

Youngtak Sohn

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EMPLOYMENT

Assistant Professor, Division of Applied Mathematics
Brown University 2024-present

Postdoctoral Associate, Department of Mathematics
Massachusetts Institute of Technology (MIT) 2022-2024
Postdoctoral mentors: Elchanan Mossel and Nike Sun

EDUCATION

Ph.D. in Statistics Dec 2021
Stanford University (Advisor: Amir Dembo)
Thesis: Random constraint satisfaction problems and high-dimensional estimation

B.Sc. in Mathematics Mar 2016
Seoul National University (summa cum laude)

PUBLICATIONS AND PREPRINTS

Published or Accepted Papers:

- (J1) Andrea Montanari, Feng Ruan, Youngtak Sohn and Jun Yan,
“The generalization error of max-margin linear classifiers: Benign overfitting and high dimensional asymptotics in the overparametrized regime”,
Annals of Statistics, to appear.
- (J2) Allan Sly and Youngtak Sohn,
“Local geometry of NAE-SAT solutions in the condensation regime”,
Probability Theory and Related Fields, to appear.
- (J3) Elchanan Mossel, Jonathan Niles-Weed, Youngtak Sohn, Nike Sun and Ilias Zadik,
“Sharp thresholds in inference of planted subgraphs”,
Annals of Applied Probability, to appear.
- (J4) Elchanan Mossel, Allan Sly and Youngtak Sohn,
“Exact Phase Transitions for Stochastic Block Models and Reconstruction on Trees”,
Annals of Probability, to appear
- (J5) Erik Bates and Youngtak Sohn,
“Parisi formula for balanced Potts spin glass”,
Communications in Mathematical Physics 405 (2024), no. 228, 68 pp.

- (J6) Danny Nam, Allan Sly and Youngtak Sohn,
“One-step replica symmetry breaking of random regular NAE-SAT II”,
Communications in Mathematical Physics 405 (2024), no.61, 61 pp.
- (J7) Erik Bates and Youngtak Sohn,
“Crisanti-Sommers formula and simultaneous symmetry breaking in multi-species spherical spin glasses”,
Communications in Mathematical Physics 394 (2022), no. 3, pp. 1101-1152.
- (J8) Erik Bates and Youngtak Sohn,
“Free energy in multi-species mixed p-spin spherical models”,
Electronic Journal of Probability 27 (2022), no. 52, pp. 1-75.
- (J9) Erik Bates, Leila Sloman and Youngtak Sohn,
“Replica symmetry breaking in multi-species Sherrington–Kirkpatrick model”,
Journal of Statistical Physics 174 (2019), no. 2, pp. 333–350.

Conference Proceedings:

- (C1) Evan Chang, Neel Kolhe and Youngtak Sohn,
“Upper bounds on the 2-colorability threshold of random d -regular k -uniform hypergraphs for $k \geq 3$ ”,
Proceedings of APPROX/RANDOM 2024.
- (C2) Allan Sly and Youngtak Sohn,
“Local geometry of NAE-SAT solutions in the condensation regime”,
Proceedings of the 56th STOC (2024), pp. 1083-1093.
Conference version of (J2)
- (C3) Elchanan Mossel, Jonathan Niles-Weed, Youngtak Sohn, Nike Sun and Ilias Zadik,
“Sharp thresholds in inference of planted subgraphs”,
Proceedings of the 36th COLT (2023), pp. 5573-5577.
Conference version of (J3).
- (C4) Elchanan Mossel, Allan Sly and Youngtak Sohn,
“Exact Phase Transitions for Stochastic Block Models and Reconstruction on Trees”,
Proceedings of the 55th STOC (2023), pp. 96-102.
Conference version of (J4).
- (C5) Danny Nam, Allan Sly and Youngtak Sohn,
“One-step replica symmetry breaking of random regular NAE-SAT”,
Proceedings of 62nd FOCS (2021), pp. 310-318.
Conference version of (J6).

Preprints:

- (P1) Elchanan Mossel, Allan Sly and Youngtak Sohn,
“Weak recovery, hypothesis testing, and mutual information in stochastic block models and planted factor graphs”,
Preprint available at <https://arxiv.org/abs/2406.15957>.
- (P2) Andrea Montanari, Feng Ruan, Basil Saeed and Youngtak Sohn,
“Universality of max-margin classifiers”,
Preprint available at <https://arxiv.org/abs/2310.00176>.
- (P3) Yash Deshpande, Elchanan Mossel and Youngtak Sohn,
“Agreement and Statistical Efficiency in Bayesian Perception Models”,
Preprint available at <https://arxiv.org/abs/2205.11561>.
- (P4) Danny Nam, Allan Sly and Youngtak Sohn,
“One-step replica symmetry breaking of random regular NAE-SAT I”,
Preprint available at <https://arxiv.org/abs/2011.14270v2>.

INVITED TALKS

1) KIAS HCMC Colloquium	Dec 2024
2) AIMS workshop on Low-degree polynomial methods in average-case complexity	Dec 2024
3) KAIST SAARC Seminar	Oct 2024
4) Lehigh University & University of Minnesota joint Probability Seminar	Mar 2024
5) Probability Workshop in Korea	Jan 2024
6) Brown Probability Seminar	Dec 2023
7) Duke University Workshop in Operations Research and Data Science	Nov 2023
8) Harvard Probability Seminar	Nov 2023
9) Joint Statistical Meetings (JSM), Statistical learning theory session	Aug 2023
10) UT Austin, Graduate Mini-School in Groups, Dynamics, and Probability	May 2023
11) Seoul National University Probability and Machine Learning Seminar	Aug 2022
12) Harvard Statistics Seminar	April 2022
13) University of Illinois Chicago Combinatorics and Probability Seminar	April 2022
14) Seoul National University Statistics Seminar	October 2021
15) MIT Probability Seminar	May 2021
16) KAIST Probability Seminar	December 2020
17) Deep Learning (MoDL) Workshop	December 2020
18) Stanford Probability Seminar	October 2020
19) Korea Institute for Advanced Study(KIAS) Analysis/Probability Seminar	August 2020
20) Korea Institute for Advanced Study(KIAS) Analysis/Probability Seminar	December 2019

TEACHING EXPERIENCE

Instructor. Brown University

Theory of Probability II (Graduate course)	Spring 2025
Seminar in Theoretical Computer Science (at MIT, Topic: Statistical learning theory)	Fall 2023

Teaching Assistant. Stanford University.

MATH 21, Calculus	Summer 2021
STATS 219, Stochastic Processes	Winter 2021
STATS 310A, Theory of Probability I	Fall 2020
STATS 315B, Modern Applied Statistics: Data Mining	Spring 2020
STATS 203, Introduction to Regression Models and Analysis of Variance	Winter 2020, Summer 2017
STATS 110 Statistical Methods in Engineering and the Physical Sciences	Summer 2019
STATS 218, Introduction to Stochastic Processes II	Spring 2021, 2019, 2017
STATS 217, Introduction to Stochastic Processes I	Winter 2019, Summer 2018
STATS 300B, Theory of Statistics II	Winter 2018
STATS 305A, Introduction to Statistical Modeling	Autumn 2017
STATS 200, Introduction to Statistical Inference	Winter 2017

RESEARCH MENTORSHIP

MIT PRIMES program 2023
Students: Evan Chang and Neel Kolhe
Title: "Upper bounds on the 2-colorability threshold of random d -regular k -uniform hypergraphs for $k \geq 3$ "

AWARDS AND HONORS

Probability Dissertation Award, Department of Statistics, Stanford University 2021
Graduate Study Fellowship, Korean Foundation for Advances Studies 2016-2021
Presidential Science Scholarship 2010-2016

ORGANIZATIONAL ACTIVITIES

Deep Learning Theory Summer School and Workshop, Simons institute Jul-Aug 2022

WORK EXPERIENCE

Korean Augmentation to the United States Army (Mandatory), Sergeant 2012-2014

REFERENCES

Dr. Amir Dembo
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Department of Statistics and
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Massachusetts Institute of Technology.
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Dr. Allan Sly
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Princeton University.
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Dr. Nike Sun
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