Kishen N Gowda

PhD Student in Computer Science @ University of Maryland, College Park

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Education

Aug 2021 – Present
🔖 **University of Maryland, College Park**, MD, USA
M.S./Ph.D. in Computer Science

Aug 2017 – Dec 2020
🔖 **Indian Institute of Technology, Gandhinagar**, Gujarat, India
B.Tech. in Computer Science and Engineering

Publications

In Review

1. M. H. Bateni, L. Dhulipala, **K. N. Gowda**, D. E. Hershkowitz, R. Jayaram, and J. Łącki, "Parallel and Sequential Hardness of Hierarchical Graph Clustering," Under Submission at ICALP '24.

2. L. Dhulipala, X. Dong, **K. N. Gowda**, and Y. Gu, "Optimal Parallel Algorithms for Dendrogram Computation and Single-Linkage Clustering," Under Submission at SPAA '24.

Journal Articles

1. **K. N. Gowda**, A. Lonkar, F. Panolan, V. Patel, and S. Saurabh, "Improved FPT Algorithms for Deletion to Forest-Like Structures," *Algorithmica*, 2024. 🔗 DOI: `10.1007/s00453-023-01206-z`.

Conference Proceedings

1. S. Gorantla, **K. N. Gowda**, A. Deshpande, and A. Louis, "Socially Fair Center-Based and Linear Subspace Clustering," in *Joint European Conference on Machine Learning and Knowledge Discovery in Databases (ECML PKDD)*, 2023. 🔗 DOI: `10.1007/978-3-031-43412-9_43`.

2. **K. N. Gowda**, T. Pensyl, A. Srinivasan, and K. Trinh, "Improved Bi-point Rounding Algorithms and a Golden Barrier for k-Median," in *Proceedings of the 2023 Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2022. 🔗 DOI: `10.1137/1.9781611977554.ch38`.

3. **K. N. Gowda**, A. Lonkar, F. Panolan, V. Patel, and S. Saurabh, "Improved FPT Algorithms for Deletion to Forest-Like Structures," in *31st International Symposium on Algorithms and Computation (ISAAC)*, 2020. 🔗 DOI: `10.4230/LIPIcs.ISAAC.2020.34`.

4. **K. N. Gowda**, N. Misra, and V. Patel, "A Parameterized Perspective on Attacking and Defending Elections," in *Combinatorial Algorithms: 31st International Workshop (IWOCA) Proceedings*, 2020. 🔗 DOI: `10.1007/978-3-030-48966-3_21`.

Research Experience

2022 – Present
🔖 **Research Assistant, University of Maryland, College Park**
Advisors: Prof. Laxman Dhulipala and Prof. Aravind Srinivasan
Research Interests: Efficient parallel graph algorithms, approximation and parameterized algorithms for problems in combinatorial optimization with a focus on clustering, algorithmic fairness and differential privacy.

2021
🔖 **Research Intern, Indian Institute of Science, Bangalore**
Advisors: Prof. Anand Louis and Amit Deshpande (Microsoft Research India)
Worked on designing a general framework for fair clustering with theoretical guarantees and good empirical performance. My work during this internship resulted in a publication at ECML-PKDD.

Research Experience (continued)

2020 **Research Intern, University of Bergen, Norway** (remote)
Advisor: Prof. Saket Saurabh
Designed and analyzed fast(er) randomized FPT algorithms for problems like Almost Forest Deletion, Pseudo Forest Deletion and their generalizations. My work during this internship resulted in a publication at ISAAC.

2019 **Narendra Summer Research Intern, Indian Institute of Science, Bangalore**
Advisor: Prof. Arindam Khan
Studied the 2D Strip Packing Problem and performed a fine-grain analysis of Steinberg's and Schiermeyer's algorithms to identify the worst case inputs. Applied techniques from Scheduling, Knapsack and some heuristics to improve the worst case performance.

Honors and Awards

2023 **SIAM Travel Award**, SODA 2023.

2021 **Gold Medal**, IIT Gandhinagar.
Awarded for best performance in core courses of Physics, Chemistry and Life Sciences.

2017 – 2020 **Dean's List**, IIT Gandhinagar.
Awarded for outstanding academic performance in a graded semester.

2020 **Mitacs Globalink Research Internship** (program called-off due to the pandemic)

2019 **Honorable Mention** at ACM ICPC Amritapuri and Kanpur Regionals.

2019 **Narendra Summer Research Internship**, IISc Bangalore, India.

Teaching Experience

2021 – 2023 **Graduate Teaching Assistant** for Algorithms (CMSC 351), Analysis of Algorithms (CMSC 451), Scalable Parallel Algorithms and Data Structures (CMSC 858N).

2020 **Teaching Assistant** for Data Structures and Algorithms I (ES 242)

2018 – 2020 **Tutorial Organizer and Presenter** at GRASP and METIS, IIT Gandhinagar.
Organized various workshops and tutorials on competitive programming, C++, web scraping, etc.

Skills

Coding — Python, C, C++, Mathematica, Matlab, LaTeX

Web Dev — HTML, CSS, JavaScript, Django, Flask.

Miscellaneous Experience

Invited Talks

2023 **Improved Bi-point Rounding Algorithms and a Golden Barrier for k-Median**, Algorithms and Complexity Theory Seminar, Johns Hopkins University, Baltimore, MD.

2023 **Improved Bi-point Rounding Algorithms and a Golden Barrier for k-Median**, Capital Area Theory Seminar (CATS) Series, University of Maryland, College Park, MD.

Visits

2023 **DIMACS Workshop on Modern Techniques in Graph Algorithms**, DIMACS, Rutgers University, Piscataway, NJ.

2020 **Parameterized Complexity 201**, IISER Pune, India.

Miscellaneous Experience (continued)

Professional Service

2023 – Present	**Organizer, Capital Area Theory Seminar (CATS)** Responsible for co-organizing the CS Theory weekly seminar and hosting external speakers.
2019 – 2021	**President and Co-founder, GRASP**, Competitive Programming Group at IIT Gandhinagar.
2018 – 2021	**Organizer and Problem Setter, HackRush**, intra-college hackathon, IIT Gandhinagar.
2018	**Event Organizer, Amalthea**, IIT Gandhinagar's Annual Tech Summit.
	Journal Reviewer. OPTL '24
	Reviewer. ICLR '23, ESA '21

Key Courses

Graduate Level	Advanced Algorithms, Computational Geometry, Convex Optimization, Randomized Algorithms, Quantum Information Processing.
Data Science	Advanced Numerical Optimization, Algorithms in Machine Learning: Guarantees and Analyses, Numerical Methods in Data Science and Machine Learning, Probabilistic Models.

Selected Projects

2023	**Socially-Fair Correlation Clustering** *Advisor:* Prof. Furong Huang Designed a PTAS for a natural *fair*-variant of the classic correlation clustering problem (maximizing agreements version).
2021	**Quantum Speed-ups for Dynamic Programming Algorithms: A Write-Up** *Advisor:* Prof. Daniel Gottesman Surveyed the techniques of Ambainis et al. [SODA '18] for the problem of finding Quantum Speed-ups for Dynamic Programming-based algorithms.
2020	**A Survey on Matching in the Graph-Stream Model** *Advisor:* Prof. Anirban Dasgupta Conducted a comprehensive survey and experiments on the Maximum Matching problem in the semi-streaming model.
2019	**MiniNim** *Advisor:* Prof. Bireswar Das Implemented a compiler for a concise subset of the programming language Nim in C. The compiler outputs MIPS Assembly code.
2019	**Map Reduce Framework** *Advisor:* Prof. Nipun Batra Implemented and evaluated the performance of a reliable MapReduce library in C. Utilized approximation algorithms for workload scheduling in Mappers and wrote an efficient external sort routine.
2019	**AutoCoder** *Advisor:* Prof. Mayank Singh Designed a Transformer-based model to generate LISP code given task descriptions. Achieved state-of-the-art accuracy on the standard AlgoLisp Dataset.