Jiaheng Wang

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Employment

- Postdoctoral researcher — University of Regensburg, 2024 -
- Postdoctoral researcher — University of Edinburgh, 2023 - 2024

Education

- Ph.D. — University of Edinburgh, 2020 - 2023
  Thesis: *Algorithms and complexity for approximately counting hypergraph colourings and related problems*
  Advisor: Heng Guo
- B.Sc. *summa cum laude* in Computer Science *(Turing Class)* — Peking University, 2016 - 2020

Research Visiting (for a long period)

- IT University of Copenhagen / BARC — 07/2023 - 08/2023
  Host: Radu Curticapean
- University of Oxford — 06/2023
  Host: Andreas Galanis and Leslie Ann Goldberg
- Queen Mary, University of London — 06/2022
  Host: Mark Jerrum
- Shanghai University of Finance and Economics — 05/2020 - 09/2020
  Host: Pinyan Lu
- University of Edinburgh — 07/2019 - 08/2019
  Host: Heng Guo
- Institute of Computing Technology, Chinese Academy of Sciences — 09/2018 - 01/2020
  Host: Xiaoming Sun

Research Interests

- General theoretical computer science, especially algorithms and complexity of counting problems.
- Discrete mathematics, including extremal combinatorics and probabilistic combinatorics.

Research Articles

[Link to Google Scholar] — [Link to DBLP]

[12] **Sink-free orientations: a local sampler with applications.**
Konrad Anand, Graham Freifeld, Heng Guo, Chunyang Wang and **J. Wang**.
submitted
arXiv: 2502.05877

[11] **Can you link up with treewidth?**
Radu Curticapean, Simon Döring, Daniel Neuen and **J. Wang**.
[C] *42nd International Symposium on Theoretical Aspects of Computer Science* (**STACS 2025**)
arXiv: 2410.02606

[10] **Rapid mixing of the flip chain over non-crossing spanning trees.**
Konrad Anand, Weiming Feng, Graham Freifeld, Heng Guo, Mark Jerrum and **J. Wang**.
[C] *41st International Symposium on Computational Geometry* (**SoCG 2025**)
arXiv: 2409.07892

Last update: 11/02/2025 dd/mm/yyyy. Author lists are sorted in the alphabetical order. **[J]***: Journal,* **[C]***: Conference.*

[9] **The complexity of computing fermionants and flow-like structures in graphs, modulo p.**
Isja Mannens and **J. Wang**.
submitted

[8] **Approximate counting for spin systems in sub-quadratic time.**
Konrad Anand, Weiming Feng, Graham Freifeld, Heng Guo and **J. Wang**.
[J] *TheoretiCS, Volume 4 (2025), Article 3, 1–27*
[C] *51th International Colloquium on Automata, Languages and Programming* (**ICALP 2024**)
arXiv: 2306.14867

[7] **Inapproximability of counting independent sets in linear hypergraphs.**
Guoliang Qiu and **J. Wang**.
[J] *Information Processing Letters, Volume 184, Article 106448, 1–6, 2024*
arXiv: 2212.03072

[6] **Towards derandomising Markov chain Monte Carlo.**
Weiming Feng, Heng Guo, Chunyang Wang, **J. Wang** and Yitong Yin.
[J] *SIAM Journal on Computing*, to appear
[C] *64th IEEE Symposium on Foundations of Computer Science* (**FOCS 2023**)
arXiv: 2211.03487

[5] **A simple polynomial-time approximation algorithm for the total variation distance between two product distributions.**
Weiming Feng, Heng Guo, Mark Jerrum and **J. Wang**.
[J] *TheoretiCS, Volume 2 (2023), Article 8, 1–7*
[C] *6th SIAM Symposium on Simplicity in Algorithms* (**SOSA 2023**)
arXiv: 2208.00740

[4] **Swendsen-Wang dynamics for the ferromagnetic Ising model with external fields.**
Weiming Feng, Heng Guo and **J. Wang**.
[J] *Information and Computation, Volume 294, Article 105066, 1–34, 2023*
arXiv: 2205.01985

[3] **Improved bounds for randomly colouring simple hypergraphs.**
Weiming Feng, Heng Guo and **J. Wang**.
[C] *26th International Conference on Randomization and Computation* (**RANDOM 2022**)
arXiv: 2202.05554

[2] **Inapproximability of counting hypergraph colourings.**
Andreas Galanis, Heng Guo and **J. Wang**.
[J] *ACM Transactions on Computation Theory, 14(3–4):10, pp. 1–33, 2022*
arXiv: 2107.05486

[1] **On the degree of Boolean functions as polynomials over $\mathbb{Z}_m$.**
Xiaoming Sun, Yuan Sun, **J. Wang**, Kewen Wu, Zhiyu Xia and Yufan Zheng.
[C] *47th International Colloquium on Automata, Languages and Programming* (**ICALP 2020**)
arXiv: 1910.12458

Honours and Awards

- Informatics Global PhD Scholarship (3.5 years) — University of Edinburgh, 2020
- 4 awards/scholarships during undergraduate study — Peking University

Services and Activities

- Served as an external reviewer at conferences: CIAC'25, APPROX/RANDOM'24, FOCS'24, ICALP'21, SODA'21
- Student organizer of SAGT'18 (organizing volunteers, getting involved in press, etc.)

Talks

- Can you link up with treewidth?

  - LFCS Seminar, University of Edinburgh, United Kingdom. 11/2024
- Approximate counting for spin systems in sub-quadratic time
  - Peking University, Beijing, China. 09/2023
  - Shanghai Jiao Tong University, Shanghai, China. 09/2023
  - NII Shonan Meeting No. 186 "MCMC 2.0", Kanagawa, Japan. 09/2023
- Towards derandomising Markov chain Monte Carlo
  - Basic Algorithm Research Copenhagen (BARC), Denmark. 08/2023
- A simple polynomial-time approximation algorithm for the total variation distance between two product distributions
  - University of Science and Technology of China, Hefei, China. 09/2023
  - QuACT classical talk, Beijing, China. 09/2023
  - Algorithms and Complexity Theory Seminars, Oxford, United Kingdom. 06/2023
  - LFCS Lab Lunch, Edinburgh, United Kingdom. 04/2023
  - SOSA 2023, Florence, Italy. 01/2023
- Improved bounds for randomly colouring simple hypergraphs
  - APPROX/RANDOM 2022, Champaign, IL, United States (virtual conference). 08/2022
  - Highlights of Algorithms, LSE & QMUL, London, United Kingdom. 06/2022
- Inapproximability of counting hypergraph colourings
  - CS Peer Talk, Peking University, Beijing, China (virtual). 07/2022
  - Highlights of Algorithms, LSE & QMUL, London, United Kingdom. 06/2022
- On the degree of Boolean functions as polynomials over $\mathbb{Z}_m$.
  - ICALP 2020, Saarbrücken, Germany (virtual conference). 06/2020

Teaching

- At University of Regensburg:
  - 70101 Complexity Theory — Durchführender, 2024 Winter
- At University of Edinburgh:
  - INFR08026 Introduction to Algorithms and Data Structures — Teaching Assistant/Tutor, 2022/23
  - INFR11201 Randomized Algorithms — Tutor, 2022 Autumn
  - INFR08026 Introduction to Algorithms and Data Structures — Teaching Assistant/Tutor, 2021/22
- At Peking University:
  - 04834010 Randomized Algorithms — Teaching Assistant, 2020 Spring
  - 04833440 Introduction to the Theory of Computation — Teaching Assistant, 2020 Spring
  - 04833040/04832363 Introduction to Computer Systems — Teaching Assistant/Tutor, 2019 Fall
  - 04833440 Introduction to the Theory of Computation — Teaching Assistant, 2019 Spring
  - 04833040/04832363 Introduction to Computer Systems — Teaching Assistant/Tutor, 2018 Fall