

## Youngtak Sohn

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### EMPLOYMENT

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

### EDUCATION

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

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

### PUBLICATIONS AND PREPRINTS

#### Journal papers:

- (J1) Danny Nam, Allan Sly and Youngtak Sohn,  
“One-step replica symmetry breaking of random regular NAE-SAT II”,  
*Communications in Mathematical Physics* (2023+), to appear.
- (J2) 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.
- (J3) 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.
- (J4) 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) 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.
- (C2) 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.

- (C3) 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 (J1).

### Revision requested:

- (R1) Danny Nam, Allan Sly and Youngtak Sohn,  
“One-step replica symmetry breaking of random regular NAE-SAT I”,  
*Forum of Mathematics, Pi*, Major revision requested.  
Preprint available at <https://arxiv.org/abs/2011.14270v2>.
- (R2) 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*, Major revision requested.  
Preprint available at <https://arxiv.org/abs/1911.01544v3>.

### Preprints:

- (P1) Erik Bates and Youngtak Sohn,  
“Parisi formula for balanced Potts spin glass”,  
Submitted to *Annals of Probability*,  
Preprint available at <https://arxiv.org/abs/2310.06745>.
- (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) Evan Chang, Neel Kolhe and Youngtak Sohn,  
“Upper bounds on the 2-colorability threshold of random  $d$ -regular  $k$ -uniform hypergraphs for  $k \geq 3$ ”,  
Submitted to *Random Structures and Algorithms*,  
Preprint available at <https://arxiv.org/abs/2308.02075>.
- (P4) Allan Sly and Youngtak Sohn,  
“Local geometry of NAE-SAT solutions in the condensation regime”,  
Submitted to *Probability Theory and Related Fields*,  
Preprint available at <https://arxiv.org/abs/2305.17334>.
- (P5) Elchanan Mossel, Jonathan Niles-Weed, Youngtak Sohn, Nike Sun and Ilias Zadik,  
“Sharp thresholds in inference of planted subgraphs”,  
Submitted to *Annals of Applied Probability*,  
Full version of (C1) available at <https://arxiv.org/abs/2302.14830>.
- (P6) Elchanan Mossel, Allan Sly and Youngtak Sohn,  
“Exact Phase Transitions for Stochastic Block Models and Reconstruction on Trees”,  
Submitted to *Annals of Probability*,  
Full version of (C2) available at <https://arxiv.org/abs/2212.03362>.
- (P7) Yash Deshpande, Elchanan Mossel and Youngtak Sohn,  
“Agreement and Statistical Efficiency in Bayesian Perception Models”,  
Preprint available at <https://arxiv.org/abs/2205.11561>.

## INVITED TALKS

1) Brown Probability Seminar	Dec 2023
2) University of Wisconsin-Madison Probability Seminar	Nov 2023
3) Duke University Workshop in Operations Research and Data Science	Nov 2023
4) Harvard Probability Seminar	Nov 2023
5) Joint Statistical Meetings (JSM), Statistical learning theory session	Aug 2023
6) UT Austin, Graduate Mini-School in Groups, Dynamics, and Probability	May 2023
7) Seoul National University Probability and Machine Learning Seminar	Aug 2022
8) Harvard Statistics Seminar	Apr 2022
9) University of Illinois Chicago Combinatorics and Probability Seminar	Apr 2022
10) Seoul National University Statistics Seminar	Oct 2021
11) MIT Probability Seminar	May 2021
12) KAIST Probability Seminar	Dec 2020
13) Deep Learning (MoDL) Workshop	Dec 2020
14) Stanford Probability Seminar	Oct 2020
15) Korea Institute for Advanced Study(KIAS) Analysis/Probability Seminar	Aug 2020
16) Korea Institute for Advanced Study(KIAS) Analysis/Probability Seminar	Dec 2019

## TEACHING EXPERIENCE

**Instructor.** Massachusetts Institute of Technology. Fall 2023  
Seminar in Theoretical Computer Science (Topic: Statistical learning theory)

**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
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## WORK EXPERIENCE

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

Dr. Amir Dembo  
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Department of Statistics and  
Department of Mathematics,  
Stanford University.  
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Dr. Andrea Montanari  
Professor,  
Department of Statistics and  
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Stanford University.  
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Dr. Elchanan Mossel  
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Department of Mathematics,  
Massachusetts Institute of Technology.  
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Dr. Allan Sly  
Professor,  
Department of Mathematics,  
Princeton University.  
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Dr. Nike Sun  
Associate Professor,  
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