

Education

Duke University M.S. in Computer Science, Thesis Track	August 2024 - Present Durham, NC
University of Southern California M.S. (progressive degree) in Applied Mathematics Thesis: <i>A “Pointless” Theory of Probability</i> , advised by Andrew Bacon B.S. in Computer Science, <i>summa cum laude</i> B.S. in Mathematics, <i>summa cum laude</i> , with honors (B.M. into) Minor in Piano Performance, advised by Lucinda Carver	August 2020 - May 2024 Los Angeles, CA

Research

Kamesh Munagala, Qilin Ye, Ian Zhang. *Deliberation via Matching*. [TODO \(arXiv\)](#). *Alphabetical order*.

We study metric distortion in social choice and propose “Deliberation via Matching,” a protocol augmenting tournament rules with pairwise deliberations to achieve metric distortion 3, breaking the 3.11 deliberation-free lower bound. This proves simple tournament rules can match the welfare guarantees of general deterministic rules. Technically, we resolve the analytical intractability of deliberative objectives via a novel supermodularity-based bilinear relaxation to yield a fully closed-form proof.

Qilin Ye*, Deqing Fu*, Robin Jia, Vatsal Sharan. *When Do Transformers Learn Heuristics for Graph Connectivity?* [TODO \(arXiv\)](#). **Equal contribution*.

We characterize Transformer training dynamics for graph connectivity as a competition between a robust matrix-powering algorithm and statistical shortcuts. We establish tight capacity bounds to show that the generalization gap is a deterministic consequence of the data mixture, and prove that restricting training instances to within this theoretical capacity suppresses heuristics, effectively encouraging the model to learn the generalizable solution.

Teaching Experience

At Duke University:

Teaching assistant, CPS 390.01: Algorithmic Foundations of Data Science	Spring 2025
Teaching assistant, CPS 330: Algorithm Design	Fall 2024, Spring 2025

At University of Southern California:

(Informal) Teaching assistant, CSCI 270: Algorithms Lecture notes	Spring 2024
Teaching assistant, MATH 425a: Undergraduate Real Analysis I Lecture notes	Spring 2022

Relevant Coursework

Computer Science: {Approximation, Geometric, Randomized} Algorithms, {ML, DL, NLP} Theory

Mathematics: {Real, Complex, Functional, Numerical, Convex} Analysis, Mathematical Statistics, Algebra, {Measure, Measure-theoretic Probability, Statistical Learning} Theory, ODEs, PDEs.

Honors

Renaissance Scholar for divergent fields of study, USC	2024
Discovery Scholar for thesis distinction, USC	2024
Phi Beta Kappa, USC	2023