

Ruth Luo

Department of Mathematics
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(updated September 28, 2021)

Research Interests

Extremal graph theory and hypergraph theory, specifically extremal problems for cycles, discrete geometry, Ramsey theory

Academic Appointments

NSF Postdoctoral Fellow - University of California, San Diego (2019-2022)

Lecturer - University of California, San Diego (2020-2022)

Education

Ph.D. in Mathematics - University of Illinois at Urbana-Champaign (2014-2019)

Advisor: Alexandr Kostochka

M.S. in Mathematics - University of Illinois at Urbana-Champaign (2014-2016)

B.S. in Mathematical Sciences - Carnegie Mellon University (2010-2014)

Phi Beta Kappa

Publications and Preprints

1. *Dirac's Theorem for hamiltonian Berge cycles in uniform hypergraphs.* (with Alexandr Kostochka and Grace McCourt) submitted.
2. *Forbidding $K_{2,t}$ - traces in triple systems.* (with Sam Spiro) Electronic Journal of Combinatorics, Volume 28, Issue 2, 2021.
3. *Large monochromatic components in almost complete graphs and bipartite graphs.* (with Zoltán Füredi) to appear in Electronic Journal of Combinatorics.

4. *Conditions for a bigraph to be super-cyclic.* (with Alexandr Kostochka, Mikhail Lavrov, and Dara Zirlin) Electronic Journal of Combinatorics, Volume 28, Issue 1, 2021.
 5. *Longest cycles in 3-connected hypergraphs and bipartite graphs.* (with Alexandr Kostochka, Mikhail Lavrov, and Dara Zirlin) to appear in Journal of Graph theory.
 6. *Induced Turán problems and traces of hypergraphs.* (with Zoltán Füredi) submitted.
 7. *Berge cycles in non-uniform hypergraphs.* (with Zoltán Füredi and Alexandr Kostochka) Electronic Journal of Combinatorics, Volume 27, Issue 3, 2020.
 8. *Towards the Small Quasi-Kernel Conjecture.* (with Alexandr Kostochka and Songling Shan) submitted.
 9. *Super-pancyclic hypergraphs and bipartite graphs.* (with Alexandr Kostochka and Dara Zirlin) Journal of Combinatorial Theory, Series B, Volume 145, pp. 450-465, 2020.
 10. *On 2-connected hypergraphs with no long cycles.* (with Zoltán Füredi and Alexandr Kostochka) Electronic Journal of Combinatorics, Volume 26, Issue 4, 2019.
 11. *Avoiding long Berge cycles II, exact bounds for all n .* (with Zoltán Füredi and Alexandr Kostochka) to appear in Journal of Combinatorics, 2020.
 12. *On r -uniform hypergraphs with circumference less than r .* (with Alexandr Kostochka) Discrete Applied Mathematics, Volume 217, pp. 69-91, 2020.
 13. *Avoiding long Berge cycles.* (with Zoltán Füredi and Alexandr Kostochka) Journal of Combinatorial Theory, Series B, Volume 137, pp. 55-64, 2019.
 14. *A variation of a theorem of Posa.* (with Zoltán Füredi and Alexandr Kostochka) Discrete Mathematics, Volume 342, Issue 7, pp. 1919-1923, 2019.
 15. *Stability in the Erdos--Gallai Theorem on cycles and paths, II.* (with Zoltan Furedi, Alexandr Kostochka, and Jacques Verstraete) Discrete Mathematics, Volume 341, Issue 5, pp. 1253-1263, 2018.
 16. *Extensions of a theorem of Erdos on nonhamiltonian graphs.* (with Zoltan Furedi and Alexandr Kostochka) Journal of Graph Theory, Volume 89, Issue 2, pp. 176-193, 2018.
 17. *The maximum number of cliques in graphs without long cycles.* Journal of Combinatorial Theory, Series B, Volume 128, pp. 219-226, 2018.
 18. *A stability version for a theorem of Erdos on nonhamiltonian graphs.* (with Zoltan Furedi and Alexandr Kostochka) Discrete Mathematics, Volume 340, Issue 11, pp. 2688-2690, 2017.
 19. *A forest building process on simple graphs.* (with Zhanar Berikkyzy, Steve Butler, Jay Cummings, Kristin Heysse, Paul Horn, and Brent Moran) Discrete Mathematics, Volume 341, Issue 2, pp. 497-507, 2018.
 20. *Signed quasi-clique merger: a new clustering method for signed networks with positive and negative edges.* (with Xingqin Qi, Edgar Fuller, Rong Luo, and Cun-Quan Zhang) International Journal of Pattern Recognition and Artificial Intelligence, Volume 30, Issue 3, 2016.
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Awards and Fellowships

1. NSF Mathematical Sciences Postdoctoral Research Fellowship (2019-2022)
 2. Philippe Tondeur Dissertation Prize, UIUC (2019)
 3. James D. Hogan Memorial Scholarship, UIUC (2018-2019)
 4. Mathematics Department TA Instructional Award, UIUC (2018)
 5. Senior Leadership Recognition Award, CMU (2014)
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Invited Talks

1. Joint Mathematics Meetings, AMS Special Session on Topics in Extremal Combinatorics, Seattle, WA (January 2022) (upcoming)
2. Shanghai Center for Mathematical Sciences Combinatorics Seminar, online seminar (October 2021) (upcoming)
3. SIAM minisymposium on Extremal Graph Theory and Combinatorics, online seminar (July 2021)
4. University of Delaware Discrete Mathematics/Algebra Seminar, online seminar (May 2021)
5. Illinois State University Discrete Math Seminar, online seminar (February 2021)
6. Georgia Tech Graph Theory Seminar, online seminar (November 2020)
7. SIAM Texas-Louisiana Section minisymposium on Graph Theory, online seminar (October 2020)
8. AMS Special Session on Advances in Graph Theory, online seminar (October 2020)
9. Women in Combinatorics Virtual Colloquium (March 2020)
10. Joint Mathematics Meetings, AMS Special Session on Extremal and Probabilistic Combinatorics, Denver, CO (January 2020)
11. Institute for Basic Science Discrete Math Seminar, Daejeon, South Korea (November 2019)
12. AMS Special Session on Topics in Extremal and Structural Graph Theory, Riverside, CA (November 2019)
13. Carnegie Mellon University ACO Seminar, Pittsburgh, PA (October 2019)

14. UCSD Combinatorics Seminar, La Jolla, CA (May 2019, October 2021)
 15. AWM Graduate Colloquium, Urbana, IL (March 2019)
 16. Joint Mathematics Meetings, AMS Special Session on Advances by Early Career Women in Discrete Mathematics, Baltimore, MD (January 2019)
 17. University of Illinois at Chicago seminar, Chicago, IL (November 2018)
 18. Rose Hulman Institute of Technology Seminar, Terre Haute, IN (October 2018)
 19. SIAM minisymposium on Modern methods in Graph Theory, Denver, CO (June 2018)
 20. AMS Special Session on Extremal graph theory and quantum walks on graphs, Boston, MA (April 2018)
 21. William and Mary Mathematics Colloquium, Williamsburg, VA (March 2018)
 22. AMS Special Session on Structural and Chromatic Graph Theory, Buffalo, NY (September 2017)
 23. AMS Special Session on Graph Theory, Charleston, SC (March 2017)
 24. IIT Applied Math Seminar, Chicago, IL (February 2017)
 25. AMS Special Session on Graphs, Hypergraphs, and Set Systems, Raleigh, NC (November 2016)
 26. UIUC Graph Theory Seminar, Urbana, IL (September 2016, February 2017, April 2018, September 2018, February 2019, October 2021)
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Contributed Talks

1. UCSD Postdoc Seminar (October 2020)
 2. Tsinghua Sanya International Mathematics Forum (TSIMF) Workshop on Structural Graph Theory and Graph Colorings, Sanya, Hainan, China (April 2019)
 3. Mostly Manitoba, Michigan and Minnesota Combinatorics Graduate Students Workshop 2018, Ames, IA (September 2018)
 4. Structure in Graphs and Matroids (SiGMa), Waterloo, ON (July 2017)
 5. 30th Midwest Conference on Combinatorics and Combinatorial Computing (MCCCC), Normal, IL (October 2016)
 6. Sao Paulo School of Advanced Science on Algorithms, Combinatorics and Optimization (poster presentation), Sao Paulo, Brazil (July 2016)
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Teaching Experience

At University of California, San Diego:

1. Fall 2021 - Instructor for Math 18: Linear Algebra (~175 students)
2. Spring 2021 - Instructor for Math 109: Mathematical Reasoning (55 students, 87.8% student evaluation)
3. Winter 2021 - Instructor for Math 152: Applicable Math and Computing (94 students, 97.6% student evaluation)
4. Fall 2020 - Instructor for Math 18: Linear Algebra (176 students, 98.8% student evaluation)

At University of Illinois at Urbana-Champaign:

1. Fall 2018 - Instructor for 1 section of Math 181: A Mathematical World **
2. Spring 2018 - TA for 5 sections of Math 415: Applied Linear Algebra **
3. Fall 2017 - TA for 5 sections of Math 415: Applied Linear Algebra; Head TA **
4. Spring 2017 - TA for 5 sections of Math 415: Applied Linear Algebra; Head TA **
5. Fall 2016 - TA for 5 sections of Math 415: Applied Linear Algebra **
6. Spring 2016 - TA for 4 sections of Math 415: Applied Linear Algebra **
7. Fall 2015 - TA for 2 sections of Math 231: Calculus 2 **
8. Spring 2015 - TA for 4 sections of Math 415: Applied Linear Algebra **
9. Fall 2014 - TA for 2 sections of Math 231: Calculus 2 *

* = On the list of Teachers Ranked as Excellent by their students

** = * + outstanding rating

At Carnegie Mellon University:

1. Spring 2014 - TA for 1 section of 21-241: Matrices and Linear Transformations

Mentoring Experience

1. Fall 2017 - Graduate mentor for undergraduate research project "The Four Color Theorem: Archival Documentation and Outreach" under Jeremy Tyson (through the Illinois Geometry Lab)
2. Spring 2016 - Fall 2016 - Graduate mentor for undergraduate research project "Interactive Learning Tools for Linear Algebra" under Cary Malkiewich and Jenya Sapir (through the Illinois Geometry Lab in Spring 2016)
3. Spring 2015 - Graduate mentor for undergraduate research project "Collaboration graphs and cluster analysis" under Steven Bradlow (through the Illinois Geometry Lab)

Selected Conferences, Workshops, and Research Visits

1. Institute for Basic Science (IBS DIMAG) research visit, Daejeon, South Korea (November 2019)
 2. Tsinghua Sanya International Mathematics Forum (TSIMF) Workshop on Structural Graph Theory and Graph Colorings, Sanya, Hainan, China (April 2019)
 3. SIAM Conference on Discrete Mathematics (DM18), Denver, CO (June 2018)
 4. Structure in Graphs and Matroids (SiGMa), Waterloo, ON (July 2017)
 5. Fields Institute Summer School on Random Graphs and Probabilistic Methods, Toronto, CA (June 2017)
 6. Sao Paulo School of Advanced Science on Algorithms, Combinatorics and Optimization, Sao Paulo, Brazil (July 2016)
 7. Random Structures and Algorithms, Pittsburgh, PA (July 2015)
 8. Graduate Research Workshop in Combinatorics, Ames, IA (June 2015)
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Service

1. Co-organizer of the UCSD Association of Women in Mathematics Colloquium (Fall 2020)
2. Member of UCSD ABACUS (graduate combinatorics seminar) executive committee (Fall 2020)
3. Co-organizer (with Abhishek Methuku and Casey Tompkins): Minisymposium on Turán-type problems and their variants, SIAM Discrete Mathematics (DM20) (cancelled due to COVID-19 pandemic)
4. Member of the TA Teaching Award Committee at University of Illinois at Urbana-Champaign (Fall 2018)
5. Co-organizer of the *Four Color Theorem Fest* open house at University of Illinois at Urbana-Champaign (November 2017)
6. Referee Service
 - a. *Combinatorica* (Springer)
 - b. *Combinatorics, Probability and Computing* (Cambridge Core)
 - c. *Discrete Mathematics* (Elsevier)
 - d. *Discussiones Mathematicae Graph Theory* (University of Zielona Gora)
 - e. *European Journal of Combinatorics* (Elsevier)

- f. Journal of Combinatorial Theory, Series B (Elsevier)
- g. Journal of Combinatorial Theory, Series A (Elsevier)
- h. SIAM Journal on Discrete Mathematics
- i. Electronic Journal of Combinatorics