

# Weiming Feng

SCHOOL OF INFORMATICS  
UNIVERSITY OF EDINBURGH

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🏠 <https://fwm94.github.io/>

## CURRENT POSITIONS

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**Research Associate** in School of Informatics (2021 – now)

UNIVERSITY OF EDINBURGH

## EDUCATION

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**Ph.D.** in Computer Science (2016 – 2021)

NANJING UNIVERSITY

Field: Theoretical Computer Science

Advisor: Professor Yitong Yin

**B.Eng.** in Network Engineering (2012 – 2016)

UNIVERSITY OF ELECTRONIC SCIENCE AND TECHNOLOGY OF CHINA

## RESEARCH INTERESTS

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Theoretical Computer Science:

- sampling & counting algorithms;
- discrete probability.

## HONORS

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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

## PUBLICATIONS

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### PUBLICATIONS

1. Weiming Feng, Heng Guo, Chunyang Wang, Jiaheng Wang, Yitong Yin.  
Towards derandomising Markov chain Monte Carlo.  
In **FOCS** 2023 (to appear).
2. Weiming Feng, Jiaheng Wang, Heng Guo.  
Swendsen-Wang dynamics for the ferromagnetic Ising model with external fields.  
**Information and Computation** 2023 (accepted).
3. 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 (to appear).
4. 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.

5. Xiaoyu Chen, Weiming Feng, Yitong Yin, Xinyuan Zhang.  
Optimal mixing for two-state anti-ferromagnetic spin systems.  
In **FOCS** 2022: 588-599.
6. 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.
7. 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.
8. Weiming Feng, Heng Guo and Yitong Yin.  
Perfect sampling from spatial mixing.  
**Random Structures & Algorithms** 61(4): 678-709 (2022).
9. Xiaoyu Chen, Weiming Feng, Yitong Yin, Xinyuan Zhang.  
Rapid mixing of Glauber dynamics via spectral independence for all degrees.  
In **FOCS** 2021: 137-148.
10. 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.
11. 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.
12. Weiming Feng, Kun He and Yitong Yin.  
Sampling constraint satisfaction solutions in the local lemma regime.  
In **STOC** 2021: 1565-1578.
13. Weiming Feng, Thomas P. Hayes and Yitong Yin.  
Distributed Metropolis sampler with optimal parallelism.  
In **SODA** 2021: 2121-2140.
14. Weiming Feng, Kun He, Xiaoming Sun and Yitong Yin.  
Dynamic inference in probabilistic graphical models.  
In **ITCS** 2021: 25:1-25:20.
15. 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.
16. Weiming Feng and Yitong Yin.  
On local distributed sampling and counting.  
In **PODC** 2018: 189-198.

## PREPRINTS

1. Konrad Anand, Weiming Feng, Graham Freifeld, Heng Guo, Jiaheng Wang  
Approximate counting for spin systems in sub-quadratic time.  
CoRR abs/2306.14867 (2023).

TALKS AND POSTERS

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## 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

## TEACHING ASSISTANTSHIPS

Advanced Algorithms (Fall 2019)

NANJING UNIVERSITY

Instructor: Yitong Yin

Advanced Algorithms (Fall 2018)

NANJING UNIVERSITY

Instructor: Yitong Yin

## RESEARCH VISITS

University of Warwick, Coventry, UK

NOV. 2022

Visiting scholar, hosted by Charilaos Efthymiou

Carnegie Mellon University, Pittsburgh, US

NOV. 2022

Visiting scholar, hosted by Prasad Tetali

Queen Mary, University of London, London, UK

JUNE 2022

Visiting scholar, hosted by Mark Jerrum

University of Edinburgh, Edinburgh, UK

SEPT. 2019 -- DEC. 2019

Visiting student, advised by Heng Guo

Shanghai Jiao Tong University, Shanghai, China

SEPT. 2018 -- JAN. 2019

Visiting student, advised by Chihao Zhang

## SERVICE

External reviewer for: STOC 2021, STOC 2022, STOC 2023, SODA 2022, RANDOM 2023, RANDOM 2022, SICOMP, IPL.

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