

Sepehr Hajebi

Curriculum Vitæ (updated on October 30, 2023)

Contact	✉ shajebi@uwaterloo.ca (current) ✉ sepehr.hajebi@gmail.com (personal) 🌐 sepehrhajebi.com
Education	PhD in Mathematics (Combinatorics and Optimization) University of Waterloo, Waterloo, Ontario, Canada Fall 2020 – (expect to graduate in Spring 2024) <i>Thesis:</i> Dichotomy theorems for treewidth and induced subgraphs <i>Advisor:</i> Sophie Spirkl BSc and MSc in Mathematics Isfahan University of Technology, Isfahan, Iran Fall 2012 – Spring 2019
Awards	<ol style="list-style-type: none">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 . <i>Published, accepted or in revision:</i> <ol style="list-style-type: none">23. Induced subgraphs and tree decompositions VII. Basic obstructions in H-free graphs <i>J. Comb. Theory Ser. B</i> (accepted) with Tara Abrishamin, Bogdan Alecu, Maria Chudnovsky and Sophie Spirkl (2023)

22. **Induced subgraphs and tree decompositions**
VIII. Excluding a forest in (theta, prism)-free graphs
Combinatorica (in revision)
with Tara Abrishami, Bogdan Alecu, Maria Chudnovsky and Sophie Spirkl (2023)
21. **Induced subgraphs and tree decompositions**
V. One neighbor in a hole
J. Graph Theory (accepted)
with Tara Abrishami, Bogdan Alecu, Maria Chudnovsky, Sophie Spirkl and Kristina Vušković (2022)
20. **Hitting all maximum stable sets in P_5 -free graphs**
J. Comb. Theory Ser. B (in revision)
with Yanjia Li and Sophie Spirkl (2023)
19. **List-3-Coloring ordered graphs with a forbidden induced subgraph**
SIAM J. Discrete Math (accepted)
with Yanjia Li and Sophie Spirkl (2023)
18. **Induced subgraphs and tree decompositions**
II. Toward walls and their line graphs in graphs of bounded degree
J. Comb. Theory Ser. B 164 (2024) – free access until Dec 19, 2023
with Tara Abrishami, Maria Chudnovsky, Cemil Dibek, Paweł Rzażewski, Sophie Spirkl and Kristina Vušković.
17. **Induced subgraphs and tree decompositions**
IV. (Even hole, diamond, pyramid)-free graphs
Electron. J. Comb 30(2) (2023)
with Tara Abrishami, Maria Chudnovsky and Sophie Spirkl.
16. **Induced subgraphs and tree decompositions**
III. Three-path-configurations and logarithmic treewidth
Advances in Combinatorics (6) (2022)
with Tara Abrishami, Maria Chudnovsky and Sophie Spirkl.
15. **Complexity dichotomy for List-5-Coloring with a forbidden induced subgraph**
SIAM J. Discrete Math 256(6) (2022)
with Yanjia Li and Sophie Spirkl.
14. **Minimal induced subgraphs of two classes of 2-connected non-Hamiltonian graphs**
Discrete Math. 345(7) (2022)
with Joseph Cheriyian, Zishen Qu and Sophie Spirkl.
13. **Edge clique cover of claw-free graphs**
J. Graph Theory 90(3) (2019)
with Ramin Javadi.

Submitted:
12. **Induced subgraphs and tree decompositions**
XII. Grid Theorem for pinched graphs
with Bogdan Alecu, Maria Chudnovsky and Sophie Spirkl (2023)
11. **Induced subgraphs and tree decompositions**
XI. Local structure for even-hole-free graphs of large treewidth
with Bogdan Alecu, Maria Chudnovsky and Sophie Spirkl (2023)
10. **Induced subdivisions with pinned branch vertices** (2023)

9. **Induced subgraphs and tree decompositions**
X. Towards logarithmic treewidth for even-hole-free graphs
 with Tara Abrishami, Bogdan Alecu, Maria Chudnovsky and Sophie Spirkl (2023)
8. **Tree independence number for (even hole, diamond, pyramid)-free graphs**
 with Tara Abrishami, Bogdan Alecu, Maria Chudnovsky, Sophie Spirkl and Kristina Vušković (2023)
7. **Induced subgraphs and tree decompositions**
IX. Grid theorem for perforated graphs
 with Bogdan Alecu, Maria Chudnovsky and Sophie Spirkl (2023)
6. **Induced subgraphs and tree decompositions**
VI. Graphs with 2-cutsets
 with Tara Abrishamin, Bogdan Alecu, Maria Chudnovsky and Sophie Spirkl (2022)

Upcoming:

5. **Induced subgraphs and tree decompositions**
XIII. Basic obstruction in \mathcal{H} -free graphs for finite \mathcal{H}
 with Bogdan Alecu, Maria Chudnovsky and Sophie Spirkl.
4. **Induced subgraphs and tree decompositions**
XIV. Non-adjacent neighbors in a hole
 with Maria Chudnovsky and Sophie Spirkl.
3. **Chordal graphs, even-hole-free graphs and sparse obstructions to bounded treewidth.**
2. **List- k -Coloring H -free graphs for all $k \geq 5$**
 with Maria Chudnovsky and Sophie Spirkl.
1. **Proof labelling schemes for forbidden induced subgraphs.**
 with Aristotelis Chaniotis, Linda Cook and Sophie Spirkl

Talks

Upcoming:

7. **Treewidth, Erdős-Posá and induced subgraphs** [invited]
 New York Combinatorics Seminar (Dec 8, 2023)
6. **Several Gyárfás-Sumner-type results for treewidth** [invited]
 Graphs and Matroids Seminar, University of Waterloo, Canada (Nov 23, 2023)

Past:

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 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)
- J. Comb. Theory Ser. B (JCTB)
- European Journal of Combinatorics
- J. Graph Theory (JGT)
- Electronic Journal of Combinatorics
- European Conference on Combinatorics, Graph Theory and Applications (EUROCOMB)
- Workshop on Graphs (WG)