

# Seonghyuk Im

Graduate student at KAIST

<https://seonghyukim.github.io/>

October 22, 2024

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## Current Position

- **KAIST** Daejeon, South Korea  
*Integrated master's/doctoral program* *2021-Current*
  - Advised by Jaehoon Kim and Hong Liu.

## Education

- **KAIST** Daejeon, South Korea  
*B.S., Mathematics* *2016-2020*
  - Advised by Yong Jung Kim.

## Preprints

- Sidorenko's conjecture for subdivisions and theta substitutions (with Ruonan Li and Hong Liu), arXiv:2408.03491
- Dirac's theorem for linear hypergraphs (with Hyunwoo Lee), arXiv:2403.14269
- Graph with any rational density and no rich subsets of linear size (with Suyun Jiang, Hong Liu, and Tuan Tran), arXiv:2402.13825
- On rainbow Turán Densities of Trees (with Jaehoon Kim, Hyunwoo Lee, and Haesong Seo), arXiv:2312.15956
- A bandwidth theorem for graph transversals (with Debsoumya Chakraborti, Jaehoon Kim, and Hong Liu), arXiv:2302.09637
- The proper conflict-free  $k$ -coloring problem and the odd  $k$ -coloring problem are NP-complete on bipartite graphs (with Jungho Ahn and Sang-il Oum), arXiv:2208.08330

## To appear

- Crux, space constraints and subdivisions (with Jaehoon Kim, Younjin Kim, and Hong Liu), to appear in *Journal of Combinatorial Theory, Series B*. arXiv:2207.06653. An extended abstract appears in EUROCOMB23

## Published

2024

- A proof of the Elliott-Rödl conjecture on hypertrees in Steiner triple systems (with Jaehoon Kim, Joonkyong Lee, and Abhishek Methuku)  
*Forum of Mathematics, Sigma* 2024;12:e75  
arXiv, journal
- On the spectral radius of graphs with given maximum degree and girth (with Jiangdong Ai, Jaehoon Kim, Hyunwoo Lee, Suil O, and Liwen Zhang)  
*Linear Algebra and its Applications* vol 691, 182-195  
journal

## 2016

- On the mean square displacement of a random walk on a graph (with Hwidong Kim, Jiho Maeng, Jihwan Yu, Yongwook Cha, and Seong-Hun Paeng)  
*European Journal of Combinatorics* 51 (2016): 227-235  
journal

## Talks

- Discrete Analysis Seminar  
October 15, 2024 at Yonsei University(Seoul, South Korea)  
*Rainbow Turán Densities of Trees via Graph Limits* (site)
- Shandong University Seminar  
August 5, 2024, Zoom  
*Rainbow Turán Densities of Trees via Graph Limits*
- 9th European Congress of Mathematics(ECM) - CS-15: 04. Combinatorics and Discrete Mathematics (II)  
July 16, 2024 at Sevilla, Spain  
*Graph with any rational density and no rich subsets of linear size* (site)
- Summit280  
July 11, 2024 at Budapest, Hungary  
*Dirac's theorem for linear hypergraphs* (site)
- 30th British Combinatorial Conference(BCC)  
July 3, 2024 at London, UK  
*Dirac's theorem for linear hypergraphs* (site)
- 31st KIAS combinatorics workshop  
June 1, 2024 at Jeju, South Korea  
*Dirac's theorem for linear hypergraphs* (site)
- 2024 KMS spring meeting  
April 19, 2024 at Daejeon, South Korea  
*On rainbow Turán densities of trees* (site)
- Yeungnam University Combinatorics Seminar  
March 18, 2024 at Yeungnam University(Gyeongsan, South Korea)  
*Graph with any rational density and no rich subsets of linear size* (site)

- 2023 European Conference on Combinatorics, Graph Theory and Applications (EUROCOMB'23)  
August 31, 2023 at Prague, Czech Republic  
*Cruz, space constraints and subdivisions* (Extended abstract)
- 2023 KMS Spring Meeting - Special Section: Extremal Combinatorics: Methods and Applications  
April 29, 2023 at Daejeon, South Korea  
*A bandwidth theorem for graph transversals* (site)
- Shandong University Seminar  
March 30, 2023, Zoom  
*A bandwidth theorem for graph transversals* (Bilibili)
- IBS Discrete Math Seminar  
November 29, 2022 at IBS(Daejeon, South Korea)  
*A proof of the Elliott-Rödl conjecture on hypertrees in Steiner triple systems* (Youtube)
- KAIST Math Graduate student Seminar (KMGS)  
November 3, 2022 at KAIST(Daejeon, South Korea)  
*Large clique subdivisions in graphs without small dense subgraphs* (site)
- 2021 Combinatorics Workshop  
December 21, 2021 at Yangpyeong, South Korea  
*Large clique subdivisions in graphs without small dense subgraphs* (Youtube)
- IBS Discrete Math Seminar  
November 30, 2021 at IBS(Daejeon, South Korea)  
*Large clique subdivisions in graphs without small dense subgraphs* (Youtube)

## Competitive Programming

2018 Kakao Code Festival 5th prize(30th place) . . . . . 2018  
2017 ACM-ICPC Daejeon Regional 17th place . . . . . 2017

## TA works

### 2024

- (spring) MAS 275 Discrete mathematics at KAIST

### 2023

- (fall) MAS 102 Calculus 2 and MAS 480 Topological methods in combinatorics at KAIST
- (spring) MAS 101 Calculus 1 and MAS 275 Discrete mathematics at KAIST

### 2022

- (fall) MAS 102 Calculus 2 and MAS 477 Introduction to Graph Theory at KAIST
- (spring) MAS 102 Calculus 2 and MAS 275 Discrete mathematics at KAIST

### 2021

- (fall) MAS 102 Calculus 2 and CC511 Probability and Statistics at KAIST
- (spring) MAS 101 Calculus 1 at KAIST (Won the Outstanding Teaching Assistant Award).