Inhyeok Choi

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June E Huh Center for Mathematical Challenges, KIAS 85 Hoegiro Dongdaemun-gu, Seoul, South Korea, 02455 Email: inhyeokchoi48@gmail.com Website: https://inhyeokchoi48.github.io

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, $Out(F_N)$, Gromov hyperbolic spaces, CAT(0) spaces, random walks, and dynamics of groups acting on spaces.

Positions

Korea Institute for Advanced Study, Seoul, South Korea
Project research fellow (-07/2023), June E Huh Fellow (08/2023-) (Post-doc)
Mentor: Prof. Sang-hyun Kim
Fields Institute, Toronto, ON, Canada
Marsden Postdoctoral Fellowship (visiting for the program "Thematic program on
Randomness and Geometry")
Mentor: Prof. Giulio Tiozzo

Education

09/2018 - 02/2023	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

12/2018-02/2019	Exchange student, Tokyo Institute of Technology
08/2017 - 02/2018	Exchange student, École Polytechnique Féderale 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

02/2023	Best Thesis Award, 2023, Dept. of Mathematical Sciences, KAIST
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

- 1. Contracting isometries and differentiability of the escape rate Preprint (2024). arXiv:2403.09992.
- Random walks on groups and superlinear divergent geodesics With Kunal Chawla, Vivian He and Kasra Rafi. Preprint (2023). arXiv:2310.18506.
- 3. Genericity of contracting geodesics in groups With *Kunal Chawla and Giulio Tiozzo*. Preprint (2023). arXiv:2308.01877.
- 4. Random walks and contracting elements III: Outer space and outer automorphism group Preprint (2023). arXiv:2212.12122.
- 5. Random walks and contracting elements II: Translation lengths and quasi-isometric embedding Preprint (2023). arXiv:2212.12119.
- Random walks and contracting elements I: Deviation inequality and limit laws Preprint (2023). arXiv:2207.06597.
- Random walks on mapping class groups (survey paper) With Hyungryul Baik.
 EMS Surveys in Mathematical Sciences, 9 (2022), no. 2, pp. 279–320. https://doi.org/10.4171/EMSS/59.
- Pseudo-Anosovs are exponentially generic in mapping class groups Preprint (2021). To appear in Geometry & Topology. arXiv:2110.06678.
- 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.
- Linear growth of translation lengths of random isometries on Gromov hyperbolic spaces and Teichmüller spaces
 With Hyungryul Baik and Dongryul M. Kim.

Preprint (2021). To appear in Journal of the Institute of Mathematics of Jussieu. arXiv:2103.13616.

- Simple length spectra as moduli for hyperbolic surfaces and rigidity of length identities With Hyungryul Baik and Dongryul M. Kim. Preprint (2020). arXiv:2012.05652.
- On the surjectivity of the Symplectic representation of the mapping class group With Hyungryul Baik and Dongryul M. Kim.
 Topology and its Applications, Volume 322, 108334 (2022). doi.org/10.1016/j.topol.2022.108334.
- 13. Topological entropy of pseudo-Anosov maps from a typical Thurston construction With Hyungryul Baik and Dongryul M. Kim.
 International Mathematics Research Notices, Volume 2022, No. 24, pp. 19762-19904. (2022) https: //doi.org/10.1093/imrn/rnab167
- 14. 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).

Invited Talks

2024.05.13.	TBD. Dynamics of group actions and random walks on groups, Fields Institute. (Tentative)
2024.05.03.	Hyperbolicity of geodesics, counting and random walks. (series of 4 talks) <i>Riverside</i> Workshop on <i>Geometric Group Theory</i> 2021, UC <i>Riverside</i> (Tentative)
2024.04.08.	Genericity of pseudo-Anosov mapping classes. Young Geometric Group Theory XII, Bristol, UK. (Tentative)
2024.04.04.	Genericity of pseudo-Anosovs (and fully irreducibles). <i>Princeton Topology Seminar</i> , <i>Princeton University</i> .
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 <i>GT GAPS Seminar</i> (Online)
2024.02.29.	Normal subgroups, confined subgroups and growth. Korea-France Workshop on Dynamical Group Theory KIAS
2024.01.17.	Regularity of the escape rate and the asymptotic entropy of a random walk. <i>KAIST</i> <i>GT Fair 2024 Busan Korea</i>
2023.11.03.	Genericity of contracting elements in groups. SNU Rookies Workshop 2023, Yanapeona, Korea
2023 10 28	Generic mapping classes are pseudo-Anosov 2023 KMS Fall Meeting SNU
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. <i>Topology seminar</i> , <i>KAIST</i> .
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, KIAS.
2023.07.14.	Geometry and dynamics of a finitely generated group. Workshop on Quantum Analysis 2023, Sokcho, Korea.
2023.04.20.	Random walks on non-positively curved spaces: rate of escape, CLT and large deviation principle. <i>Conference on Probability and PDE, KAIST.</i>
2023.04.06.	Counting pseudo-Anosov mapping classes. (series of 4 talks) Virtual Seminar on Geometry and Topology, KIAS.
2023.02.09.	Asymmetry of a generic outer automorphism of a free group. The 18th East Asian Conference on Geometric Topology. (Online)
2022.11.08.	Random subgroup is quasi-isometrically embedded. <i>Geometry and Topology</i> Seminar, CUNY.
2022.11.08.	The log-regularity of the hitting measure on the Gromov boundary. <i>Group actions</i> , <i>Geometry and Dynamics Seminar</i> , Yale University.
2022.11.02.	Asymmetry of a typical outer automorphism. <i>Geometry and Topology Seminar,</i> <i>Temple university.</i>
2022.10.27.	Simple length spectrum of a hyperbolic surface. <i>Hyperbolic lunch, University of Toronto.</i>
2022.10.24.	Mapping class group, Teichmüller space and Bers' proof of Nielsen-Thurston's classification. <i>Dynamics Seminar</i> , University of Toronto.
2022.05.12.	Typical behavior of random mapping classes and outer automorphisms. <i>Fudan</i> <i>Topology Seminar</i> . (Online)

2022.04.11.	Limit laws beyond hyperbolic spaces. AIM Workshop "Random walks beyond
	hyperbolic groups", San Jose, CA United States
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 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. (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)

Conference organization

Hyperbolic Geometry of Numbers, KIAS (with Prof. Sang-hyun Kim, Prof.
Ser-Peow Tan)
The 1st Korea-Chile Workshop on Dynamical Group Theory, Incheon, Korea. (with
Prof. Sang-hyun Kim)

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, Mathematical Reviews.

• Published a series of math cartoons on KIAS webzine $\langle Horizon \rangle$ (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