

# Weiming Feng

Last Update: July 2025

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🌐 <https://fwm94.github.io/>

## Work Experience

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### Assistant Professor

Feb 2025 - Now

School of Computing and Data Science, The University of Hong Kong.

### Junior Fellow

Jan 2024 - Jan 2025

Institute for Theoretical Studies, ETH Zürich

### Simons–Berkeley Research Fellow

Aug 2023 - Dec 2023

Simons Institute for the Theory of Computing, UC Berkeley

### Research Associate

Oct 2021 - Sep 2023

School of Informatics, The University of Edinburgh

## Education

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### Ph.D. in Computer Science

Sep 2016 - June 2021

Field: Theoretical Computer Science

Advisor: Professor Yitong Yin

Nanjing University

### B.Eng. in Network Engineering

Sep 2012 - June 2016

University of Electronic Science and Technology of China

## Research Interests

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Theoretical Computer Science:

- sampling and counting algorithms;
- discrete probability;
- learning theory.

## Honors

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CCF Outstanding Doctoral Dissertation Award (2021)

China Computer Federation

National Scholarship (2019)

MOE of PRC

Microsoft Research Asia Fellowship (2018)

MSRA

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

ACM

## External Grants

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Sampling and Approximate Counting for Undirected Graphical Models via Influence Bounds

HK\$ 792,146

Early Career Scheme, Research Grants Council of Hong Kong, 2025–2028.

Project number: 27202725.

## Advisees

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- Minji Yang (Ph.D. Student, 2024 – )
- Xiongxin Yang (Research Assistant, May 2025 - July 2025)
- Yixiao Yu (Research Assistant, May 2025 - July 2025)
- Yucheng Fu (Student Research Assistant, July 2025 - August 2025)

## Publications

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1. Xiaoyu Chen, Weiming Feng, Zhe Ju, Tianshun Mao, Yitong Yin, Xinyuan Zhang.  
Faster mixing of the Jerrum-Sinclair chain.  
In **FOCS** 2025 (to appear).
2. Xiaoyu Chen, Weiming Feng, Heng Guo, Xinyuan Zhang, Zongrui Zou.  
Deterministic counting from coupling independence.  
In **FOCS** 2025 (to appear).
3. Xiaoyu Chen, Weiming Feng.  
Rapid mixing via coupling independence for spin systems with unbounded degree.  
In **RANDOM** 2025 (to appear).
4. Weiming Feng, Hongyang Liu, Minji Yang.  
Approximating the total variation distance between spin systems.  
In **COLT** 2025 (to appear).
5. Konrad Anand, Weiming Feng, Graham Freifeld, Heng Guo, Mark Jerrum, Jiaheng Wang.  
Rapid mixing of the flip chain over non-crossing spanning trees.  
In **SoCG** 2025 (to appear).
6. Arnab Bhattacharyya, Weiming Feng, Piyush Srivastava.  
Approximating the total variation distance between Gaussians.  
In **AISTATS** 2025 (to appear).
7. Weiming Feng, Ce Jin.  
Approximately counting knapsack solutions in subquadratic time.  
In **SODA** 2025: 1094-1135.
8. 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: 5418-5433.
9. Konrad Anand, Weiming Feng, Graham Freifeld, Heng Guo, Jiaheng Wang.  
Approximate counting for spin systems in sub-quadratic time.  
**TheoretCS**, Volume 4 (2025), Article 3, 1-27  
Conference version in **ICALP** 2024: 11:1-11:20.
10. Weiming Feng, Heng Guo.  
An FPRAS for two terminal reliability in directed acyclic graphs.  
In **ICALP** 2024: 62:1-62:19.
11. Weiming Feng, Tianren Liu, Liqiang Liu.  
On deterministically approximating total variation distance.  
In **SODA** 2024: 1766-1791.

12. Weiming Feng, Heng Guo, Chunyang Wang, Jiaheng Wang, Yitong Yin.  
Towards derandomising Markov chain Monte Carlo.  
**SIAM Journal on Computing** 54(3), 775–813, 2025.  
In **FOCS** 2023: 1963-1990.
13. Weiming Feng, Jiaheng Wang, Heng Guo.  
Swendsen-Wang dynamics for the ferromagnetic Ising model with external fields.  
**Information and Computation** 294: 105066 (2023).
14. 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.
15. Weiming Feng, Heng Guo, Mark Jerrum, Jiaheng Wang.  
A simple polynomial-time approximation algorithm for the total variation distance between product two distributions.  
**TheoretCS** Volume 2 (2023), Article 8, 1-7.  
Conference version in **SOSA** 2023: 343-347.
16. Xiaoyu Chen, Weiming Feng, Yitong Yin, Xinyuan Zhang.  
Optimal mixing for two-state anti-ferromagnetic spin systems.  
In **FOCS** 2022: 588-599.
17. 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.
18. 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.
19. Weiming Feng, Heng Guo and Yitong Yin.  
Perfect sampling from spatial mixing.  
**Random Structures & Algorithms** 61(4): 678-709 (2022).
20. Xiaoyu Chen, Weiming Feng, Yitong Yin, Xinyuan Zhang.  
Rapid mixing of Glauber dynamics via spectral independence for all degrees.  
**SIAM Journal on Computing** special section FOCS 2021.  
Conference version in **FOCS** 2021: 137-148.
21. 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.
22. 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.
23. Weiming Feng, Kun He and Yitong Yin.  
Sampling constraint satisfaction solutions in the local lemma regime.  
In **STOC** 2021: 1565-1578.

24. Weiming Feng, Thomas P. Hayes and Yitong Yin.  
Distributed Metropolis sampler with optimal parallelism.  
In **SODA** 2021: 2121-2140.
25. Weiming Feng, Kun He, Xiaoming Sun and Yitong Yin.  
Dynamic inference in probabilistic graphical models.  
In **ITCS** 2021: 25:1-25:20.
26. 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.
27. Weiming Feng and Yitong Yin.  
On local distributed sampling and counting.  
In **PODC** 2018: 189-198.

## PREPRINTS

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28. Weiming Feng, Minji Yang.  
Rapid mixing of Glauber dynamics for monotone systems via entropic independence  
CoRR abs/2507.11031 (2025).

## Talks and Posters

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### Faster mixing of the Jerrum-Sinclair chain

Conference on Mixing Times between Probability, Computer Science and Statistical Physics, ICTP, Trieste, Italy, 2025

### Mini-Course: Mixing time analysis for MCMC algorithms

University of Science and Technology of China, Hefei, China, 2025

### 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  
Probabilistic Circuits and Logic Workshop, Simons Institute, Berkeley, California, US, 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

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Program Committee for RANDOM 2024.

External reviewer for STOC (2021, 2022, 2023, 2024), SODA (2022, 2024), RANDOM (2022, 2023, 2025), ISAAC (2023), JACM (2024), SICOMP (2022), IPL (2025).

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