Kiril Bangachev

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EDUCATION

MIT, Cambridge, MA September 2024-
PhD Candidate in Electrical Engineering and Computer Science, advised by Guy Bresler.

MIT, Cambridge, MA September 2022 – September 2024
Master of Science in Electrical Engineering and Computer Science, advised by Guy Bresler.
Thesis title: "Statistical and Computational Limits for Detection of High-Dimensional Latent Space Structure in Random Networks"

Princeton University, Princeton, NJ September 2018-May 2022
Bachelor of Arts, Mathematics, advised by Matt Weinberg for junior and senior independent work.
Thesis title: "Exploring the Space Between Subadditive and Fractionally Subadditive Valuations"

REASEARCH PAPERS

Conference Publications

1. "Global Minimizers of Sigmoid Contrastive Loss" K. Bangachev, G. Bresler, I. Noman, Y. Polyanskiy, NeurIPS 2025.
2. "Exploring the Space Between Subadditive and Fractionally Subadditive Valuations" K. Bangachev, S. M. Weinberg, ICALP 2025.
3. "Near-Optimal Time-Sparsity Trade-Offs for Solving Noisy Linear Equations" K. Bangachev, G. Bresler, S. Tiegel, V, Vaikuntanathan. STOC 2025.
4. "Sandwiching Random Geometric Graphs and Erdos-Renyi with Applications: Sharp Thresholds, Robust Testing, and Enumeration" K. Bangachev, G. Bresler. STOC 2025.
5. "On the Fourier Coefficients of High-Dimensional Random Geometric Graphs" K. Bangachev, G. Bresler. STOC 2024.
6. "Detection of $\boldsymbol{L}_\infty$ Geometry in Random Geometric Graphs: Suboptimality of Triangles and Cluster Expansion", K. Bangachev, G. Bresler. COLT 2024.

Journal Publications

7. "Random Algebraic Graphs and Their Convergence to Erdos-Renyi" K. Bangachev, G. Bresler. Random Structures and Algorithms, Volume 66, Issue 1 (2025).
8. "Enumerative and Structural Aspects of Anagrams Without Fixed Letters" K. Bangachev, ECA 3:2 (2023) Article #S2R9.
9. "On the Asymmetric Generalizations of Two Extremal Questions on Friends-And-Strangers Graphs" K. Bangachev, European J. Combin., 104 (2022).

In Submission

10. "Graph Quasirandomness for Hypothesis Testing of Stochastic Block Models." K. Bangachev, G. Bresler. https://arxiv.org/abs/2504.17202

INTERNSHIP AND OTHER WORK EXPERIENCE

Quantitative Research Intern at Citadel, EQR group, New York City, New York June 2025-August 2025
Worked on fast convex approximation algorithms in the context of large-scale portfolio optimization.

Summer Undergraduate Researcher at Duluth REU, University of Minnesota, Duluth June 2021- July 2021
Worked on graph problems in extremal combinatorics.

Machine Learning Intern at QuantCo June 2020 – August 2020
Worked on methods for unbiased estimation of treatment effects and combining several statistical estimates.

Summer Undergraduate Researcher at the Big Data Summer Institute at University of Michigan June 2019- July 2020
Worked on data-science problems related to personalized medicine.

TEACHING

Teaching Fellow for "Discrete Probability and Stochastic Processes" at MIT Spring 2024
Hosted office hours, mentored students for the final project, created and graded problem sets and exams.

Course Grader for "Economics and Computing" at Princeton University Spring 2021 and Spring 2022
Graded exams and problem sets.

SELECTED HONORS AND AWARDS

Carlton E. Tucker Teaching Award 2024
Awarded for excellence in departmental teaching at MIT EECS.

Siebel Scholarship 2024

George B. Covington Prize in Mathematics 2022
Awarded for excellence in mathematics at Princeton University.

Andrew H. Brown Prize 2021
Awarded to the outstanding juniors in mathematics at Princeton University.

The Class of 1861 Prize 2020
Awarded to the sophomore at Princeton University with the best record on the Putnam Examination.

Freshman First Honor Prize 2019
Awarded to the sophomore at Princeton University who achieved highest in the freshman year.

Shapiro Prize for Academic Excellence 2019 and 2020
Awarded for outstanding academic achievement by Princeton students in their first or second years.

International Mathematical Olympiad Silver Medal 2017 and 2018