricular Activities, Hobbies and miscellaneous

* Learning pottery and rock climbing
* Travel and Hiking enthusiast, done several treks in South India and three in the Himalayas.
* First in women chess and second in carroms at Progress Software.
* Wildlife photography enthusiast. Clicked 100+ birds of Indian subcontinent.

For more information visit Maneesha Papireddygari webpage at : Maneesha Webpage