

## Education

### Duke University

M.S. in Computer Science

August 2024 - Present  
Durham, NC

### University of Southern California

M.S. (progressive degree) in Applied Mathematics

Thesis: *A “Pointless” Theory of Probability*, advised by Andrew Bacon

B.S. in Computer Science, *summa cum laude*

B.S. in Mathematics, *summa cum laude*, 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*.

Under review at STOC 2026 || [arXiv:2511.00986](#) || Authors listed alphabetically.

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?*

Under review at ICLR 2026 || [arXiv:2510.19753](#) || \*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:*

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, High-Dimensional Expanders, Machine Learning, Deep Learning, Natural Language Processing.

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

## Honors

Renaissance Scholar for divergent fields of study, USC

2024

Discovery Scholar for thesis distinction, USC

2024

Phi Beta Kappa, USC

2023