

## Education

### Duke University

M.S. in Computer Science

August 2024 - Present  
Durham, NC

### University of Southern California

M.S. 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](https://arxiv.org/abs/2511.00986) || Authors listed alphabetically.

*Problem:* Tournament voting rules are traditionally limited by a 3.11 metric distortion lower bound.

*Key result:* Proved that tournament rules augmented with minimal deliberative information can achieve distortion 3, matching the general deterministic optimum.

*Technique:* Resolved analytical intractability via a novel supermodularity-based bilinear relaxation.

Qilin Ye\*, Deqing Fu\*, Robin Jia, Vatsal Sharan. *When Do Transformers Learn Heuristics for Graph Connectivity?*

Under review at ICLR 2026 || [arXiv:2510.19753](https://arxiv.org/abs/2510.19753) || \*Equal contribution.

*Problem:* Transformers prioritize heuristic shortcuts over robust algorithmic reasoning on graph connectivity.

*Key result:* Proved that training dynamics is determined by the training distribution, and that restricting training data to within the model’s theoretical capacity encourages robust algorithmic reasoning.

*Technique:* Established capacity bounds via computation-DAG backtracking and analyzed gradient dynamics using permutation-equivariant algebra.

## 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