

# 최인혁

이력서/2024년 8월 수정

미국 뉴욕주 이타카 시 Malott Hall 310, 코넬대학교 수학과

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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,  $\text{Out}(F_N)$ , Gromov hyperbolic spaces,  $\text{CAT}(0)$  spaces, random walks, dynamics of groups acting on spaces.

## 경력

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|-----------------|---|
| 07/2024-        | 미국 코넬대학교<br>Harry Kesten Assistant Professor (박사후연구원)   |
| 03/2023-        | <b>KIAS (KAIST부설 고등과학원)</b><br>Project research fellow (-07/2023), June E Huh fellow (08/2023-) (박사후연구원)<br>멘토교수: 김상현 교수님 |
| 03/2024-06/2024 | 캐나다 펄즈 연구소<br>Marsden 박사후연구원 프로그램 ("Thematic program on Randomness and Geometry" 참가)<br>멘토교수: Prof. Giulio Tiozzo         |

## 학력

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|-----------------|--|
| 09/2018-02/2023 | <b>KAIST</b><br>수리과학과 석박사통합과정 졸<br>지도교수: 백형렬 교수님 |
| 03/2015-08/2018 | <b>KAIST</b><br>물리학, 수리과학 및 생명과학 학사 졸<br>최우등 졸업  |

## 기타 경력

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|-----------------|---|
| 12/2018-02/2019 | Tokyo Institute of Technology 교환학생                        |
| 08/2017-02/2018 | École Polytechnique Fédérale de Lausanne 교환학생             |
| 12/2015-06/2017 | <b>KAIST Biomedical Optics Lab</b> 학사연구원<br>지도교수: 박용근 교수님 |
| 06/2015-08/2015 | University of California, Berkeley 교환학생                   |

## 수상

- |                 |                                       |
|-----------------|---------------------------------------|
| 02/2023         | KAIST 수리과학과 2023학년도 학위논문상             |
| 08/2022         | KAIST 수리과학과 2022학년도 봄학기 우수조교상         |
| 03/2017         | KAIST 자연과학대학 2016학년도 가을학기 Dean's list |
| 12/2016         | 전국 대학생수학경시대회 은상                       |
| 03/2015-08/2018 | 대통령과학장학생                              |
| 03/2015-08/2018 | KAIST 총장 장학생                          |

1. Counting pseudo-Anosovs as weakly contracting isometries  
Preprint (2024). arXiv:2408.00603.
2. Confined subgroups in groups with contracting elements  
With *Ilya Gekhtman, Wenyan Yang and Tianyi Zheng*.  
Preprint (2024). arXiv:2405.09070.
3. Contracting isometries and differentiability of the escape rate  
Preprint (2024). arXiv:2403.09992.
4. Random walks on groups and superlinear divergent geodesics  
With *Kunal Chawla, Vivian He and Kasra Rafi*.  
Preprint (2023). arXiv:2310.18506.
5. Genericity of contracting geodesics in groups  
With *Kunal Chawla and Giulio Tiozzo*.  
Preprint (2023). arXiv:2308.01877.
6. Random walks and contracting elements III: Outer space and outer automorphism group  
Preprint (2023). arXiv:2212.12122.
7. Random walks and contracting elements II: Translation lengths and quasi-isometric embedding  
Preprint (2023). arXiv:2212.12119.
8. Random walks and contracting elements I: Deviation inequality and limit laws  
Preprint (2023). arXiv:2207.06597.
9. Random walks on mapping class groups (survey paper)  
With *Hyungrul Baik*.  
**EMS Surveys in Mathematical Sciences**, 9 (2022), no. 2, pp. 279–320. <https://doi.org/10.4171/EMSS/59>.
10. Pseudo-Anosovs are exponentially generic in mapping class groups  
**Geometry & Topology**, Volume 28, pp. 1923–1955. (2024) <https://doi.org/10.2140/gt.2024.28.1923>.
11. Central limit theorem and geodesic tracking on hyperbolic spaces and Teichmüller spaces  
**Advances in Mathematics**, Volume 431, 109236 (2023). <https://doi.org/10.1016/j.aim.2023.109236>.
12. Linear growth of translation lengths of random isometries on Gromov hyperbolic spaces and Teichmüller spaces  
With *Hyungrul Baik and Dongryul M. Kim*.  
**Journal of the Institute of Mathematics of Jussieu**, published online 2023:1–45. <https://doi.org/10.1017/S1474748023000373>.
13. Simple length spectra as moduli for hyperbolic surfaces and rigidity of length identities  
With *Hyungrul Baik and Dongryul M. Kim*.  
Preprint (2020). arXiv:2012.05652.
14. On the surjectivity of the Symplectic representation of the mapping class group  
With *Hyungrul Baik and Dongryul M. Kim*.  
**Topology and its Applications**, Volume 322, 108334 (2022). <https://doi.org/10.1016/j.topol.2022.108334>.

15. Topological entropy of pseudo-Anosov maps from a typical Thurston construction  
With *Hyungryl Baik and Dongryul M. Kim*.  
**International Mathematics Research Notices**, Volume 2022, No. 24, pp. 19762-19904. (2022) <https://doi.org/10.1093/imrn/rnab167>
16. 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

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### 강연 시리즈

- 2023.07.29. Growth of (sub)groups with hyperbolicity. (강연 4회 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

- 2024.10.22. TBA. *CUNY Geometry & Topology Seminar, CUNY.* (Tentative)
- 2024.09.24. TBA. *KIAS-Rice Workshop on Geometric Topology, 고등과학원*  
*허준이수학난제연구소.*
- 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.*
- 2024.04.08. 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)

### 참가 발표

- 2022.05.31. Frequently contracting geodesics and random mapping class. *PK2 Topology Workshop*.
- 2022.04.25. Limit laws and their consequences on MCG and  $\text{Out}(Fn)$ . 5-min lightning talk, *IHP Conference "Mapping Class Groups and  $\text{Out}(Fn)$ "*.
- 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

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- 2023.12.18–20. Hyperbolic Geometry of Numbers, 고등과학원 (김상현 교수님 및 Ser Peow Tan 교수님과 공동으로 조직)
- 2023.09.27–28. The 1st Korea-Chile Workshop on Dynamical Group Theory, 인천 (김상현 교수님과 공동으로 조직)

코넬대학교에서

2024 가을 MATH 1110 Calculus I 강사

KAIST에서

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

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봉사 및 대외활동

- 다음에 심사 의견 제출: *Annales Henri Lebesgue*, *Annales de l'IHP (B)*, *Journal of Topology*, *Mathematical Reviews*.
- 고등과학원 웹진 (Horizon)에 수학 만화 연재