

# Jiaheng Wang

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## EMPLOYMENT

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

## EDUCATION

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- 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)

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- 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

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

## RESEARCH ARTICLES

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[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**.  
[C] 29th International Conference on Randomization and Computation (**RANDOM 2025**)  
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

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Last update: 01/07/2025 dd/mm/yyyy. Author lists are sorted in the alphabetical order by convention. [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, Vol. 54, Iss. 3, pp. 775–813, 2025*  
[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

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

## TALKS

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- Can you link up with treewidth?
  - Highlight of Algorithms 2025, ETH Zürich, Switzerland, 06/2025
  - STACS 2025, Jena, Germany, 03/2025
  - 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 2022, 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

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- 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

## PROFESSIONAL SERVICES

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- Programme Committee: FSTTCS’25.
- Managing editor of the journal TheoretiCS since 04/2025. (Voluntary. This is a Diamond Open Access journal published by the TheoretiCS Foundation e.V., a German not-for-profit organization. Please consider supporting it!)
- External reviewer at conferences: MFCS’25, ESA’25, CIAC’25, APPROX/RANDOM’24, FOCS’24, ICALP’21, SODA’21.
- Student organizer of SAGT’18 (organizing volunteers, getting involved in press, etc.).