

Inhyeok Choi

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Research Interests

My research lies in the intersection of geometric topology, geometric group theory and probability theory. Research keywords include Teichmüller space, mapping class groups, Outer space, $\text{Out}(F_N)$, Gromov hyperbolic spaces, $\text{CAT}(0)$ spaces, random walks, and dynamics of groups acting on spaces.

Education

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| 09/2018– | Korea Advanced Institute of Science and Technology , Daejeon, South Korea
M.S. & Ph.D. Integrated Program in Mathematical Sciences
Advisor: Prof. Hyungryul Baik |
| 03/2015–08/2018 | Korea Advanced Institute of Science and Technology , Daejeon, South Korea
B.Sc. in Physics, Mathematical Sciences, and Biological Sciences
Summa Cum Laude |

Other Educational Experiences

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| 12/2018–02/2019 | Exchange student, Tokyo Institute of Technology |
| 08/2017–02/2018 | Exchange student, École Polytechnique Fédérale de Lausanne |
| 12/2015–06/2017 | Undergraduate researcher, Biomedical Optics Lab, KAIST
Advisor: Prof. YongKeun Park |
| 06/2015–08/2015 | Exchange student, University of California, Berkeley |

Awards and Honors

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| 08/2022 | Best TA Award, 2022 Spring semester, Dept. of Mathematical Sciences, KAIST |
| 03/2017 | Dean's list, 2016 Fall semester, College of Natural Sciences, KAIST |
| 12/2016 | Silver Prize, Korean Undergraduate Mathematics Competition (전국 대학생수학경시대회), Korean Mathematical Society |
| 03/2015–08/2018 | Korea Presidential Science Scholarship (대통령과학장학생), Korea Student Aid Foundation |
| 03/2015–08/2018 | KAIST Presidential Fellowship |

Publications & Preprints

- Limit laws on Outer space, Teichmüller space, and $\text{CAT}(0)$ spaces
Preprint (2022). [arXiv:2207.06597](https://arxiv.org/abs/2207.06597).
- Random walks on mapping class groups (survey paper)
With *Hyungryul Baik*.
Preprint (2021). [arXiv:2110.04868](https://arxiv.org/abs/2110.04868).
- Pseudo-Anosovs are exponentially generic in mapping class groups
Preprint (2021). To appear in **Geometry & Topology**. [arXiv:2110.06678](https://arxiv.org/abs/2110.06678).
- Central limit theorem and geodesic tracking on hyperbolic spaces and Teichmüller spaces
Preprint (2021). [arXiv:2106.13017](https://arxiv.org/abs/2106.13017).

5. Linear growth of translation lengths of random isometries on Gromov hyperbolic spaces and Teichmüller spaces
With *Hyungrul Baik and Dongryul M. Kim*.
Preprint (2021). arXiv:2103.13616.
6. 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.
7. 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). doi.org/10.1016/j.topol.2022.108334.
8. Topological entropy of pseudo-Anosov maps from a typical Thurston construction
With *Hyungrul Baik and Dongryul M. Kim*.
International Mathematics Research Notices, Volume 2022, No. 24, pp. 19762-19904. (2022) <https://doi.org/10.1093/imrn/rnab167>
9. 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).

Research Talks

Invited Talks

- 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*. (Online)
- 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*. (Online)
- 2021.11.29. Random walks on mapping class groups favor pseudo-Anosovs. *Dynamics Seminar, University of Toronto*. (Online)
- 2021.11.18. Random walks, counting problems and genericity of loxodromics. *Geometry and Topology Seminar, Technion*. (Online)
- 2021.10.06. Random walks on Gromov hyperbolic spaces and Teichmüller spaces. *Tokyo Tech Topology Seminar*. (Online)
- 2021.07.22. Random walks on Gromov hyperbolic spaces and Teichmüller spaces. *Pacific Dynamics Seminar*. (Online)
- 2021.02.03. Simple length spectra of a generic hyperbolic surface determine its isometry class. *Virtual Seminar on Geometry and Topology*. (Online)

Contributed Talks

- 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*. (Online)
- 2021.01.26. Rigidity of length Identities of hyperbolic surfaces. *The 16th East Asian Conference on Geometric Topology*. (Online)
- 2020.10.30. Random walks and mapping class groups. 10-minute talk at *Geometric Group Theory in East Asia*. (Online)

Teaching

- 2022F TA, MAS102 Calculus II & MAS430 Combinatorial Topology
- 2022S TA, MAS109 Linear algebra and Applications & MAS201 DE and Applications
- 2021F TA, MAS201 DE and Applications & MAS441 Lebesgue Integration Theory
- 2021S TA, MAS109 Linear algebra and Applications & MAS331 Topology
- 2020F TA, MAS102 Calculus II & MAS441 Lebesgue Integration Theory
- 2020S Head TA, MAS201 DE and Applications
- 2019F TA, MAS201 DE and Applications & MAS441 Lebesgue Integration Theory
- 2019S TA, MAS201 DE and Applications & MAS331 Topology
- 2018F TA, MAS355 Mathematical Statistics
- 2017S, 2018S Undergraduate TA, MAS101 Calculus I

Service & Outreach

- Refereed for *Annales Henri Lebesgue*
- Published a series of math cartoons on KIAS webzine $\langle \text{Horizon} \rangle$ (in Korean)

References

Prof. Hyungryul Baik, KAIST
`hrbaik@kaist.ac.kr`

Prof. Ilya Gekhtman, Technion
`ilyagekh@gmail.com`

Prof. Sébastien Gouëzel, Université de Rennes 1
`sebastien.gouezel@univ-rennes1.fr`

Prof. Kasra Rafi, University of Toronto
`rafi@math.toronto.edu`

Prof. Giulio Tiozzo, University of Toronto
`tiozzo@math.utoronto.ca`

(Teaching) Prof. Moon-Jin Kang, KAIST
`moonjinkang@kaist.ac.kr`