

Minsung Kim

CONTACT INFORMATION	Department of Mathematics, Kungliga Tekniska Högskolan KTH Royal Institute of Technology Lindstedtsvägen 25, SE-100 44 Stockholm, Sweden	minsung@kth.se
RESEARCH INTERESTS	Parabolic dynamics and its connections with geometry and representation theory: - Deviation of ergodic integrals, cohomological equations, and cocycle rigidity. Dynamics on nilmanifolds and their probabilistic applications: - Random walks and limit theorems on nilmanifolds. Interactions with hyperbolic dynamics: - Ruelle resonances and applications of transfer operator methods on anisotropic spaces.	
ACADEMIC APPOINTMENT	KTH Royal Institute of Technology, Stockholm, Sweden. Oct. 2024 - present • Post-doc research associate. (Mentor: Professor. Danijela Damjanović, Liviana Palmisano, and co-advised by Marco Martens.)	
	Scuola Normale Superiore, Pisa, Italy. Oct. 2022 - Oct. 2024. • Junior visitor in Centro Ennio De Giorgi. (Mentor: Professor. Stefano Marmi.)	
	Nicolaus Copernicus University, Toruń, Poland. Jan. 2021 - Sep. 2022. • Research associate. (Mentor: Professor. Krzysztof Frączek.)	
EDUCATION	Ph.D. Mathematics, University of Maryland - College Park. Dec. 2020. • Advisor: Professor. Giovanni Forni. • Visiting doctorant, Institut de Mathématiques de Jussieu - Paris Rive Gauche. Oct 2017 - Aug 2018, Jan 2019 - June 2019.	
	M.S. Mathematics, North Carolina State University. May 2013 (Advisor: Professor. Robert H. Martin, Jr.)	
	B.S. Mathematics education, Pusan National University. Aug 2011 (Advisor: Professor. Jae Keol Park.)	
	Exchange student, University of Hawaii at Hilo, Mathematics. Fall 2009 - Spring 2010	
PUBLICATIONS AND PREPRINTS	7. On rapid mixing for random walks on nilmanifolds. (with Dmitry Dolgopyat and Spencer Durham) arXiv:2510.00398	
	6. Anisotropic spaces and nil-automorphisms (with Oliver Butterley) Revision requested from <i>Nonlinearity</i> arXiv:2308.06630	
	5. Solving the cohomological equation for locally Hamiltonian flows, part II - global obstructions. (with Krzysztof Frączek) <i>Proceedings of the London Mathematical Society (3)</i> 131 (2025), no. 4.	
	4. Solving the cohomological equation for locally Hamiltonian flows, part I - local obstructions. (with Krzysztof Frączek) <i>Advances in Mathematics</i> 446 (2024), 109668.	

3. New phenomena for deviation of Birkhoff integrals for locally Hamiltonian flows.
 (with Krzysztof Frączek)
Journal für die reine und angewandte Mathematik (Crelle's Journal), vol. 2024, no. 807, 2024, pp. 81-149
2. Effective equidistribution for generalized higher step nilflows.
Ergodic Theory and Dynamical Systems, 42(12), 3656-3715, December 2022
1. Limit theorem for higher rank action on Heisenberg manifolds.
Discrete and Continuous Dynamical Systems - A, Vol. 42, No. 9, September 2022

SCHOLARSHIP, GRANT	Stiftelsen Magnusons fund (30K SEK), The Royal Swedish Academy of Sciences Hierta Retzius Foundation fund (30K SEK), Royal Swedish Academy of Sciences Stiftelsen Magnusons fund (50K SEK), The Royal Swedish Academy of Sciences Hierta Retzius Foundation fund (30K SEK), Royal Swedish Academy of Sciences Scholarship from Carl Trygger's Foundation for Scientific Research Grant for experienced researchers from abroad, Nicolaus Copernicus University. Excellence Center 'Dynamics, Analysis and Artificial Intelligence'. Dean's Fellowship, University of Maryland.	2025 2025 2024 2024 2024-26 2021 2013-14
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SEMINAR AND CONFERENCE TALKS	<i>Winter Young Mathematician Forum</i> , Shanghai Jiao Tong University, China <i>Workshop on Dynamical Systems and Math-Physics</i> , Dongguan, China <i>Global Mathematics Young Scholars Forum</i> , SUSTech, Shenzhen, China <i>Special talk, Problems in parabolic dynamics</i> , POSTECH, Pohang, Korea Ergodic theory seminar, Nicolaus Copernicus University, Toruń, Poland HCMC topology seminar, KIAS, Seoul, Korea <i>Job talk, Problems in parabolic dynamics</i> , Yonsei University, Korea Ergodic theory and Dynamical systems, POSTECH, Pohang, Korea <i>Workshop on Dynamics and Related Topics</i> , NUS, Singapore <i>Winter Annual Conference on Dynamical Systems 2024</i> , Fukuoka, Japan Dynamics seminar, Seoul National University, Seoul, Korea Mathematics RIT seminar series, Great Bay University, Dongguan, China Geometry and Topology seminar, National University of Singapore (NUS) <i>New Frontiers in Parabolic Dynamics and Renormalization</i> , Bologna, Italy Dynamics and Number Theory seminar, Uppsala University, Sweden Dynamics seminar, KTH Royal Institute of Technology, Stockholm, Sweden Mini-workshop, Chern Institute of Mathematics, Tianjin, China Dynamics (Dagger) seminar, University of Warwick, Warwick, U.K. Probability/Dynamics seminar, Leiden University, Leiden, Netherlands Mini-workshop, <i>Group actions and rigidity theory</i> , Nankai University <i>Regular and Stochastic Behaviour in Dynamical Systems</i> , CRM, Italy Short talk in conference, <i>Anosov Dynamics</i> , CIRM, Luminy, France Geometry seminar, IBS-Center for Geometry and Physics, Pohang, Korea Ergodic theory seminar, Nicolaus Copernicus University, Toruń, Poland Special seminar for new junior visitors, Scuola Normale Superiore, Pisa Zoominar in Dynamical Systems at Porto, Portugal Ergodic theory and Dynamical systems, POSTECH, Pohang, Korea Dynamics seminar, Centro De Giorgi(Sculola Normale Superiore), Pisa Dynamics seminar, IMPAN(Polish Academy of Sciences), Warsaw, Poland Probability seminar, IMPAN(Polish Academy of Sciences), Sopot, Poland Analysis seminar, Saitama University, Saitama, Japan Ergodic theory and Dynamical systems, POSTECH, Pohang, Korea Seminar in Ergodic theory and Dynamical systems, KIAS, Seoul, Korea	Dec 2025 Dec 2025 Nov 2025 Nov 2025 Sep 2025 Aug 2025 July 2025 May 2025 Mar 2025 Jan 2025 Dec 2024 Dec 2024 Aug 2024 June 2024 Mar 2024 Feb 2024 Jan 2024 Dec 2023 Nov 2023 Oct 2023 June 2023 Apr 2023 Jan 2023 Dec 2022 Nov 2022 June 2022 May 2022 Apr 2022 Mar 2022 Nov 2021 Oct 2021 Sep 2021 Aug 2021
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	Ergodic theory and Dynamical systems, Nicolaus Copernicus University (2 talks) Toruń, Poland	Mar 2021 Feb 2021
	Contributed talk, Workshop in Dynamical Systems and Related Topics, PSU	Sep 2019
SUPERVISION	Stage de recherche (Master's research internship at KTH)	
	• Clara Spector (M1, École Polytechnique, France) - Fast mixing systems and Central Limit Theorem via transfer operator methods.	Mar - Aug, 2025
TEACHING EXPERIENCE	Special topics course in dynamical systems. KTH.	
	• Cohomology in Dynamics, FSF3675 (instructor: Danijela Damjanović) Lectured on topics in cohomological equations, higher rank actions, and time-change flows.	5 weeks Spring 2025
	Teaching Assistant. UMCP.	
	• Sole Contact Instructor - <i>Introduction to Probability (MATH 111)</i>	Spring 2014
	• Discussion Leader	
	- <i>Calculus II (MATH 141)</i>	Fall 2014, Spring 2015
	- <i>Differential Equations for Scientists and Engineers (MATH 246)</i>	Sp 2016, 20
	- <i>Calculus for Life Sciences II (MATH 131)</i>	Spring 2017
	- <i>Calculus III (MATH 241)</i>	Fall 2018, 2019, 2020
	• Grader	
	<i>Advanced Calculus 1,2 (MATH 410, 411), Introduction to Dynamics and Chaos (MATH 452), Introduction to Topology (MATH 432), Differential Forms and Their Applications (MATH 437), Real Analysis I* (MATH 630), Dynamical systems I* (MATH 642), Differential Geometry* (MATH 740)</i>	* for grad course.
	• Directed Reading Program Mentor	
	<i>Rebecca Hsu, Riemann mapping theorem.</i>	Summer 2014
	Lecture Assistant. NCSU.	
	• Instructor - <i>Contemporary Mathematics (MA 103)</i>	Summer II 2012
	• Grader	
	- <i>Introduction to Finite Mathematics with Applications (MA 114)</i>	Spring 2013
	- <i>Calculus for Life and Management Sciences (MA 231)</i>	Fall 2012
REFEREED JOURNALS	Comm. in Math. Physics,	
ORGANISATIONS	Organizer, Dynamical system seminar, KTH Royal Institute of Technology Organizer, Seminari di Sistemi Dinamici, Scuola Normale Superiore - Uni.Pisa	2024-25 2023
EXPERIENCE	Student Dynamics Seminar Organizer, University of Maryland Math tutor, University of Hawaii at Hilo Republic of Korea Army, completion of military service	Fall 2015 - Fall 2016 Fall 2009 - Spring 2010 July 2006 - July 2008
LANGUAGE	Korean (native), English (fluent), French, Italian (elementary), Polish (beginner)	