

Sharmila Duppala

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EDUCATION

University of Maryland, College Park, Maryland, USA Aug 2019–Present
M.S./Ph.D. in Computer Science, Department of Computer Science

Stony Brook University, New York, USA Jul 2017–May 2019
M.S. (Thesis), Department of Computer Science

National Institute of Technology Surat, Gujarat, India Jul 2012–May 2016
B.Tech., Department of Computer Science and Engineering

PUBLICATIONS

Group Fairness in Set Packing Problems
Sharmila Duppala, Juan Luque, John P. Dickerson, Aravind Srinivasan
IJCAI 2023

Rawlsian Fairness in Online Bipartite Matching: Two-sided, Group, and Individual
Seyed Esmaeili, *Sharmila Duppala*, Vedant Nanda, John P. Dickerson, Aravind Srinivasan
AAAI 2023

Online minimum matching with uniform metric and random arrivals
^{abc} *Sharmila Duppala*, Karthik Sankararaman, Pan Xu
Operations Research Letters 2022

Fair labelled Clustering
Seyed Esmaeili, *Sharmila Duppala*, Brian Brubach, John P. Dickerson
KDD 2022

Improved MapReduce Load Balancing through Distribution-Dependent Hash Function Optimization
^{abc} Zafar Ahmad, *Sharmila Duppala*, Rezaul Chowdhury, Steven Skiena
ICPADS 2020

Data Races and the Discrete Resource-time Tradeoff Problem with Resource Reuse over Paths
Rathish Das, Shih-Yu Tsai, *Sharmila Duppala*, Jason Lynch, Ester Arkin, Rezaul Chowdhury, Joseph Mitchell, Steven Skiena
SPAA 2019

Barter Exchange with Shared Item Valuations
Juan Luque, *Sharmila Duppala*, John P. Dickerson, Aravind Srinivasan
Under submission at NeurIPS 2023

Algorithms for online matching under random order with degree-dependent competitive ratios
Sharmila Duppala, Pan Xu
In preparation

RESEARCH EXPERIENCE

Ph.D. Student, University of Maryland, College Park Aug 2019–Present
Algorithmic Fairness and Stochastic Models for Combinatorial Optimization Prof. John Dickerson
Prof. Aravind Srinivasan
Worked on formulating notions of fairness, translating them into rigorous mathematical objects, and incorporating them in classical algorithmic problems. Specifically, fairness in hypergraph matching, online matching, clustering and kidney exchange markets and the role of stochasticity in obtaining fairness, with emphasis on how the latter can ensure socially fair algorithmic solutions.

Masters Thesis , Stony Brook University Jul 2017–May 2019
Optimizing two systems employing reducers Prof. Rezaul Chowdhury
Work on approximation algorithms for the *Space-Time Trade-off Problem* that can simultaneously optimize the memory utilization and the makespan of series-parallel graphs and computational Directed Acyclic Graphs (DAGs) with applications in parallel algorithms.

KEY COURSES	<p>Graduate Level: Quantum Computing, Modern Discrete Probability, Mechanism Design for Social AI, Algorithmic Lowerbounds, Advanced Algorithms, Computational Geometry, Discrete Mathematics, Computer Vision, Operating Systems, Network Security.</p> <p>Data Science: Deep Learning Theory, Advanced Numerical Optimization, Algorithms in Machine Learning</p>
POSITIONS OF RESPONSIBILITY	<p>Graduate Teaching Assistant Jul 2017–May 2021 Served as a Discussion Leader and responsible for teaching Object Oriented Programming, Analysis of Algorithms, Computer Systems and Discrete Structures during different semesters.</p> <p>Organizer, CATS (Capital Area Theory Seminar) Aug 2021–May 2022 Responsible for co-organizing CS theory weekly seminar and hosting external speakers.</p> <p>Curriculum Designer and Instructor, Girls Talk Math Jun 2021–Aug 2021 Responsible for designing curriculum on undergraduate mathematics topics like Group Theory, Network Theory and Quantitative Finance for high school students and conducting educational camps.</p>
KEY PROJECTS	<p>Comparing the efficacy of different data-preprocessing techniques in fair classification, University of Maryland Prof. Soheil Feizi Compared the performance of recent data preprocessing techniques in fair classification (eg. Clustering) like data (reweighing techniques (RW), learning fairness representations (LFR), optimized preprocessing(OP)) under the fairness metric "statistical parity" using open source toolkit AI Fairness 360 on standard data sets available.</p> <p>Operating Systems, Stony Brook University Prof. Michael Ferdman Built a pre-emptive, multi-tasking Operating System from scratch. Implemented demand-paging, copy-on-fork and auto-growing stack functionalities. Created a compatible standard library and bash-like shell to interact with the OS.</p> <p>Computational Geometry, Stony Brook University Prof. Joseph Mitchell The alpha-fatness and chord-arc scores are different measures of the "niceness" of polygons. They may prove useful in developing quantitative measures by which electoral districts may be determined illegal. This project includes software for implementing these measures together with preliminary results on random polygons.</p> <p>Energy Consumption Prediction, Stony Brook University Prof. Zhenhua Liu Predicting an year's electricity consumption using the electricity consumption of previous year, time series data at 15min interval for 365 days. Implemented SARIMA, SVM and LSTM models using PyTorch and compared the results for 10 homes. Also enhanced the predictions using smart meter data for various appliances of the same homes.</p>
TECHNICAL SKILLS	<p>Programming Languages: C, C++, Java, Python, SQL, PL-SQL, MATLAB, Prolog, Qiskit</p> <p>Platforms/Tools: Linux, Windows, GDB, Eclipse, QEMU, Processing</p> <p>Libraries for Machine Learning: PyTorch, Numpy, Keras, TensorFlow, Jupyter Notebook</p>
ACADEMIC AWARDS	<p>Chair's Fellowship, University of Maryland, College Park</p> <p>TCS (Theoretical Computer Science) Women Scholarship STOC-2018</p> <p>ACM Travel Scholarship SPAA-2019</p> <p>TCS (Theoretical Computer Science) Women Scholarship STOC-2019</p>
REFERENCES	<p>Prof. Aravind Srinivasan, University of Maryland, College Park email: srin@cs.umd.edu</p> <p>Prof. John Dickerson, University of Maryland, College Park email: johnd@umd.edu</p> <p>Prof. Rezaul Chowdhury, Stony Brook University email: rezaul@cs.stonybrook.edu</p>