

Weiming Feng

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🌐 <https://fwm94.github.io/>

Work Experience

Junior Fellow

Institute for Theoretical Studies, ETH Zürich

Jan 2024 - now

Simons–Berkeley Research Fellow

Simons Institute for the Theory of Computing, UC Berkeley

Aug 2023 - Dec 2023

Research Associate

School of Informatics, University of Edinburgh

Oct 2021 - Sep 2023

Education

Ph.D. in Computer Science

Field: Theoretical Computer Science

Advisor: Professor Yitong Yin

Nanjing University

Sep 2016 - June 2021

B.Eng. in Network Engineering

University of Electronic Science and Technology of China

Sep 2012 - June 2016

Research Interests

Theoretical Computer Science:

- sampling & counting algorithms;
- discrete probability.

Honors

CCF Outstanding Doctoral Dissertation Award (2021)

National Scholarship (2019)

Microsoft Research Asia Fellowship (2018)

Gold Medals in ACM-ICPC Asia Regional Contests (2014-2015)

China Computer Federation

MOE of PRC

MSRA

ACM

Publications

Publications

1. Weiming Feng, Ce Jin.
Approximately counting knapsack solutions in subquadratic time.
In **SODA** 2025 (to appear).
2. Charlie Carlson, Xiaoyu Chen, Weiming Feng, Eric Vigoda.
Optimal mixing for randomly sampling edge colorings on trees down to the max degree.
In **SODA** 2025 (to appear).
3. Weiming Feng, Heng Guo.
An FPRAS for two terminal reliability in directed acyclic graphs.
In **ICALP** 2024: 62:1-62:19.

4. Konrad Anand, Weiming Feng, Graham Freifeld, Heng Guo, Jiaheng Wang.
Approximate counting for spin systems in sub-quadratic time.
In **ICALP** 2024: 11:1-11:20.
5. Weiming Feng, Tianren Liu, Liqiang Liu.
On deterministically approximating total variation distance.
In **SODA** 2024: 1766-1791.
6. Weiming Feng, Heng Guo, Chunyang Wang, Jiaheng Wang, Yitong Yin.
Towards derandomising Markov chain Monte Carlo.
In **FOCS** 2023: 1963-1990.
7. Weiming Feng, Jiaheng Wang, Heng Guo.
Swendsen-Wang dynamics for the ferromagnetic Ising model with external fields.
Information and Computation 294: 105066 (2023).
8. Charilaos Efthymiou, Weiming Feng.
On the mixing time of Glauber dynamics for the hard-core and related models on $G(n, d/n)$
In **ICALP** 2023: 54:1-54:17.
9. Weiming Feng, Heng Guo, Mark Jerrum, Jiaheng Wang.
A simple polynomial-time approximation algorithm for the total variation distance between product two distributions.
TheoretiCS Volume 2 (2023), Article 8, 1-7.
Conference version in **SOSA** 2023: 343-347.
10. Xiaoyu Chen, Weiming Feng, Yitong Yin, Xinyuan Zhang.
Optimal mixing for two-state anti-ferromagnetic spin systems.
In **FOCS** 2022: 588-599.
11. Weiming Feng, Heng Guo, Jiaheng Wang.
Improved bounds for randomly colouring simple hypergraphs.
In **RANDOM** 2022: volume 245 of LIPIcs, pages 25:1–25:17.
12. Weiming Feng, Heng Guo, Yitong Yin and Chihao Zhang.
Rapid mixing from spectral independence beyond the Boolean domain.
ACM Transactions on Algorithms 18(3): 28:1-28:32 (2022).
Conference version in **SODA** 2021: 1558-1577.
13. Weiming Feng, Heng Guo and Yitong Yin.
Perfect sampling from spatial mixing.
Random Structures & Algorithms 61(4): 678-709 (2022).
14. Xiaoyu Chen, Weiming Feng, Yitong Yin, Xinyuan Zhang.
Rapid mixing of Glauber dynamics via spectral independence for all degrees.
In **FOCS** 2021: 137-148.
15. Weiming Feng, Heng Guo, Yitong Yin and Chihao Zhang.
Fast sampling and counting k -SAT solutions in the local lemma regime.
Journal of the ACM 68 (6), 1-42, 2021.
Conference version in **STOC** 2020: 854-867.
16. Weiming Feng, Nisheeth K. Vishnoi and Yitong Yin.
Dynamic sampling from graphical models.
SIAM Journal on Computing, 50(2), 350–381. 2021.
In **STOC** 2019: 1070-1081.

17. Weiming Feng, Kun He and Yitong Yin.
Sampling constraint satisfaction solutions in the local lemma regime.
In **STOC** 2021: 1565-1578.
18. Weiming Feng, Thomas P. Hayes and Yitong Yin.
Distributed Metropolis sampler with optimal parallelism.
In **SODA** 2021: 2121-2140.
19. Weiming Feng, Kun He, Xiaoming Sun and Yitong Yin.
Dynamic inference in probabilistic graphical models.
In **ITCS** 2021: 25:1-25:20.
20. Weiming Feng, Yuxin Sun and Yitong Yin.
What can be sampled locally?
Distributed Computing, 33, 227–253. 2020.
Conference version in **PODC** 2017: 121-130.
21. Weiming Feng and Yitong Yin.
On local distributed sampling and counting.
In **PODC** 2018: 189-198.

PREPRINTS

22. Xiaoyu Chen, Weiming Feng.
Rapid mixing via coupling independence for spin systems with unbounded degree.
CoRR abs/2407.04672 (2024).
23. Konrad Anand, Weiming Feng, Graham Freifeld, Heng Guo, Mark Jerrum, Jiaheng Wang.
Rapid mixing of the flip chain over non-crossing spanning trees.
CoRR abs/2409.07892 (2024).
24. Xiaoyu Chen, Weiming Feng, Heng Guo, Xinyuan Zhang, Zongrui Zou.
Deterministic counting from coupling independence.
CoRR abs/2410.23225 (2024).

Talks and Posters

An FPRAS for two terminal reliability in directed acyclic graphs.

Summer School on Algorithms, Dynamics, and Information Flow in Networks, Möhnesee, Germany, 2024
ICALP, Tallinn, Estonia, 2024

On deterministically approximating total variation distance.

SODA, Washington D.C., US, 2024

Sampling and approximately counting CNF formula solutions in the local lemma regime

Meet the Fellows Workshop, Simons Institute, Berkeley, California, US, 2023

Approximating the TV distance between two product distributions

MCMC 2.0 Workshop, NII Shonan Meeting, Shonan, Japan, 2023

On the mixing time of Glauber dynamics for the hard-core and related models on $G(n, d/n)$

ICALP 2023, Paderborn, Germany 2023

Sampling and counting hypergraph colourings

FODSI Workshop, Massachusetts Institute of Technology, Boston, Massachusetts, US, 2023

Perfect sampling from spatial mixing

Online Talk, Probability, Information Theory and Computing Workshop, TU Dortmund, Germany, 2023

Towards derandomising Markov chain Monte Carlo

Seminar Talk, University of Science and Technology of China, Hefei, China, 2023

A simple polynomial-time approximation algorithm for the total variation distance between two product distributions

CFCS Youth Forum, Peking University, Beijing, China, 2023

Swiss Winter School on Theoretical Computer Science, Zinal, Switzerland, 2023

A Markov chain approach to the sampling Lovász local lemma.

BARC Talk, University of Copenhagen, Copenhagen, Denmark, 2023

DIMAP Seminar, University of Warwick, Coventry, UK, 2022

Optimal mixing for two-state anti-ferromagnetic spin systems.

FOCS, Denver, Colorado, US, 2022

Field dynamics: a new tool to boost mixing results.

UCSB Summer School, UC Santa Barbara, Santa Barbara, California, US, 2022

Algorithms and Complexity Theory Seminar, University of Oxford, Oxford, UK, 2022

Rapid mixing of Glauber dynamics via spectral independence for all degrees.

HALG, London School of Economics and Political Science, London, UK, 2022

FOCS, online, 2022

IFCS Lab Lunch, University of Edinburgh, Edinburgh, UK, 2022

Chengdu Algorithm & Logic Seminar, University of Electronic Science and Technology of China, Chengdu, China, 2021

Rapid mixing from spectral independence beyond the Boolean domain.

SODA, online, 2021

Distributed Metropolis sampler with optimal parallelism.

SODA, online, 2021

Fast sampling and counting k -SAT solutions in the local lemma regime.

SIGMA Seminar, Institute of Computing Technology, Chinese Academy of Sciences, online, 2020

STOC, online, 2020

IJTCS, online, 2020

Dynamic sampling from graphical models

Nanjing Theory Day, Nanjing University, Nanjing, China, 2019

STOC, Phoenix, Arizona, US, 2019

NCTCS, Lanzhou University, Lanzhou, China, 2019

Microsoft PhD Summit, Microsoft Research Redmond, Redmond, Washington, US, 2019

Local distributed sampling

Microsoft Research Asia, Beijing, China, 2018

Service

Program Committee for RANDOM 2024.

External reviewer for STOC (2021, 2022, 2023, 2024); SODA (2022, 2024), RANDOM (2022, 2023), ISAAC (2023), JACM, SICOMP, IPL.

Organizer (with Xiaoming Sun, Jialin Zhang and Zhijie Zhang) of CCF TCS PhD Forum 2020.