최인혁

이력서/2025년 10월 수정

한국과학기술원부설고등과학원 수학부
서울시 동대문구 회기로 85길, 02455
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연구 관심사

제 연구는 기하위상수학, 기하군론 및 동역학 등에 걸쳐 있습니다. 핵심 키워드는 다음과 같습니다. Teichmüller space, mapping class groups, Outer space, Out(F_N), Gromov hyperbolic spaces, CAT(0) spaces, random walks, Patterson-Sullivan theory, growth of groups, percolation in groups, counting problems and growth problems in groups, dynamics of groups acting on Gromov hyperbolic spaces.

경력

08/2025-	**KIAS (KAIST부설 고등과학원)** KIAS Fellow
07/2024-08/2025	미국 **코넬대학교** Harry Kesten Assistant Professor (박사후연구원)
03/2023–06/2024	**KIAS (KAIST부설 고등과학원)** Project Research Fellow (–07/2023), June E Huh Fellow (08/2023–) 멘토교수: 김상현
03/2024–06/2024	캐나다 **필즈 연구소** Marsden 박사후연구원 프로그램 ("Thematic program on Randomness and Geometry" 참가) 멘토교수: Giulio Tiozzo

학력

09/2018–02/2023	**KAIST** 수리과학과 박사 지도교수: 백형렬
03/2015–08/2018	**KAIST** 물리학, 수리과학 및 생명과학 학사 최우등 졸업

기타 경력

07/2024-08/2025	고등과학원 허준이수학난제연구소 Visiting fellow
12/2018–02/2019	Tokyo Institute of Technology 방문
08/2017–02/2018	École Polytechnique Féderale de Lausanne 방문
12/2015–06/2017	**KAIST Biomedical Optics Lab** 학사연구원 지도교수: 박용근
06/2015–08/2015	University of California, Berkeley 방문

수상

09/2025	대한수학회 상산젊은수학자상
12/2024	S-OIL 우수학위논문상 (수학부문)
02/2023	KAIST 수리과학과 2023학년도 학위논문상
08/2022	KAIST 수리과학과 2022학년도 봄학기 우수조교상

논문

1. Classification of horospherical invariant measures in higher rank
   With *Dongryul M. Kim.*
   Preprint (2025), arXiv:2510.23365.

2. Invariant measures on the space of measured laminations for subgroups of mapping class group
   With *Dongryul M. Kim.*
   Preprint (2025), arXiv:2510.23256.

3. Percolation in acylindrically hyperbolic groups
   With *Donggyun Seo.*
   Preprint (2025), arXiv:2508.08932.

4. Metric weak proper discontinuity for pseudo-Anosov maps
   Preprint (2025), arXiv:2506.21214.

5. Acylindrically hyperbolic groups and counting problems
   Preprint (2025), arXiv:2504.20985.

6. 원의 위상동형사상 군의 자유군과 Tits 대안 (Pivoting technique for the circle homeomorphism group)
   Preprint (2025), 일부 번역: arXiv:2504.02788.

7. Smoothing countable group actions on metrizable spaces
   With *Sang-hyun Kim.*
   Preprint (2024), **Proceedings of the Mathematical Society of Japan, Seasonal Institute**에 게재 예정. arXiv:2410.06077.

8. Counting pseudo-Anosovs as weakly contracting isometries
   Inventiones Mathematicae, Vol. 242, pp. 337-386. (2025) `https://doi.org/10.1007/s00222-025-01358-5`, arXiv:2408.00603.

9. Confined subgroups in groups with contracting elements
   With *Ilya Gekhtman, Wenyuan Yang and Tianyi Zheng.*
   Preprint (2024). arXiv:2405.09070.

10. Contracting isometries and differentiability of the escape rate
    Preprint (2024). arXiv:2403.09992. **Probability Theory and Related Fields**에 게재 예정.

11. Random walks on groups and superlinear divergent geodesics
    With *Kunal Chawla, Vivian He and Kasra Rafi.*
    Ergodic Theory and Dynamical Systems, Vol. 45, no. 5, pp. 1403–1443. (2025) `https://doi.org/10.1017/etds.2024.75`, arXiv:2310.18506.

12. Genericity of contracting geodesics in groups
    With *Kunal Chawla and Giulio Tiozzo.*
    Preprint (2023). **Groups, Geometry, and Dynamics**에 온라인 사전 게재. `https://ems.press/journals/ggd/articles/14298985`. arXiv:2308.01877.

13. Random walks and contracting elements III: Outer space and outer automorphism group
    Preprint (2023). arXiv:2212.12122.

14. Random walks and contracting elements II: Translation lengths and quasi-isometric embedding
    Groups, Geometry, and Dynamics, Vol. 19, pp. 1373-1423. (2025) `https://doi.org/10.4171/ggd/831`.

15. Random walks and contracting elements I: Deviation inequality and limit laws
    Compositio Mathematica, Vol. 161, pp. 1512-1575. (2025) `https://doi.org/10.1112/S0010437X25007511`.

16. Random walks on mapping class groups (survey paper)
    With *Hyungryul Baik*.
    EMS Surveys in Mathematical Sciences, Vol. 9, no. 2, pp. 279–320. (2022) `https://doi.org/10.4171/EMSS/59`.

17. Pseudo-Anosovs are exponentially generic in mapping class groups
    Geometry & Topology, Vol. 28, pp. 1923-1955. (2024) `https://doi.org/10.2140/gt.2024.28.1923`.

18. Central limit theorem and geodesic tracking on hyperbolic spaces and Teichmüller spaces
    Advances in Mathematics, Vol. 431, 109236. (2023) `https://doi.org/10.1016/j.aim.2023.109236`.

19. Linear growth of translation lengths of random isometries on Gromov hyperbolic spaces and Teichmüller spaces
    With *Hyungryul Baik and Dongryul M. Kim*.
    Journal of the Institute of Mathematics of Jussieu, Vol. 23, no. 4, pp. 1751–1795. (2023) `https://doi:10.1017/S1474748023000373`.

20. Simple length spectra as moduli for hyperbolic surfaces and rigidity of length identities
    With *Hyungryul Baik and Dongryul M. Kim*. **Annales de l'Institut Fourier**에 게재 예정.
    Preprint (2020). arXiv:2012.05652.

21. On the surjectivity of the Symplectic representation of the mapping class group
    With *Hyungryul Baik and Dongryul M. Kim*.
    Topology and its Applications, Vol. 322, 108334. (2022) `https://doi.org/10.1016/j.topol.2022.108334`.

22. Topological entropy of pseudo-Anosov maps from a typical Thurston construction
    With *Hyungryul Baik and Dongryul M. Kim*.
    International Mathematics Research Notices, Vol. 2022, No. 24, pp. 19762-19904. (2022) `https://doi.org/10.1093/imrn/rnab167`

23. Inhyeok Choi, KyeoReh Lee, and YongKeun Park. Compensation of aberration and speckle noise in quantitative phase imaging using lateral shifting and spiral phase integration. **Optics Express**, 25(24) pp. 30771-30779 (2017).

연구 발표

강연 시리즈

2023.07.29.   Growth of (sub)groups with hyperbolicity. (강연 3회 및 1주일간 그룹 토의 진행)
               Geometry in Groups 2024. TIFR-ICTS, Bangalore, India.
2024.05.03.   Hyperbolicity of geodesics, counting and random walks. (강연 4회) *Riverside
               Workshop on Geometric Group Theory 2024, UC Riverside.*

초청 발표

2025.10.14. Locally finite invariant measures on measured laminations. *KIAS conference on mapping class groups.* 고등과학원.

2025.09.29. Nonuniqueness from percolation in acylindrically hyperbolic groups. *Alfred Renyi Insitute, Budapest, Hungary.*

2025.09.22. Nonuniqueness from percolation in acylindrically hyperbolic groups. *Autumn School on Probability and Dynamics on Groups, University of Münster, Germany.*

2025.09.17. Metric WPD of pseudo-Anosov maps. *Groups, Dynamics and Surfaces in Paris. IMJ-PRG at Sorbonne, Paris, France.*

2025.08.27. Many infinite clusters from percolation in many groups. *KIAS-KAIST Workshop on current challenges in mathematics.* 고등과학원.

2025.08.18. Metric WPD of pseudo-Anosov maps and quasimorphisms. *Algebraic and analytic methods in group theory in Warsaw. IMPAN, Warsaw, Poland.*

2025.08.06. Dynamics of semigroups of circle homeomorphisms. *One-day Festival of Group actions, Geometry and Dynamics.* 고등과학원.

2025.06.16. Genericity problem in groups with negative curvature. *Geometric Group Theory and Related Topics. BICMR, Peking University, China.*

2025.05.19. Counting pseudo-Anosovs and fully irreducibles. *53rd Barrett Lectures: Recent Development in Geometric Group Theory. TN, USA.*

2025.04.15. Genericity of pseudo-Anosovs and quasi-isometries. *Stanford Topology Seminar. CA, USA.*

2025.04.01. Genericity of pseudo-Anosovs and quasi-isometries. *Geometry & Topology Seminar. Rutgers New Brunswick, NJ, USA.*

2025.03.14. Dynamics of semigroups of circle homeomorphisms. *The Scottish Dynamics Network. Heriot-Watt University, Edinburgh, UK.*

2025.03.12. Genericity of pseudo-Anosovs and quasi-isometries. *Algebra, Geometry, and Topology Seminar. Heriot-Watt University, Edinburgh, UK.*

2025.03.06. Genericity of pseudo-Anosovs and quasi-isometries. *Binghamton Geometry & Topology Seminar. NY, USA.*

2025.02.14. Genericity of pseudo-Anosovs and quasi-isometries. *SUNY at Buffalo Geometry & Topology Seminar. NY, USA.*

2024.01.16. Free discrete subgroups of Homeo(S) and the fine curve graph. *Virtual Seminar in Geometry and Topology (VISGAT),* 고등과학원.

2024.12.03. Metric WPD for Homeo(S): loxodromics on the fine curve graph. *KAIST* 위상수학 세미나.

2024.11.28. Metric WPD for Homeo(S): loxodromics on the fine curve graph. *Hyperbolic Lunch, University of Toronto.*

2024.10.22. Genericity of pseudo-Anosovs and quasi-isometries. *CUNY Geometry & Topology Seminar, CUNY.*

2024.09.24. Genericity of pseudo-Anosovs and quasi-isometries. *KIAS-Rice Workshop on Geometric Topology,* 고등과학원 허준이수학난제연구소.

2024.09.05. Genericity of pseudo-Anosovs and quasi-isometries. *Cornell Dynamics Seminar.* (예정)

2024.06.25. Sullivan's conjecture, Myrberg limit set and Hausdorff dimension. *One day workshop with Young Geometric Topologists at KAIST.*

2024.05.13. Continuity of escape rate of random walks on CAT(0) spaces. *Dynamics of group actions and random walks on groups, Fields Institute.*

2024.04.21. Confined subgroups and their growth.*Alfréd Rényi Institute. Budapest, Hungary.*

2024.04.08. Genericity of pseudo-Anosov mapping classes. *Young Geometric Group Theory XII, Bristol, UK.*

2024.04.04. Genericity of pseudo-Anosovs (and fully irreducibles). *Princeton Topology Seminar, Princeton University.*

2024.04.02. Genericity of pseudo-Anosov mapping classes. *Brandeis Topology Seminar, Brandeis University.*

2024.03.20.	Random walks, superlinear divergence and quasi-isometry. *UBC Probability Seminar, University of British Columbia.*
2024.03.15.	Growth of normal subgroups of a hyperbolic group. *GT GAPS Seminar.* (Online)
2024.02.29.	Normal subgroups, confined subgroups and growth. *Korea-France Workshop on Dynamical Group Theory,* 고등과학원.
2024.01.17.	Regularity of the escape rate and the asymptotic entropy of a random walk. *KAIST GT Fair 2024,* 부산.
2023.11.03.	Genericity of contracting elements in groups. 서울대학교 *Rookies Workshop 2023,* 양평.
2023.10.28.	Generic mapping classes are pseudo-Anosov. *2023* 대한수학회 가을 발표회, 서울대학교.
2023.10.05.	Genericity of contracting elements in groups. *Tokyo-Seoul Conference in Mathematics 2023, The University of Tokyo.*
2023.09.11.	Random walks on groups without an action on hyperbolic spaces. *Topology seminar, KAIST.*
2023.09.04.	Genericity of contracting elements in groups. *World of GroupCraft III.* (Online)
2023.08.21.	Genericity of contracting elements in groups. *The 4th Korea-France Conference in Mathematics,* 고등과학원.
2023.07.14.	Geometry and dynamics of a finitely generated group. *Workshop on Quantum Analysis 2023,* 속초.
2023.04.20.	Random walks on non-positively curved spaces: rate of escape, CLT and large deviation principle. *Conference on Probability and PDE, KAIST.*
2023.04.06.	Counting pseudo-Anosov mapping classes. (a series of 4 talks) *Virtual Seminar on Geometry and Topology,* 고등과학원.
2023.02.09.	Asymmetry of a generic outer automorphism of a free group. *The 18th East Asian Conference on Geometric Topology.* (온라인)
2022.11.08.	Random subgroup is quasi-isometrically embedded. *Geometry and Topology Seminar, CUNY.*
2022.11.08.	The log-regularity of the hitting measure on the Gromov boundary. *Group actions, Geometry and Dynamics Seminar, Yale University.*
2022.11.02.	Asymmetry of a typical outer automorphism. *Geometry and Topology Seminar, Temple university.*
2022.10.27.	Simple length spectrum of a hyperbolic surface. *Hyperbolic lunch, University of Toronto.*
2022.10.24.	Mapping class group, Teichmüller space and Bers' proof of Nielsen-Thurston's classification. *Dynamics Seminar, University of Toronto.*
2022.05.12.	Typical behavior of random mapping classes and outer automorphisms. *Fudan Topology Seminar.* (온라인)
2022.04.11.	Limit laws beyond hyperbolic spaces. *AIM Workshop "Random walks beyond hyperbolic groups".*
2021.12.03.	Limit laws for random walks on mapping class groups. *Conformal Dynamics and Groups Seminar, BICMR.* (온라인)
2021.11.29.	Random walks on mapping class groups favor pseudo-Anosovs. *Dynamics Seminar, University of Toronto.* (온라인)
2021.11.18.	Random walks, counting problems and genericity of loxodromics. *Geometry and Topology Seminar, Technion.* (온라인)
2021.10.06.	Random walks on Gromov hyperbolic spaces and Teichmüller spaces. *Tokyo Tech Topology Seminar.* (온라인)
2021.07.22.	Random walks on Gromov hyperbolic spaces and Teichmüller spaces. *Pacific Dynamics Seminar.* (온라인)
2021.02.03.	Simple length spectra of a generic hyperbolic surface determine its isometry class. *Virtual Seminar on Geometry and Topology.* (온라인)

<div align="center">참가 발표</div>

2022.05.31.	Frequently contracting geodesics and random mapping class. *PK2 Topology Workshop.*
2022.04.25.	Limit laws and their consequences on MCG and Out(Fn). 5-min lightning talk, *IHP Conference "Mapping Class Groups and Out(Fn)".*
2022.01.18.	Random mapping classes are pseudo-Anosov. *The 17th East Asian Conference on Geometric Topology.* (온라인)
2021.01.26.	Rigidity of length Identities of hyperbolic surfaces. *The 16th East Asian Conference on Geometric Topology.* (온라인)
2020.10.30.	Random walks and mapping class groups. 10-minute talk at *Geometric Group Theory in East Asia.* (온라인)

학회 조직

2026.06.07.	Young Geometric Group Theory (yGGT) XIV, KIAS (공동조직: Giovanni Italiano (Oxford), Annette Karrer (Ohio State), 곽상훈 (서울대학교))
2025.08.29.	2025 2K-GATE One day Geometric Topology Festival (공동조직위원: 김상현 (고등과학원), 백형렬 (KAIST))
2023.12.18–20.	Hyperbolic Geometry of Numbers, 고등과학원 (공동조직: 김상현 (고등과학원), Ser Peow Tan (NUS))
2023.09.27–28.	The 1st Korea-Chile Workshop on Dynamical Group Theory, 인천 (공동조직: 김상현 (고등과학원))

교육

코넬대학교

2025 봄	MATH 3040 Prove It! 강의
2024 가을	MATH 1110 Calculus I 강의

KAIST

2022 가을	MAS102 미적분학 II & MAS430 조합적 위상수학 조교
2022 봄	MAS109 선형대수학개론, MAS201 응용미분방정식 조교
2021 가을	MAS201 응용미분방정식, MAS441 르베그적분론 조교
2021 봄	MAS109 선형대수학개론, MAS331 위상수학 조교
2020 가을	MAS102 미적분학 II, MAS441 르베그적분론 조교
2020 봄	MAS201 응용미분방정식 총괄조교
2019 가을	MAS201 응용미분방정식, MAS441 르베그적분론 조교
2019 봄	MAS201 응용미분방정식, MAS331 위상수학 조교
2018 가을	MAS355 수리통계학 조교
2017 봄, 2018 봄	MAS101 미적분학 I 학부생조교

봉사 및 대외활동

- 다음에 심사 의견 제출: *Advances in Mathematics, Annales Henri Lebesgue, Annales de l'IHP (B), Compositio Mathematica, Forum of Mathematics, Sigma* (quick opinion), *Israel Journal of Mathematics, Journal of Topology, Journal of Topology and Analysis, Memoirs of the EMS, MathSciNet Mathematical Reviews.*

- Cornell Topology Seminar 주관: 2024학년도 가을학기 및 2025학년도 봄학기