Peter Bradshaw

pb38@illinois.edu
peter-bradshaw.com
+1-217-898-4426

Citizenship: USA
English: Native
Mandarin: Proficient (HSK 6)
Cantonese: Proficient (daily at home)

I am a postdoctoral researcher in graph theory working with Alexandr Kostochka at University of Illinois Urbana-Champaign. My interests include graph coloring, rainbow graph structures, and games on graphs. I also take great pride in teaching math to students of all levels.

Employment

Postdoctoral Researcher and Instructor at University of Illinois Urbana-Champaign **Jan 2023 — Present**

- Work with Alexandr Kostochka carrying out graph theoretic research and writing papers
- Teach upper level undergraduate courses
- Work as research mentor for undergraduate students

Teaching/Research Assistant at Simon Fraser University **Sept 2018 — Dec 2022**

Cambridge teacher of Math and Physics at Zhengzhou No. 47 High School **Aug 2016 - Jun 2018**

Education

PhD., Mathematics, Simon Fraser University, GPA: 4.17/4.33 Sep 2020 — Dec 2022

- Thesis: *Graph coloring with additional restrictions*, advised by Bojan Mohar and Ladislav Stacho

MSc., Mathematics, Simon Fraser University, GPA: 4.13/4.33 Sep 2018 — Aug 2020

- Thesis: *Cops and robbers on Cayley graphs and embedded graphs*, advised by Ladislav Stacho

B.S., Mathematics, University of Kansas, GPA: 3.82/4.00 Aug 2012 — April 2016

Awards

University of Illinois Urbana-Champaign

- AMS Simons Travel Grant - $2500 2024
- Ranked as excellent teacher for Introduction to Combinatorics 2023

Simon Fraser University

- Department of Mathematics graduate scholarship - $3800 2021
- Travel and research award - $700 2021
- Travel and research award - $880 2020
- Graduate fellowship - $6500 2019
- Graduate entrance scholarship - $5000 2018

Publications and preprints

1. Peter Bradshaw, Alexander Clow, and Ladislav Stacho. “Cornering Robots to Synchronize a DFA” (2024). URL: arXiv:2405.00826
2. Peter Bradshaw and Jinghan Zeng. “Paintability of r-chromatic graphs” (2024). arXiv:2403.11888
3. Peter Bradshaw, Yaobin Chen, Hao Ma, Bojan Mohar, and Hehui Wu. “List-avoiding orientations”. *Combinatorica* (2024)
4. Richard Bi and Peter Bradshaw. “Flexibility of graphs with maximum average degree less than 3” (2024). URL: arXiv:2310.02979
5. Peter Bradshaw. “Rainbow spanning trees in random subgraphs of dense regular graphs”. *Discrete Mathematics* (2024)
6. Peter Bradshaw, Alexander Clow, and Jingwei Xu. “Injective edge colorings of degenerate graphs and the oriented chromatic number” (2023). URL: arXiv:2308.15654
7. Peter Bradshaw. “Fractional colorings of partial t-trees with no large cliques” (2023). URL: arXiv:2302.09028
8. Peter Bradshaw. “Cooperative colorings of forests”. *Electronic J. Comb.* (2023)
9. Peter Bradshaw. “Separating the online and offline DP-chromatic numbers”. *Electronic J. Comb.* (2023)
10. Peter Bradshaw and Tomas Masařík. “Single-conflict colorings of degenerate graphs”. *Journal of Graph Theory* (2023)
11. Peter Bradshaw. “A note on the connected game coloring number”. *Discrete Appl. Math.* (2023)

12. Peter Bradshaw, Zhilin Ge, and Ladislav Stacho. “Hamiltonicity of covering graphs of trees”. *Accepted to Discrete Appl. Math.* (2022). URL: arXiv:2206.05583
13. Peter Bradshaw. “On the hat guessing number of a planar graph class”. *JCTB* (2022)
14. Peter Bradshaw, Tomáš Masařík, Jana Novotná, and Ladislav Stacho. “Robust Connectivity of Graphs on Surfaces”. *SIDMA* (2022)
15. Peter Bradshaw, Tomáš Masařík, and Ladislav Stacho. “Flexible List Colorings in Graphs with Special Degeneracy Conditions”. *Journal of Graph Theory* (2022)
16. Peter Bradshaw, Seyyed Aliasghar Hosseini, Bojan Mohar, and Ladislav Stacho. “Cops and robbers on graphs of high girth”. *Journal of Graph Theory* (2022)
17. Peter Bradshaw. “On the hat guessing number and guaranteed subgraphs” (2021). URL: arXiv:2109.13422
18. Peter Bradshaw and Bojan Mohar. “A Rainbow Connectivity Threshold for Random Graph Families”. *Extended Abstracts EuroComb 2021*. Vol. 14. Trends in Mathematics. Cham Birkhäuser, 2021, pp. 848–854. ISBN: 978-3-030-83823-2
19. Peter Bradshaw, Kevin Halasz, and Ladislav Stacho. “From one to many rainbow Hamiltonian cycles.” *Graphs and Combinatorics* (2021). URL: https://doi.org/10.1007/s00373-022-02574-z
20. Peter Bradshaw. “Graph colorings with restricted bicolored subgraphs: II. The graph coloring game”. *Journal of Graph Theory* (2021)
21. Peter Bradshaw. “ Transversals and bipancyclicity in bipartite graph families”. *Electronic J. Comb.* 28 (4 2021), p. 4.25
22. Peter Bradshaw, Seyyed Aliasghar Hosseini, and Jérémie Turcotte. “Cops and robbers on directed and undirected abelian Cayley graphs”. *European J. Combin.* 97 (2021), Paper No. 103383, 19. ISSN: 0195-6698
23. Peter Bradshaw. “A proof of the Meyniel conjecture for Abelian Cayley graphs”. *Discrete Math.* 343.1 (2020), pp. 111546, 5. ISSN: 0012-365X
24. Peter Bradshaw and Seyyed Aliasghar Hosseini. “Surrounding cops and robbers on graphs of bounded genus” (2019). URL: arXiv:1909.09916

Talks

Invited talks

- Flexible list coloring and maximum average degree, *AMS Sectional Meeting* 2023
- Graph coloring and the Lovász Local Lemma, *SSC 2022, Melbourne University* 2022

Refereed conference talks

- A rainbow connectivity threshold in random graph families, *Eurocomb* 2021
- Flexible list colorings in graphs with special degeneracy conditions, *ISAAC* 2020
- A proof of Meyniel’s conjecture for abelian Cayley graphs, *CanaDAM* 2019

Seminar talk venues

11 distinct seminar talks at the following venues:

- University of Illinois Urbana-Champaign, Shanghai Center for Mathematical Sciences, Sun Yat Sen University (Guangzhou), Iowa State University 2023-2024
- Simon Fraser University, University of British Columbia, Melbourne University, CMS Summer Meeting online, Eurocomb, CMS Summer Meeting in Regina 2019-2022

Undergraduate projects

- Graphs of maximum average degree less than $\frac{11}{3}$ are flexibly 4-choosable. Joint work with Richard Bi. *To appear on arXiv shortly, to submit to Discrete Math.*. 2023-2024
- Flexibility of graphs with maximum average degree less than 3. Joint work with Richard Bi. *To submit to JGT*. 2023-2024
- Paintability of r-chromatic graphs. Joint work with Jinghan A. Zeng. *Submitted to Discrete Math.* 2023-2024
- Illinois Math Lab: Paintability of multipartite graphs, *Team project, in preparation for undergraduate journal* 2024
- Flexible list coloring of planar graphs, *Team project* 2023

Teaching

Nonlinear programming (UIUC) **Fall 2023 - Spring 2024**

- Convex optimization, geometric programming, least-squares optimization, penalty methods, computational methods
- Evaluation of 4.4/5

Introduction to combinatorics (UIUC) **Spring 2023**

- Permutations and combinations, Ramsey theory, partially ordered sets, inclusion-exclusion, generating functions, Stirling numbers
- Evaluation of 4.7/5

Upper level undergraduate tutorials (SFU) **2021-2022**

- Led weekly review classes for discrete mathematics, probability, and number theory

Community activities

Organized conferences and seminars

- UIUC Early Career Conference in Combinatorics 2024
- UIUC Graph Theory and Combinatorics Seminar 2023-2024

Journal and conference referee JCTB, J. Graph Theory, Random Structures & Alg., Elec. J. Comb., SIDMA, European J. Comb, Disc. Applied Math., Disc. Math., Eurocomb 2021, WG2023