

CONTACT INFORMATION Mathematics Department
Northwestern University
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EMPLOYMENT **Northwestern University**, Associate Professor Fall 2019–present
The University of Chicago, Assistant Professor Fall 2017–Summer 2019
The University of Chicago, L. E. Dickson Instructor Fall 2014–Spring 2017
The Pennsylvania State University, NSF Postdoc, Course Instructor Fall 2011–Spring 2014

EDUCATION **Ph.D., Mathematics, Tufts University** May 2011
B.A., Oberlin College May 2004

PUBLICATIONS *Zimmer’s conjecture for non-uniform lattices and escape of mass.* Preprint, 2021. Joint with D. Fisher and S. Hurtado. arXiv:2105.14541.

The normal subgroup theorem through measure rigidity. To appear in *Dynamics, Geometry, Number Theory: The Impact of Margulis on Modern Mathematics*, University of Chicago Press, 2021. Joint with F. Rodriguez Hertz and Z. Wang.

C^1 actions on manifolds by lattices in Lie groups. To appear, *Compos. Math.*, 2021. Joint with D. Damjanovic and Z. Zhang.

Smoothness of stable holonomies inside center-stable manifolds. To appear, *Ergodic Theory Dynam. Systems.*, 2021.

Zimmer’s conjecture for actions of $SL(m, \mathbb{Z})$. *Invent. Math.* **221** (2020) 1001–1060. Joint with D. Fisher and S. Hurtado.

Recent progress in the Zimmer program. In *Current Developments in Mathematics, 2018*. International Press, Somerville, MA, 2020, pp. 1–56.

Entropy, Lyapunov exponents, and rigidity of group actions. *Ensaos Matemáticos*, **33** (2019), 1–197. With appendices by D. Malicet, D. Obata, B. Santiago, M. Triestino, S. Alvarez and M. Roldán. Edited by M. Triestino.

Measure rigidity for random dynamics on surfaces and related skew products. *J. Amer. Math. Soc.* **30** (2017), 1055–1132. Joint with F. Rodriguez Hertz.

Global smooth and topological rigidity of hyperbolic lattice actions. *Ann. of Math. (2)* **186** (2017), 913–972. Joint with F. Rodriguez Hertz and Z. Wang.

Zimmer’s conjecture: Subexponential growth, measure rigidity, and strong property (T). Preprint, 2016. Joint with D. Fisher and S. Hurtado. Submitted for publication; arXiv:1608.04995.

Invariant measures and measurable projective factors for actions of higher-rank lattices on manifolds. Preprint, 2016. Joint with F. Rodriguez Hertz and Z. Wang. Submitted for publication; arXiv:1609.05565.

Smooth ergodic theory of \mathbb{Z}^d -actions part 1: Lyapunov exponents, dynamical charts, and coarse Lyapunov manifolds. Preprint, 2016. Joint with F. Rodriguez Hertz. Submitted for publication; arXiv:1610.09997.

Smooth ergodic theory of \mathbb{Z}^d -actions part 2: Entropy formulas for rank-1 systems. Preprint, 2016. Submitted for publication; arXiv:1610.09997.

Smooth ergodic theory of \mathbb{Z}^d -actions part 3: Product structure of entropy. Preprint, 2016. Joint with F. Rodriguez Hertz and Z. Wang. Submitted for publication; arXiv:1610.09997

Continuity of Lyapunov Exponents for Cocycles with Invariant Holonomies. *J. Mod. Dyn.* **12** (2018), 223–260. Joint with L. Backes and C. Butler.

Smooth stabilizers for measures on the torus, *Discrete Contin. Dyn. Syst.* **35** (2015), 43–58.

Measure rigidity for random dynamics on surfaces with positive entropy. Permanent preprint, 2014. Joint with F. Rodriguez Hertz.

Unstable periodic orbits in the Lorenz attractor, *Philosophical Transactions of the Royal Society A*, **369** (2011), 2345–2353. Joint with Bruce M. Boghosian, Jonas Lätt, Hui Tang, Luis M. Fazendeiro, and Peter V. Coveney.

Constraints on dynamics preserving certain hyperbolic sets, *Ergodic Theory Dynam. Systems*, **31** (2011), 719–739.

Nonexpanding attractors: conjugacy to algebraic models and classification in 3-manifolds, *J. Mod. Dyn.* **4** (2010), 517–548.

HONORS, AWARDS,
AND INVITED
ADDRESSES

Invited Lecture, International Congress of Mathematicians, Section 9: Dynamics. St. Petersburg Russia, July 2022

New Horizons in Mathematics Prize, 2021. Joint prize shared with Sebastian Hurtado.

NSF CAREER Grant, DMS-1752675. Continued as DMS-2020013.

Invited speaker. *Current Developments in Mathematics*, Cambridge, MA, November 2018.

Invited Address. At AMS Spring Central Sectional Meeting, Ohio State University, Columbus, OH, March 2018.

Bourbaki seminar, presented by Serge Cantat, on work with Fisher and Hurtado on Zimmer's Conjecture, October 2017.

Neubauer Family Assistant Professorship, University of Chicago, 2017–2019.

NSF Postdoctoral Research Fellowship, DMS-1104013.

MINI-COURSES

4 hour Mini-course. Seminar on *Random walks, equidistribution, and rigidity*, Ohalo, Israel, March 2020. (Cancelled due to COVID-19)

7 hour Mini-course. *Simons Semester in Geometric and Analytic Group Theory*, Banach Center, Warsaw, Poland, June 2019.

4 hour Mini-course. Borel Seminar 2018: *Topology and Dynamics in the Swiss Alps*, Les Diablerets, Switzerland, December 2018.

6 hour mini-course. Rigidity School, at Nagoya University, Nagoya Japan, September 2018.

6 hour mini-course. Workshop on *Recent Breakthrough on Zimmer's Conjecture and Group Actions*, at Tsinghua Sanya International Mathematics Forum, Sanya China, March 2018.

Co-presenter for 6 hour mini-course. At *Global Dynamics Beyond Uniform Hyperbolicity* workshop, Provo, UT, June 2017.

5 hour mini-course. *Groups Acting on Manifolds* workshop, Teresópolis Brazil, June 2016.

CONFERENCE,
SEMINAR, AND
COLLOQUIUM
TALKS

Ergodic geometry, number theory and Margulis' legacy: the next generation. June 2022

Group actions and dynamics seminar, Yale University, October 2021.

Ergodic theorems, equidistribution and counting: A conference in honor of Amos Nevo, Haifa, Israel, May 3-7, 2020. (Cancelled due to COVID-19)

Dynamical Systems, Difference and Functional Equations, Krynica-Zdrój, Poland. (Keynote speaker). September 2020. (Rescheduled to September 2021 then cancelled due to COVID-19)

Geometry Seminar, Indiana University Bloomington, September 2019.

2020 vision for dynamics, Będlewo, Poland, August 2019.

Dynamics of group actions (Yves Benoist birthday conference), Cetraro, Italy, May 2019.

Equidistribution, Invariant Measures and Applications: A tribute to the Legacy of Marina Ratner, Jerusalem, Israel May 2019.

Department Colloquium, Washington University in St. Louis, Feb 2019.

Dynamics seminar, Boston College, November 2018.

Midwest dynamics conference, Minneapolis MN, November 2018.

The 14th William Rowan Hamilton Geometry and Topology Workshop, Dublin, Ireland, August 2018.

International Congress on Mathematical Physics, Montreal, Canada, July 2018.

International Conference on Dynamical Systems, Shenzhen China, June 2018.

Department Colloquium, Wesleyan University, April 2018.

Dynamics seminar, Tsinghua University, Beijing, China, March 2018.

Dynamics seminar, Peking University, Beijing, China, March 2018.

Conference on *New Methods for Zimmer's Conjecture*, Institute for Pure & Applied Mathematics, UCLA, January 2018.

Conference on *Dynamics in Number Theory and Geometry*, Queen's University, August 2017.

Dynamics seminar, Northwestern University, April 2017.

Group actions and dynamics seminar, Yale University, March 2017.

3 talks in RTG seminar, Geometry seminar, and Algebraic Topology seminar, University of Michigan, February 2017.

Department Colloquium, University of Maryland, January 2017.

Department Colloquium, University of California Berkeley, January 2017.

Department Colloquium, University of Toronto, January 2017.

Department Colloquium, University of California San Diego, January 2017.

Groups and Dynamics Seminar, University of Texas Austin, December 2016.

Department Colloquium, University of Wisconsin Madison, December 2016.

Max Dehn Seminar, University of Utah, December 2016.

Department Colloquium, Tufts University, December 2016.

Department Colloquium, University of Illinois at Chicago November 2016.

Fall Workshop in Dynamical Systems, Penn State University, October 2016.

At *Probabilistic Methods in Dynamical Systems and Applications* workshop, Centre de recherches mathématiques (CRM), Montréal, Canada, October 2016.

Geometry, Topology and Dynamics Seminar, University of Illinois at Chicago, September 2016.

Ergodic Theory Workshop, University of North Carolina at Chapel Hill, April 2016.

Spring 2016 *Geometry, Groups, and Dynamics* workshop, Indiana University–Purdue University Indianapolis, March 2016.

Special session *Smooth and Symbolic Dynamics*, 2015 Fall Eastern Sectional AMS Meeting, Rutgers University, November 2015.

Rocky Mountain Dynamical Systems Conference, Provo, UT, June 2015.

Boundaries and Ergodic Geometry conference, University of Notre Dame, June 2015.

Dynamics Seminar, University of Maryland, April 2015.

Ergodic Theory Seminar, Ohio State University, September 2015.

Global Dynamics Beyond Uniform Hyperbolicity workshop, Olmué Chile, September 2015.

Ergodic Theory Seminar, Instituto Nacional de Matemática Pura e Aplicada, Rio de Janeiro Brazil, March 2015.

Conference on *Recent Progress in Dynamical Systems and Related Topics*, Banff International Research Station for Mathematical Innovation and Discovery, August 2014.

Dynamics Seminar, University of Chicago, October 2013.

Geometry Seminar, Indiana University Bloomington, May 2013.

Special section *Dynamical systems: Thermodynamic formalism and connections with geometry*, AMS Western Sectional Meeting, Boulder CO, April 2013.

Randomness and Dynamics Mini-conference, Northeastern University, April 2011.

Special session *Statistical Properties of Dynamical Systems*, AMS Southeastern Sectional Meeting, Richmond, VA, November 2010.

Dynamical Systems Seminar, Boston University, November 2010.

Fall Workshop in Dynamical Systems, Penn State University, October 2010.

Dynamics Seminar, Northwestern University, September 2010.

Ergodic Theory Seminar, Northeastern University, April 2010.

SIAM Annual Meeting, Denver CO, July 2009.

SUPERVISING AND MENTORING	<p>Ph.D. students: Jonathan DeWitt (University of Chicago, present, joint with A. Wilkinson)</p> <p>Master students: Isabella Scott (University of Chicago, finished summer 2018), Shin Kim (University of Chicago, finished summer 2019.)</p>
OUTREACH	<p>Two-week course on surface topology for high-school students, University of Chicago Young Scholars Program, Summer 2017.</p> <p>Mini-course (3 hours) on <i>Hyperbolic Dynamics</i>, at University of Chicago Mathematics REU, Summer 2017.</p> <p>Mini-course (4.5 hours) on <i>Hyperbolic Dynamics</i>, at University of Chicago Mathematics REU, Summer 2016.</p>
ORGANIZATION	<p>Co-organizer for trimester at l’Institute Henri Poincare, <i>Group actions, geometric structures, Zimmer program and rigidity</i>, April–July 2024.</p>

Co-organizer for AIM Workshop, *Global rigidity of actions by higher-rank groups*, May 2022.

Co-organizer for Workshop at Simons Center, *Flexibility and rigidity in dynamical systems*, March 2022.

Co-organizer: Midwest dynamics and group actions seminar. Joint online seminar with UIC, U.Chicago, U.Mich, and U.Indiana during COVID-19 pandemic. April 2020–present.

Co-organizer: Emphasis year in dynamics, Northwestern 2019–2020. 3 miniconferences, multiple minicourses, and long-term visitors organized. (Some events cancelled due to COVID-19)

Co-organizer for Arbeitsgemeinschaften on *Zimmer's Conjecture* at Oberwolfach, Germany, October 2019. 2018.

Co-organizer for conference on *New Methods for Zimmer's Conjectures* at the Institute for Pure & Applied Mathematics, UCLA, January 2018. *Geom. Topol.*, and *Nonlinearity*.

Co-organizer for the University of Chicago Dynamics Seminar (2014–2019).

Co-organizer for the Penn State Dynamics Seminar (2012–2014).

PROFESSIONAL
SERVICE

Peer referee: *Discrete Contin. Dyn. Syst.*, *Adv. Math.*, *Israel J. Math.*, *Commun. Math. Phys.*, *J. Amer. Math. Soc.*.