

Sepehr Hajebi

Curriculum Vitæ (updated on January 3, 2024)

Contact

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Education

PhD in Mathematics (Combinatorics and Optimization)

University of Waterloo, Waterloo, Ontario, Canada

Fall 2020 – (expect to graduate in Spring 2024)

Thesis: Dichotomy theorems for treewidth and induced subgraphs

Advisor: [Sophie Spirkl](#)

BSc and MSc in Mathematics

Isfahan University of Technology, Isfahan, Iran

Fall 2012 – Spring 2019

Awards

7. **Sinclair Graduate Scholarship**, 1900+ ϵ CAD
Department of Combinatorics and Optimization, University of Waterloo (Fall 2023)
6. **Outstanding TA Award**
Department of Combinatorics and Optimization, University of Waterloo (Winter 2022)
5. **Visiting Korean Mathematical Society (KMS), Korea Institute for Advanced Studies (KIAS), and National Institute for Mathematical Sciences (NIMS)**
Invited and funded by The Embassy of South Korea in Iran (Fall 2016)
4. **Korean Mathematical Society Contest for University Students**
Seoul, South Korea – Third Prize (Fall 2016)
3. **International Mathematics Competition for University Students (IMC)**
Blagoevgrad, Bulgaria – Third Prize (Spring 2015 and 2016)
2. **Iranian Mathematical Society Competition for University Students**
Second and Third Prize (Spring 2015 and 2016)
1. **IUT Elite Student Award**
Isfahan University of Technology (2016 and 2018)

Research Interests

Broadly: Discrete math, especially structural, extremal and algorithmic graph theory, and combinatorial optimization

Currently: Induced subgraphs, graph minor theory, and their interconnection.

Papers

All manuscripts available at http://arxiv.org/a/hajebi_s_1.

▷ *Published (9):*

24. **Hitting all maximum stable sets in P_5 -free graphs**
J. Comb. Theory Ser. B 165 (2024)
with Y. Li and S. Spirkl (2023)

23. **Induced subgraphs and tree decompositions**
VII. Basic obstructions in H -free graphs
[J. Comb. Theory Ser. B 164 \(2024\)](#)
with T. Abrishami, B. Alecu, M. Chudnovsky and S. Spirkl.
22. **Induced subgraphs and tree decompositions**
II. Toward walls and their line graphs in graphs of bounded degree
[J. Comb. Theory Ser. B 164 \(2024\)](#)
with T. Abrishami, M. Chudnovsky, C. Dibek, P. Rzażewski, S. Spirkl and K. Vušković.
21. **Induced subgraphs and tree decompositions**
V. One neighbor in a hole
[J. Graph Theory \(2023\)](#)
with T. Abrishami, B. Alecu, M. Chudnovsky, S. Spirkl and K. Vušković.
20. **Induced subgraphs and tree decompositions**
IV. (Even hole, diamond, pyramid)-free graphs
[Electron. J. Comb 30\(2\) \(2023\)](#)
with T. Abrishami, M. Chudnovsky and S. Spirkl.
19. **Induced subgraphs and tree decompositions**
III. Three-path-configurations and logarithmic treewidth
[Advances in Combinatorics \(6\) \(2022\)](#)
with T. Abrishami, M. Chudnovsky and S. Spirkl.
18. **Complexity dichotomy for List-5-Coloring with a forbidden induced subgraph**
[SIAM J. Discrete Math 256\(6\) \(2022\)](#)
with Y. Li and S. Spirkl.
17. **Minimal induced subgraphs of two classes of 2-connected non-Hamiltonian graphs**
[Discrete Math. 345\(7\) \(2022\)](#)
with J. Cheriyian, Z. Qu and S. Spirkl.
16. **Edge clique cover of claw-free graphs**
[J. Graph Theory 90\(3\) \(2019\)](#)
with R. Javadi.

▷ Accepted or in revision (2):
15. **List-3-Coloring ordered graphs with a forbidden induced subgraph**
[SIAM J. Discrete Math \(accepted\)](#)
with Y. Li and S. Spirkl (2023)
14. **Induced subgraphs and tree decompositions**
VIII. Excluding a forest in (theta, prism)-free graphs
[Combinatorica \(in revision\)](#)
with T. Abrishami, B. Alecu, M. Chudnovsky and S. Spirkl (2023)

▷ Submitted (11):
13. **Chordal graphs, even-hole-free graphs and sparse obstructions to bounded treewidth**
solo paper (2024)
12. **List- k -Coloring H -free graphs for all $k > 4$**
with M. Chudnovsky and S. Spirkl (2023)

11. **Induced subgraphs and tree decompositions**
XIV. Non-adjacent neighbors in a hole
with M. Chudnovsky and S. Spirkl (2023)
 10. **Induced subgraphs and tree decompositions**
XIII. Basic obstruction in \mathcal{H} -free graphs for finite \mathcal{H}
with B. Alecu, M. Chudnovsky and S. Spirkl (2023)
 9. **Induced subgraphs and tree decompositions**
XII. Grid Theorem for pinched graphs
with B. Alecu, M. Chudnovsky and S. Spirkl (2023)
 8. **Induced subgraphs and tree decompositions**
XI. Local structure for even-hole-free graphs of large treewidth
with B. Alecu, M. Chudnovsky and S. Spirkl (2023)
 7. **Induced subdivisions with pinned branch vertices**
solo paper (2023)
 6. **Induced subgraphs and tree decompositions**
X. Towards logarithmic treewidth for even-hole-free graphs
with T. Abrishami, B. Alecu, M. Chudnovsky and S. Spirkl (2023)
 5. **Tree independence number for (even hole, diamond, pyramid)-free graphs**
with T. Abrishami, B. Alecu, M. Chudnovsky, S. Spirkl and K. Vušković (2023)
 4. **Induced subgraphs and tree decompositions**
IX. Grid theorem for perforated graphs
with B. Alecu, M. Chudnovsky and S. Spirkl (2023)
 3. **Induced subgraphs and tree decompositions**
VI. Graphs with 2-cutsets
with T. Abrishami, B. Alecu, M. Chudnovsky and S. Spirkl (2022)
- ▷ *Upcoming (2)*:
2. **Induced subgraphs and tree decompositions**
XV. Even-hole-free graphs have logarithmic treewidth
with M. Chudnovsky, P. Gartland, D. Lokshtanov and S. Spirkl.
 1. **Certification for H -free graphs and beyond.**
with Nicolas Bousquest, Aristotelis Chaniotis, Linda Cook, S. Spirkl, Pierron Théo and Sébastien Zeitoun.

Talks

- ▷ *Upcoming*:
7. **Treewidth, Erdős-Posá and induced subgraphs** [invited]
New York Combinatorics Seminar
(Feb 23, 2024)
- ▷ *Past*:
6. **Several Gyárfás-Sumner-type results for treewidth** [invited]
Graphs and Matroids Seminar, University of Waterloo, Canada
(Nov 23, 2023)
 5. **Hitting all maximum stable sets in P_5 -free graphs** [invited]
Graphs and Matroids Seminar, University of Waterloo, Canada
(Feb 6, 2023)
 4. **Forests in even-hole-free graphs of large treewidth** [invited]
Barbados Graph Theory Workshop, Bellairs Research Institute of McGill University, Barbados
(Dec 12, 2022)

3. **Holes, hubs, and bounded treewidth** [invited]
IBS Virtual Discrete Math Colloquium, Daejeon, South Korea
(July 7, 2022)
2. **Bounded treewidth in hereditary graph classes** [invited]
Graphs and Matroids Seminar, University of Waterloo, Canada
(July 5, 2022)
1. **Bounded treewidth in hereditary graph classes** [invited]
Seymour is 70, ENS de Lyon, France
(June 22, 2022)

**Mentoring
Teaching
Service**

▷ *Undergraduate mentorship at the University of Waterloo:*

Directed Reading Program (DRP)

Women in Math (WiM) committee (Fall 2023)

Project: Introduction to graph minor theory

Mentees: Xinyue Fan and Lyncy Li

Undergraduate Research Assistant Program (URA)

Department of Combinatorics and Optimization (Spring 2023)

Project: Maximum transitive set in H -free tournaments

Mentee: Yun Xing

▷ *TA at University of Waterloo:*

22. **CO456 Game theory**, instructed by Martin Pei (Fall 2023)
21. **CO250 Introduction to optimization**, instructed by Jane Gao, David Jao and Walaa Morsi (Fall 2023)
20. **CO342 Graph Theory**, instructed by Peter Nelson (Spring 2023)
19. **MATH138 Calculus II for honors of mathematics**, various instructors (Winter 2023)
18. **CO250 Introduction to optimization**, instructed by Henry Wolkowicz, Jorn van der Pol, David Aleman Espinosa, Martin Pei (Winter 2023)
17. **MATH600 Mathematical software**, instructed by Sarah Chan (Fall 2022)
16. **CO456 Game theory**, instructed by David Jao (Fall 2022)
15. **CO380 Mathematical discovery and invention**, instructed by Logan Crew (Spring 2022)
14. **MATH239 Introduction to combinatorics**, instructed by Jane Gao, Debbie Leung and Kanstantsin Pashkovich (Winter 2022)
13. **CO255 Advanced optimization**, instructed by Bill Cook (Winter 2022)
12. **CO250 Introduction to optimization**, instructed by Levent Tuncel and Kanstantin Pashkovich (Fall 2021)
11. **CO450/650 Graph theory (graduate)**, instructed by Luke Postle (Fall 2021)
10. **CO351 Network-flow theory**, instructed by Joseph Cheriyan (Spring 2021)

▷ *TA at Isfahan University of Technology:*

9. **Computational complexity (graduate)**, instructed by Ramin Javadi (2019).
8. **Elements of matrices and linear algebra**, instructed by Ramin Javadi (2018).

7. **Applied Linear algebra for engineering**, instructed by Ramin Javadi (2018).
6. **Graph theory (graduate)**, instructed by Ramin Javadi (2017).
5. **Elements of combinatorics**, instructed by Ramin Javadi (2017)
4. **Graph theory**, instructed by Behnaz Omoomi (2016).
3. **Elements of combinatorics**, instructed by Gholamreza Omid (2016).
2. **Graph theory (graduate)**, instructed by Behnaz Omoomi (2014)
1. **Elements of combinatorics**, instructed by Ramin Javadi (2014)

▷ *Refereeing for journals and conference proceedings:*

- International Mathematics Research Notices (IMRN)
- Journal of Combinatorial Theory, Series B (JCTB)
- European Journal of Combinatorics
- Journal of Graph Theory (JGT)
- Electronic Journal of Combinatorics
- European Conference on Combinatorics, Graph Theory and Applications (EUROCOMB)
- Workshop on Graphs (WG)