

# Jaehoon Kim

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## Positions

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**Research Fellow** From Sep 2014  
University of Birmingham, United Kingdom.

**Postdoctoral fellow** Jun 2014 - Aug 2014  
Korea Advanced Institute of Science and Technology, Republic of Korea.

## Education

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**Ph.D., Mathematics** May 2014  
University of Illinois Urbana-Champaign  
Advised by Alexandr V. Kostochka  
Thesis : Extremal Problems Involving Forbidden Subgraphs.

**M.S., Applied Mathematics: Optimization and Algorithms** Dec 2013  
University of Illinois Urbana-Champaign

**B.S., Mathematics** Feb 2009  
Korea Advanced Institute of Science and Technology  
Advised by Sujin Shin  
Thesis : Characterization of  $S$ -gap shifts.  
(Military service : July 2006 - July 2008)

## Research Interests

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Graph Theory, extremal graph theory, graph coloring, hypergraph.

## Publications

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### Preprints submitted

- **Resolution of the Oberwolfach problem**  
Stefan Glock, Felix Joos, Jaehoon Kim, Daniela Kühn and Deryk Osthus  
arXiv:1806.04644, 28 pages

- **Rainbow structures in locally bounded colourings of graphs**  
Jaehoon Kim, Daniela Kühn, Andrey Kupavskii and Deryk Osthus  
arXiv:1805.08424, 29 pages.
- **Spanning trees in randomly perturbed graphs**  
Felix Joos and Jaehoon Kim  
arXiv:1803.04958, 41 pages.
- **Two conjectures in Ramsey-Turán theory**  
Jaehoon Kim, Younjin Kim and Hong Liu  
arXiv:1803.04721, 22 pages.
- **On 1-factors with prescribed lengths in tournaments**  
Dong Yeap Kang and Jaehoon Kim  
arXiv:1802.09049, 25 pages.
- **A bandwidth theorem for approximate decompositions**  
Padraig Condon, Jaehoon Kim, Daniela Kühn and Deryk Osthus  
arXiv:1712.04562, 47 pages.
- **A characterization of testable hypergraph properties**  
Felix Joos, Jaehoon Kim, Daniela Kühn and Deryk Osthus  
arXiv:1707.03303, 82 pages  
An extended abstract of this paper appears at FOCS 2017.

## Preprints accepted

- **Optimal packings of bounded degree trees**  
Felix Joos, Jaehoon Kim, Daniela Kühn and Deryk Osthus  
to appear in *Journal of the European Mathematical Society*, arXiv:1606.03953, 55 pages.
- **A blow-up lemma for approximate decompositions**  
Jaehoon Kim, Daniela Kühn, Deryk Osthus and Mykhaylo Tyomkyn  
to appear in *Transactions of the American Mathematical Society*, arXiv:1604.07282, 70 pages.

## 2018

- **Forbidding induced even cycles in a graph: typical structure and counting**  
Jaehoon Kim, Daniela Kühn, Deryk Osthus and Timothy Townsend  
*Journal of Combinatorial Theory Series B* **131** (2018), 170–219.
- **Dynamic choosability of triangle-free graphs and sparse random graphs**  
Jaehoon Kim and Seongmin Ok  
*Journal of Graph Theory* **87** (2018), 347–355.
- **Two-regular subgraphs of odd-uniform hypergraphs**  
Jie Han and Jaehoon Kim  
*Journal of Combinatorial Theory Series B* **128** (2018), 175–191.

- **Strong edge-colorings of sparse graphs with large maximum degree**  
Ilkyoo Choi, Jaehoon Kim, Alexandr V. Kostochka and André Raspaud  
*European Journal of Combinatorics* **67** (2018), 21–39.

## 2017

- **Proof of Komlós’s conjecture on Hamiltonian subsets**  
Jaehoon Kim, Hong Liu, Maryam Sharifzadeh and Katherine Staden  
*Proceedings of the London Mathematical Society* **115**(5) (2017), 974-1013.
- **Sparse spanning  $k$ -connected subgraphs in tournaments**  
Dong Yeap Kang, Jaehoon Kim, Younjin Kim and Geewon Suh  
*SIAM Journal on Discrete Mathematics* **31**(3) (2017), 2206-2227.
- **On the number of  $r$ -matchings in a tree**  
Dong Yeap Kang, Jaehoon Kim, Younjin Kim and Hiu-Fai Law  
*Electronic Journal of Combinatorics* **24**(1) (2017), #P1.24, 16 pages.

## 2016

- **Bipartitions of highly connected tournaments**  
Jaehoon Kim, Daniela Kühn and Deryk Osthus  
*SIAM Journal on Discrete Mathematics* **30**(2) (2016), 895-911.
- **On  $r$ -dynamic coloring of Graphs**  
Sogol Jahanbekam, Jaehoon Kim, Suil O and Douglas West  
*Discrete Applied Mathematics* **206** (2016), 65-72.
- **Regular subgraphs of uniform hypergraphs**  
Jaehoon Kim  
*Journal of Combinatorial Theory Series B* **119** (2016), 214-236.
- **Improper coloring of sparse graphs with a given girth, II: Constructions**  
Jaehoon Kim, Alexandr V. Kostochka and Xuding Zhu  
*Journal of Graph Theory* **81** (2016), 403-413.
- **The difference and ratio of the fractional matching number and the matching number of graphs**  
Ilkyoo Choi, Jaehoon Kim and Suil O  
*Discrete Mathematics* **339** (2016), 1382-1386.

## 2015

- **A relative of Hadwiger’s conjecture**  
Katherine Edwards, Dong Yeap Kang, Jaehoon Kim, Sang-il Oum and Paul Seymour  
*SIAM Journal on Discrete Mathematics* **29**(4) (2015), 2385-2388.

- **On the Erdős-Ko-Rado theorem and Bollobás theorem for  $t$ -intersecting families**

Dong Yeap Kang, Jaehoon Kim and Younjin Kim  
*European Journal of Combinatorics* **47** (2015), 68-74.

## 2014

- **Improper coloring of sparse graphs with a given girth, I:  $(0, 1)$ -colorings of triangle-free graphs**

Jaehoon Kim, Alexandr V. Kostochka and Xuding Zhu  
*European Journal of Combinatorics* **42** (2014), 26-48.

- **Equicovering subgraphs of graphs and hypergraphs**

Ilkyoo Choi, Jaehoon Kim, Amelia Tebbe and Douglas West  
*Electronic Journal of Combinatorics* **21(1)** (2014), #P1.62, 17 pages.

- **Ramsey-minimal saturation numbers for matchings**

Michael Ferrara, Jaehoon Kim and Elyse Yeager  
*Discrete Mathematics* **322** (2014), 26-30.

- **Maximum hypergraphs without regular subgraphs**

Jaehoon Kim and Alexandr V. Kostochka  
*Discussiones Mathematicae Graph Theory* **34** (2014), 151-166.

## 2013

- **Average connectivity and average edge-connectivity in graphs**

Jaehoon Kim and Suil O  
*Discrete Mathematics* **313** (2013), 2232-2238.

- **New results in  $t$ -tone coloring of graphs**

Dan Cranston, Jaehoon Kim and Bill Kinnersley  
*Electronic Journal of Combinatorics* **20(2)** (2013), #P17, 17 pages.

## 2012

- **Harmonious coloring of trees with large maximum degree**

Saieed Akbari, Jaehoon Kim and Alexandr V. Kostochka  
*Discrete Mathematics* **312** (2012), 1633-1637.

## Talks

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Combinatorics seminar, University of Warwick, May 2018  
*Randomly perturbed graphs and spanning trees*

2018 KMS Spring Meeting, invited speaker, Kyung Hee University, Seoul, April 2018  
*Recent developments on graph packing problems*

Incheon combinatorics seminar, Incheon National University, April 2018

*Forbidding induced even cycles in a graph*

Discrete mathematics seminar, Princeton University, April 2018

*The tree packing conjecture for bounded degree trees*

Combinatorics seminar, MIT, March 2018

*On testable hypergraph properties*

2018 International Workshop on Graph Theory, January 2018

*A bandwidth theorem for approximate decompositions*

Combinatorics Seminar at Konkuk University, December 2017

*Packing bounded degree trees*

KAIST Discrete Math Seminar, December 2017

*Spanning trees in randomly perturbed graphs*

Video: <https://www.youtube.com/watch?v=z3gh-JeYYoE>

The 18th KIAS Combinatorics Workshop, December 2017

*How many vertex sets are covered by cycles?*

58th Annual IEEE Symposium on Foundations of Computer Science (FOCS 2017), Berkeley, California, October 2017

*A characterization of testable hypergraph properties*

Extremal Combinatorics, University of Warwick, September 2017

*Tree packing conjecture for bounded degree trees*

The 18th International Conference on Random Structures and Algorithms, Institute of European Culture, Gniezno, August 2017

*A characterization of testable hypergraph properties*

AORC Special Lecture, Sunkyunkwan University, August 2017

*Which properties of hypergraphs can we quickly guess?*

Seminar at Ewha University, July 2017

*Asymptotic inference of properties of large objects*

Combinatorics Seminar at Konkuk University, July 2017

*Sparse  $k$ -connected subgraphs of tournaments*

KAIST Discrete Math Seminar, July 2017

*Property testing for hypergraphs*

Video: <https://www.youtube.com/watch?v=KBVagEZSAw0>

Combinatorial Theory Seminar, University of Oxford, June 2017

*On the number of distinct vertex sets covered by cycles*

One Day Birmingham-Warwick Combinatorics Meeting, June 2017

*Sparse  $k$ -connected subgraphs in tournaments*

Graph Theory and Combinatorics seminar in UIUC, April 2017

*On the number of Hamiltonian subsets*

Combinatorics Seminar at Konkuk University, January 2017

*On the number of cycles covering distinct vertex sets*

KAIST Discrete Math Seminar, December 2016

*Packing bounded degree trees*

Video: <https://www.youtube.com/watch?v=hwdNE9zOvf8>

General talk in Seoul National University, November 2016

*Introduction to graph decomposition*

Combinatorics Research Seminar at University of Birmingham, September 2016

*On the number of cycles covering distinct vertex sets*

The 13th KIAS Combinatorics Workshop: Summer School for Combinatorics, August 2016

*Regularity method for sparse graph embedding*

KIAS Combinatorics Seminar, August 2016

*Packing bounded degree graphs*

Seminar at Dong-A University, August 2016

*Packing bounded degree graphs*

Graph Theory and Combinatorics seminar in UIUC, May 2016

*A blow-up lemma for approximate graph decomposition*

Combinatorics Seminar at Konkuk University, January 2016

*A blow-up lemma for approximate graph decomposition*

Seminar at Ewha University, January 2016

*Approximate graph decomposition using blow-up lemma*

Seminar at Dong-A University, December 2015

*On the Erdős-Ko-Rado theorem and Bollobás theorem for  $t$ -intersecting families*

Eurocomb 2015, Bergen, September 2015

*Bipartitions of highly connected tournaments*

1st Korean Workshop on Graph Theory, August 2015

*Typical Structure of graphs with no induced even cycles*

Video: [http://www.mathnet.or.kr/real/2015/08/JaehoonKim\(20150826\).asx](http://www.mathnet.or.kr/real/2015/08/JaehoonKim(20150826).asx) (in Korean)

Seminar at Dong-A University, August 2015

*Regular subgraphs of hypergraphs*

Combinatorics Seminar at Konkuk University, July 2015

*On  $r$ -dynamic coloring and  $r$ -dynamic choosability of special classes of graphs*

Seminars on Discrete and Applicable Mathematics, LSE, February 2015  
*Uniform hypergraphs with no  $r$ -regular subgraphs.*

DIMAP Seminar, University of Warwick, January 2015  
*Regular subgraphs in hypergraphs*

2014 KAIST CMC Discrete Math Workshop, December 2014  
*Regular subgraphs in uniform hypergraphs*  
Video: <https://www.youtube.com/watch?v=X1t6NPBUVPY>

Bordeaux Graph Workshop, November 2014  
*Improper coloring and density of graphs with given girth*

Graph Theory Seminar at Technical University of Denmark, October 2014  
*On  $r$ -dynamic coloring and  $r$ -dynamic list coloring of graphs*

Graph Theory Seminar at Technical University of Denmark, October 2014  
*Improper coloring, graph density, girth and Hadwiger number*

Combinatorics Research Seminar at University of Birmingham, October 2014  
*Improper coloring and other graph parameters*

ICM2014 Satellite Conference on Extremal and Structural Graph Theory, August 2014  
*Saturation number of Ramsey-minimal graphs for matching*

Combinatorics Seminar at Konkuk University, June 2014  
*Saturation number of Ramsey-minimal graphs for matching*

KAIST Discrete Math Seminar, June 2014  
*On  $r$ -dynamic coloring of graphs*  
Video: [http://www.mathnet.or.kr/real/2014/06/KimJaeHoon\(20140609\).asx](http://www.mathnet.or.kr/real/2014/06/KimJaeHoon(20140609).asx)

The 4th KIAS Combinatorics Workshop, May 2014  
*Improper coloring of sparse graphs with a given girth*

AMS Sectional Meeting #1092, Contributed Paper Session I, October 2013  
 *$(0,1)$ -improper coloring of sparse graphs*

KAIST Discrete Math Seminar, June 2013  
 *$(0,1)$ -improper coloring of sparse triangle-free graphs*

AMS Sectional Meeting #1090, Contributed Paper Session I, April 2013  
 *$(0,1)$ -improper coloring of sparse triangle-free graphs*

Midwestern Graph Theory (MIGHTY) LIV at Miami University, April 2013  
 *$(0,1)$ -improper coloring of sparse triangle-free graphs*

Graph Theory and Combinatorics seminar in UIUC, March 2013  
*Saturation Number of Ramsey-Minimal Graphs for Matchings*

Midwestern Graph Theory (MIGHTY) LIII at Iowa State University, September 2012  
*Equicovering subgraphs of graphs and hypergraphs*

25th Cumberland Conference on Combinatorics, Graph Theory, and Computing, May 2012  
*Harmonious coloring of trees with large maximum degree*

8th Annual Graduate Student Combinatorics Conference, April 2012  
*Harmonious coloring of trees with large maximum degree*

IIT SIAM 2011, October 2011  
*Harmonious coloring of trees with large maximum degree*

Graph Theory and Combinatorics seminar in UIUC, October 2011  
*Harmonious coloring of trees with large maximum degree*

KAIST Discrete Math Seminar, June 2011  
*Maximum hypergraphs without regular subgraphs*  
 Video: [http://www.mathnet.or.kr/real/2011/06/KimJaehoon\(0603\).asx](http://www.mathnet.or.kr/real/2011/06/KimJaehoon(0603).asx)

Graph Theory and Combinatorics seminar in UIUC, April 2011  
*Maximum hypergraphs without regular subgraphs*

Midwestern Graph Theory (MIGHTY) LI at IPFW, April 2011  
*Maximum hypergraphs without regular subgraphs*

Graph Theory and Combinatorics seminar in UIUC, January 2011  
*Average connectivity, average edge connectivity, and regular graphs*

Undergraduate Thesis Presentation at KAIST, November 2008  
*Characterization of  $S$ -gap shifts*

## Honors

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BRIDGE Seed Fund\*, 2016

List of teachers ranked as excellent, UIUC, Spring 2013

Doctoral study abroad program†, The Korea Foundation for Advanced Studies, 2009-2014

National presidential science scholarship in Korea ‡, 2003-2008

## Teaching Experience

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### University of Birmingham

Advanced Topics in Combinatorics, Lecturer, Fall 2015

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\* £3,000 for travels between Birmingham and Illinois.

† 한국고등교육재단 해외유학장학생, \$10,000 per year for 5 years.

‡ 대통령과학장학생, KRW 10,000,000 won (approximately \$10,000) per year for 4 years.



## University of Illinois Urbana-Champaign

Math 234 (Calculus for Business I), TA, Spring 2014

Math 221 (Calculus I), TA, Fall 2013

Math 241 (Calculus III), TA, Spring 2013 <sup>§</sup>

Math 241 (Calculus III), TA, Spring 2012

Grader for Abstract Linear Algebra, Applied Complex Variables, Applied Linear Algebra, Combinatorial Mathematics, Elementary Linear Algebra, Fundamental Mathematics, Graph Theory, Introduction to Combinatorics, Introductory Matrix Theory, Fall 2008 - Fall 2012

## Korea Advanced Institute of Science and Technology

Summer School for talented students by KAIST Mathematical Problem Solving Group, Instructor, Summer 2008

KAIST Institute for Gifted Students, Instructor, December 2003 to June 2006

## Professional Activities

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Referees for various journals related to combinatorics.

Publishing *Math Letter*, a college math journal in Korea as a Vice president of *Msquare* (KAIST Mathematical Problem Solving Group) in 2004.

Last updated: June 13, 2018

[http://web.mat.bham.ac.uk/~kimjs/vitae/CV\\_JaehoonKim.pdf](http://web.mat.bham.ac.uk/~kimjs/vitae/CV_JaehoonKim.pdf)

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<sup>§</sup>Named in the List of Teachers Ranked as Excellent