

Zhiyu Wang

Curriculum Vitae

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Research Interests

Probabilistic and extremal combinatorics, structural graph theory, discrete geometry, spectral graph theory, extremal set theory, applications of discrete mathematics to data science and theoretical computer science.

Education

2015-2020 **Ph.D. Mathematics**, *University of South Carolina*, Columbia, SC
Advisor: Linyuan Lu

2011-2015 **B.S. Mathematics**, *Carnegie Mellon University*, Pittsburgh, PA
Additional major in Computer Science, University Honors

Academic Employment

Aug 2020-present **Hale Visiting Assistant Professor**
School of Mathematics, Georgia Institute of Technology, Atlanta, GA

Aug 2015-May 2020 **Graduate Teaching/Research Assistant**
Department of Mathematics, University of South Carolina, Columbia, SC

Fall 2013-Fall 2014 **Undergraduate Teaching Assistant**
Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, PA

Publications and Preprints

Preprints

25. J. Schroeder, Z. Wang and X. Yu, **On the 3-colorability of triangle-free and fork-free graphs**, *arXiv:2111.10469*.
24. X. Liu, J. Schroeder, Z. Wang and X. Yu, **Polynomial χ -binding functions for t -broom-free graphs**, *arXiv:2106.08871*.
23. X. Liu, Z. Wang and X. Yu, **Counting Hamiltonian cycles in planar triangulations**, *arXiv:2105.07551*.
22. L. Lu, A. Meier and Z. Wang, **Anti-Ramsey number of edge-disjoint rainbow spanning trees in all graphs**, *arXiv:2104.12978*.
21. L. Lu and Z. Wang, **On the size of planar graphs with positive Lin-Lu-Yau Ricci curvature**, *arXiv:2010.03716*.
20. S. Bai, Y. Lin, L. Lu, Z. Wang, and S. T. Yau, **Ollivier Ricci-flow on weighted graphs**, *arXiv:2010.01802*.
19. L. Lu and Z. Wang, **Concentration inequalities in spaces of random configurations with positive Ricci curvatures**, *arXiv:1906.03550*.
18. L. Lu and Z. Wang, **A note on 1-guardable graphs in the cops and robber game**, *arXiv:1804.02802*.

Publications

17. M. N. Ellingham, L. Lu and Z. Wang, **Maximum spectral radius of outerplanar 3-uniform hypergraphs**, to appear in *J. of Graph Theory*, *arXiv:2010.04624*.
16. L. Lu and Z. Wang, **On the cover Turán number of Berge hypergraphs**, *European J. Combin.*, 98 (2021), 103416.
15. L. Lu and Z. Wang, **On Hamiltonian Berge cycles in [3]-uniform hypergraphs**, *Discrete Math.*, 344(8) (2021), 112462.
14. L. Kang, L. Liu, L. Lu and Z. Wang, **The extremal p -spectral radius of Berge-hypergraphs**, *Linear Algebra Appl.*, 610 (2021), 608-624.
13. G. Damásdi, B. Keszegh, D. Malec, C. Tompkins, Z. Wang and O. Zamora, **Saturation problems in the Ramsey theory of graphs, posets and point sets**, *European J. Combin.*, 95 (2021), 103321.
12. L. Lu and Z. Wang, **Anti-Ramsey number of edge-disjoint rainbow spanning trees**, *SIAM J. Discrete Math.*, 34(4) (2020), 2346-2362.
11. L. Lu and Z. Wang, **On the cover Ramsey number of Berge hypergraphs**, *Discrete Math.*, 343(9) (2020), 111972.
10. É. Czabarka, I. Singgih, L.A. Székely and Z. Wang, **Some remarks on the midrange crossing constant**, *Studia Sci. Math. Hung.*, 57 (2) (2020), 187-192.
9. J. Kim, R. R. Martin, T. Masařík, W. Shull, H. C. Smith, A. Uzzell, and Z. Wang, **On difference graphs and the local dimension of posets**, *European J. Combin.*, 86 (2020), 103074.
8. M. Javidian, Z. Wang, L. Lu and M. Valtorta, **On a hypergraph Bayesian network model**, *Ann. Math. Artif. Intell.*, 88(9) (2020), 1003-1033.
7. N. Salia, C. Tompkins, Z. Wang and O. Zamora, **Ramsey numbers of Berge-hypergraphs and related structures**, *Electron. J. Comb.*, 26(4) (2019), P4.40.
6. É. Czabarka, J. Reiswig, L.A. Székely and Z. Wang, **Midrange crossing constants for graphs classes**, *Indian J. Discrete Math.*, 5(1) (2019), 23-35.
5. J. Asplund, É. Czabarka, G. Clark, G. Cochran, A. Hamm, G. Spencer, L.A. Székely, L. Taylor and Z. Wang, **Using Block Designs in Crossing Number Bounds**, *J. Combin. Des.*, 27(10) (2019), 586-597.
4. É. Czabarka and Z. Wang, **Erdős-Szekeres theorem for cyclic permutations**, *Involve*, 12(2) (2019), 351-360.
3. L. Lu and Z. Wang, **On the size-Ramsey number of tight paths**, *SIAM J. Discrete Math.*, 32(3) (2018), 2172-2179.
2. J. Asplund, T. Do, A. Hamm, L. Székely, L. Taylor, and Z. Wang, **k -planar crossing number of random graphs and random regular graphs**, *Discrete Appl. Math.*, 247 (2018), 419-422.
1. A. Hasan, Z. Wang and A. Mahani, **Fast Estimation of Multinomial Logit Models: R Package mnlogit**, *J. Stat. Softw.*, 75(3) (2016), 1-24. (R package mnlogit available at <https://CRAN.R-project.org/package=mnlogit>)

Teaching Experience

Georgia Institute of Technology, Atlanta, GA

- Fall 2020-
Present **Instructor of Record**, *School of Mathematics*.
- MATH 4032: Combinatorial Analysis (Spring 2022, 49 students)
 - MATH 4699: Undergraduate Research (Spring 2022, 1 student)
 - MATH 8803/4803: Special Topics: Spectral Graph Theory (Fall 2021, 23 students)
 - MATH 4022: Intro to Graph Theory (Fall 2021, 53 students)
 - MATH 4280: Introduction to Information Theory (Spring 2021, 26 students)
 - MATH 3012: Applied Combinatorics (Summer 2021, 50 students; Fall 2020, 81 students)

University of South Carolina, Columbia, SC

- Fall 2016-
Spring 2020 **Instructor of Record**, *Department of Mathematics*.
- MATH 344L/544L: Numerical Linear Algebra Lab (Spring 2020)
 - MATH 170: Finite Mathematics (Spring 2019, Fall 2019)
 - MATH 122: Business Calculus (Spring 2017)
 - MATH 115: Pre-Calculus (Fall 2016)
- Fall 2015-
Fall 2018 **Graduate Teaching Assistant**, *Department of Mathematics*.
- MATH 142: Calculus 2 (Fall 2018)
 - MATH 141: Calculus 1 (Fall 2015, Spring 2016)

Carnegie Mellon University, Pittsburgh, PA

- 2013-2014 **Undergraduate Teaching Assistant**, *Department of Mathematical Sciences*.
- 21-259: Calculus in Three Dimensions (Spring 2014)
 - 21-242: Honors Matrix Theory (Fall 2013)
- Fall 2014 **Grader**, *Department of Mathematical Sciences*.
- 21-295: Putnam Seminar
- Fall 2013 **Undergraduate Teaching Assistant**, *School of Computer Science*.
- 15-112: Fundamentals of Programming

Student Mentoring

- Jan 2022-
present **Raymond Jiang**, *Directed Reading Program*, Georgia Institute of Technology
Reading Project: Circuit Double Cover of Graphs.
- Jan 2022-
present **Jonathan Lugo**, *Undergraduate Research Course*, School of Mathematics, Georgia Institute of Technology
Project: Problems on Magic and Anti-magic Labeling.
- Sep 2021-
present **Ariana Hall**, *Master Thesis*, School of Mathematics, Georgia Institute of Technology
Project: Local dimension of Boolean Lattice
- Aug 2021-
present **Xudong He**, *High School Research Project*, United Nations International School
Project: anti-Ramsey number of spanning structures
- Fall 2020 **Haoran Zhang**, *Directed Reading Program*, Georgia Institute of Technology
Reading Project: Statistical inference on graphs.

Industry Experience

- Summer
2014, 2015 **Software Engineer Intern**, *LinkedIn Corporation*, California, CA
Worked on graph algorithms to improve LinkedIn's internal cross-product development platform & dependency service platform
- Summer
2013 **Scientific Computing Engineer Intern**, *Sentrona Corporation*, Washington, D.C.
Design and optimize high performance R packages for quantitative modelling