

# Donggyu Kim

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CONTACT INFORMATION	School of Mathematics Georgia Institute of Technology 686 Cherry Street Atlanta, GA 30332-0160 USA donggyu@gatech.edu <a href="https://dimag.ibs.re.kr/home/donggyu/">https://dimag.ibs.re.kr/home/donggyu/</a>
RESEARCH INTERESTS	Graph Theory and Matroid Theory: Graphs with vertex-minors, delta-matroids, etc.
POSITIONS	03/2025- School of Mathematics, <b>Georgia Institute of Technology</b> . Postdoctoral Fellow. Postdoc mentor: Matthew Baker.
EDUCATION	07/2019-02/2025 <b>Discrete Mathematics Group, Institute for Basic Science (IBS)</b> , Daejeon, Korea. Training student. 03/2019-02/2025 <b>KAIST</b> , Daejeon, Korea. M.S./Ph.D integrated program in Mathematics. Advisor: Sang-il Oum. 03/2015-02/2019 <b>KAIST</b> , Daejeon, Korea. B.S. in Mathematics with <i>Cum Laude</i> . 03/2012-02/2015 <b>KOREA SCIENCE ACADEMY OF KAIST</b> , Busan, Korea.
MILITARY SERVICE	03/2022- Alternative service in KAIST until 02/2025.
SUBMITTED PAPERS	1. <b>Donggyu Kim</b> and Hyunwoo Lee. “Reconstructing hypergraph matching polynomials”. arXiv: 2501.19081, 2025. 2. Matthew Baker, Changxin Ding, and <b>Donggyu Kim</b> . “The Jacobian of a regular orthogonal matroid and torsor structures on spanning quasi-trees of ribbon graphs”. arXiv: 2501.08796, 2025. 3. <b>Donggyu Kim</b> . “Baker-Bowler theory for Lagrangian Grassmannians”. Submitted, arXiv: 2403.02356, 2024. 4. Tong Jin and <b>Donggyu Kim</b> . “Orthogonal matroids over tracts”. Submitted, arXiv: 2303.05353, 2023.
ACCEPTED PAPERS	5. <b>Donggyu Kim</b> and Sang-il Oum. “Note on Hamiltonicity of basis graphs of even delta-matroids”. Journal of Graph Theory, accepted. arXiv: 2308.05772. 6. Junggho Ahn, Debsoumya Chakraborti, Kevin Hendrey, <b>Donggyu Kim</b> , and Sang-il Oum. “Twin-width of random graphs”. Random Structures Algorithms, June 2024. DOI: 10.1002/rsa.21247, arXiv: 2212.07880. 7. <b>Donggyu Kim</b> and Sang-il Oum. “Vertex-minors of graphs: A survey”. Discrete Appl. Math., July 2024. DOI: 10.1016/j.dam.2024.03.011.

8. **Donggyu Kim** and Sang-il Oum. “Prime vertex-minors of a prime graph”. *European J. Combin.*, **118**:103871, May 2024. DOI: 10.1016/j.ejc.2023.103871, arXiv: 2202.07877.
9. **Donggyu Kim**, Duksang Lee, and Sang-il Oum. “ $\Gamma$ -graphic delta-matroids and their applications”. *Combinatorica*, **43**(5):963-983, October 2023. DOI: 10.1007/s00493-023-00043-6, arXiv: 2104.11383.
10. **Donggyu Kim** and Suil O. “Eigenvalues and parity factors in graphs with given minimum degree”. *Discrete Math.*, **346**(4):113290, April 2023. DOI: 10.1016/j.disc.2022.113290, arXiv: 2111.12966.
11. Jungho Ahn, Kevin Hendrey, **Donggyu Kim** and Sang-il Oum. “Bounds for the twin-width of graphs”. *SIAM J. Discrete Math.*, **36**(3):2352-2366, 2022. DOI: 10.1137/21M1452834, arXiv: 2110.03957.
12. **Donggyu Kim**, Duksang Lee, and Sang-il Oum. “ $\Gamma$ -graphic delta-matroids and their applications”. In: *Proceedings of the 32nd International Symposium on Algorithms and Computation (ISAAC2021, December 6-8, 2021, Fukuoka, Japan)*. Ed. by Hee-Kap Ahn and Kunihiko Sadakane. Vol. 212. Accepted. Dagstuhl, Germany: Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2021, 70:1-70:13. DOI: 10.4230/LIPIcs.ISAAC.2021.70.

REFEREED  
 CONFERENCE  
 PAPERS

RESEARCH TALKS	Feb 28, 2025	Torsor structures on spanning quasi-trees of ribbon graphs, <i>Discrete Analysis Seminar</i> , Yonsei University, Seoul, South Korea.
	Oct 24, 2024	Baker-Bowler theory for Lagrangian Grassmannians, <i>Geometry of Matroids Workshop</i> , IAS, Princeton, New Jersey, U.S.
	Aug 30, 2024	Two ways to generalize matroids with coefficients, <i>2024 Combinatorics Workshop</i> , Chung Buk National University, Cheongju, South Korea.
	Aug 20, 2024	Baker-Bowler theory for Lagrangian Grassmannians, <i>2024 Workshop on (Mostly) Matroids</i> , IBS, Daejeon, South Korea.
	Jul 08, 2024	Baker-Bowler theory for Lagrangian Grassmannians, <i>SIAM Conference on Discrete Mathematics (DM24)</i> , Spokane, Washington, U.S.
	Apr 19, 2024	Baker-Bowler theory for Lagrangian Grassmannians, <i>2024 KMS Spring Meeting</i> , Daejeon, South Korea.
	Apr 15, 2024	Baker-Bowler theory for Lagrangian Grassmannians, <i>Joint seminar Atlanta-Groningen</i> , Online.
	Mar 18, 2024	Twin-width of random graphs, <i>Combinatorics Seminar</i> , Yeungnam University, Gyeongsan, Gyeongbuk, South Korea.
	Mar 09, 2024	Orthogonal matroids over tracts, <i>30th KIAS Combinatorics Workshop</i> , Seoul, South Korea.
	Oct 28, 2023	Hamiltonicity of basis graphs of even delta-matroids, <i>2023 KMS Annual Meeting</i> , Seoul, South Korea.
	Sep 19, 2023	Orthogonal matroids over tracts, <i>Discrete Math Seminar</i> , IBS Discrete Mathematics Group, Daejeon, South Korea.
	Jun 07, 2023	Prime vertex-minors of prime graphs, <i>CanADAM 2023</i> , Winnipeg, Canada.
	Apr 29, 2023	Orthogonal matroids over tracts, <i>2023 KMS Spring Meeting</i> , Daejeon, South Korea.
	Apr, 2023	(Poster) Orthogonal Matroids over Tracts, (Internal) IBS ECOPRO and DIMAG poster day.
	Dec 04, 2022	Matroid theory arising from projective geometry, <i>Workshop for Young Mathematicians in Korea 2022</i> , KAIST, Daejeon, South Korea.
	Jun 01, 2022	Stronger versions of Tutte's wheel theorem for vertex-/pivot-minors, <i>Student Symposium in Combinatorics 2022</i> , Online, Australia.
	May 28, 2022	(Poster) $\Gamma$ -graphic delta-matroids and their applications, <i>2022 KSIAM Spring Conference</i> , IBS, Daejeon, South Korea.
	Apr 28, 2022	A stronger version of Tutte's wheel theorem for vertex-minors, <i>2022 KMS Spring Meeting</i> , Online, South Korea.
	Feb 21, 2022	A stronger version of Tutte's wheel theorem for vertex-minors, <i>Discrete Math Seminar</i> , IBS Discrete Mathematics Group, Daejeon, South Korea.
	Nov 25, 2021	Eigenvalues and parity factors in graphs, <i>KAIST Math Graduate student Seminar</i> , Online, KAIST, South Korea.
	Nov 14, 2021	Eigenvalues and parity factors in graphs, <i>2021 China-Korea Young Scholars' Symposium on Discrete Mathematics, Statistics and Optimization</i> , Online, South Korea and China.
	Oct 26, 2021	$\Gamma$ -graphic delta-matroids and their applications, <i>Discrete Math Seminar</i> , IBS Discrete Mathematics Group, Daejeon, South Korea.
	Oct 21, 2021	$\Gamma$ -graphic delta-matroids and their applications, <i>2021 KMS Annual Meeting</i> , Online, South Korea.

AWARDS	May 28, 2022	Excellent Poster Award (Title: $\Gamma$ -graphic delta-matroids and their applications), 2022 KSIAM Spring Conference.
SERVICE	Jul 29 – Aug 02, 2024	Co-organizing 2024 Korean Student Combinatorics Workshop, Gongju, South Korea.
TEACHING EXPERIENCE	Fall 2023	TA, Introduction to Graph Theory (MAS477), <i>KAIST</i> .
	Summer 2023	TA, 2023 Third International Summer School for Advanced Undergraduate Students – Topological Methods in Combinatorics, <i>KAI-X Mathematics Global Workshop</i> (July 31st – August 3rd).
	Spring 2023	TA, Linear Algebra (MAS212), <i>KAIST</i> .
	Fall 2022	TA, Logic and Set Theory (MAS270), <i>KAIST</i> .
	Spring 2022	TA, Discrete Mathematics (MAS275), <i>KAIST</i> .
	Fall 2021	TA, Probability and Statistics (CC511), <i>KAIST</i> . TA, Introduction to Linear Algebra (MAS109), <i>KAIST</i> .
	Spring 2021	TA, Differential Equations and Applications (MAS201), <i>KAIST</i> . TA, Discrete Mathematics (MAS275), <i>KAIST</i> .
	Fall 2020	TA, Calculus I (MAS101), <i>KAIST</i> . TA, Introduction to Graph Theory (MAS477), <i>KAIST</i> .
	Spring 2020	TA, Introduction to Linear Algebra (MAS109), <i>KAIST</i> . (Excellent TA Award) TA, Discrete Mathematics (MAS275), <i>KAIST</i> .
	Fall 2019	TA, Introduction to Linear Algebra (MAS109), <i>KAIST</i> . TA, Linear Algebra (MAS212), <i>KAIST</i> .
	Spring 2019	TA, Calculus I (MAS101), <i>KAIST</i> .
REVIEW ACTIVITIES	Journals:	Graphs Combin. Studia Sci. Math. Hungar. Inform. and Comput.
	Conferences:	2025 SODA 2024 WG 2023 WALCOM 2023 MFCS
RELEVANT SKILLS	Languages:	Korean and English
	Design:	KAIST 45th Anniversary Emblem Contest - Prize winner (Jan. 6th, 2016) KAIST Dept. of Mathematical Sciences Logo Design Contest - 2nd award (Nov. 29th, 2021)
	Live streaming system:	Familiar with YouTube Live, ATEM, and OBS Studio.

(Last Updated: March 3, 2025)