

# Inhyeok Choi

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## Research Interests

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My research lies in the intersection of geometric topology, geometric group theory and dynamics. Research keywords include: 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.

## Education

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- 09/2018– **KAIST**, Daejeon, South Korea  
M.S. & Ph.D. Integrated Program in Mathematical Sciences  
Advisor: Prof. Hyungryul Baik
- 03/2015–08/2018 **KAIST**, 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

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1. Limit laws on Outer space, Teichmüller space, and  $\text{CAT}(0)$  spaces  
Preprint (2022). [arXiv:2207.06597](https://arxiv.org/abs/2207.06597).
2. Random walks on mapping class groups (survey paper)  
With *Hyungryul Baik*.  
Preprint (2021). [arXiv:2110.04868](https://arxiv.org/abs/2110.04868).
3. 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).
4. 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 *Hyungrgul 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 *Hyungrgul Baik and Dongryul M. Kim*.  
Preprint (2020). arXiv:2012.05652.
7. On the surjectivity of the Symplectic representation of the mapping class group  
With *Hyungrgul Baik and Dongryul M. Kim*.  
Preprint (2020). arXiv:2008.10142.
8. Topological entropy of pseudo-Anosov maps from a typical Thurston construction  
With *Hyungrgul Baik and Dongryul M. Kim*.  
Online published in **International Mathematics Research Notices**, <https://doi.org/10.1093/imrn/rnab167> (2021).
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

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### Invited Talks

- 2022.11.08. Random subgroup is quasi-isometrically embedded. *Geometry and Topology Seminar, CUNY*. (Upcoming)
- 2022.11.08. The log-regularity of the hitting measure on the Gromov boundary. *Group actions, Geometry and Dynamics Seminar, Yale University*. (Upcoming)
- 2022.11.02. Asymmetry of a typical outer automorphism. *Geometry and Topology Seminar, Temple university*. (Upcoming)
- 2022.10.24. Mapping class group, Teichmüller space and Bers' proof of Nielsen-Thurston's classification. *Dynamics Seminar, University of Toronto*. (Upcoming)
- 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

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- 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

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

## References

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- Prof. Hyungryul Baik, KAIST  
[hrbaik@kaist.ac.kr](mailto:hrbaik@kaist.ac.kr)
- Prof. Ilya Gekhtman, Technion  
[ilyagekh@gmail.com](mailto:ilyagekh@gmail.com)
- Prof. Sébastien Gouëzel, Université de Rennes 1  
[sebastien.gouezel@univ-rennes1.fr](mailto:sebastien.gouezel@univ-rennes1.fr)
- Prof. Kasra Rafi, University of Toronto  
[rafi@math.toronto.edu](mailto:rafi@math.toronto.edu)
- Prof. Giulio Tiozzo, University of Toronto  
[tiozzo@math.utoronto.ca](mailto:tiozzo@math.utoronto.ca)
- (Teaching) Prof. Moon-Jin Kang, KAIST  
[moonjinkang@kaist.ac.kr](mailto:moonjinkang@kaist.ac.kr)