

Alex Blumenthal

CONTACT INFORMATION	School of Mathematics Georgia Institute of Technology 686 Cherry Street Atlanta, GA 30332-0160 USA	ablumenthal6@math.gatech.edu http://people.math.umd.edu/~ablumenthal6
APPOINTMENTS	Georgia Institute of Technology Assistant Professor (August 2020 - Present) University of Maryland, College Park Postdoctoral Researcher (September 2019 - May 2020) <ul style="list-style-type: none">• Scientific advisor: Jacob Bedrossian NSF Postdoctoral researcher (October 2016 - August 2019) <ul style="list-style-type: none">• Scientific advisor: Dmitry Dolgopyat	
RESEARCH INTERESTS	Dynamical systems: smooth ergodic theory, infinite dimensional dynamical systems, random dynamical systems and multiplicative ergodic theorems.	
EDUCATION	Courant Institute of Mathematical Sciences, New York University Ph.D., Mathematics, September 2016 <ul style="list-style-type: none">• Dissertation title: Nonuniformly hyperbolic theory for Banach space maps• Advisor: Lai-Sang Young Columbia University B.S. in Applied Mathematics, May 2011 <ul style="list-style-type: none">• Graduated summa cum laude	
PUBLICATIONS	Jacob Bedrossian, Alex Blumenthal and Samuel Punshon-Smith. The Batchelor spectrum of passive scalar turbulence in stochastic fluid mechanics. <i>arXiv preprint arXiv:1911.11014</i> , submitted 2019. Jacob Bedrossian, Alex Blumenthal and Samuel Punshon-Smith. Almost-sure enhanced dissipation and uniform-in-diffusivity exponential mixing for advection-diffusion by stochastic Navier-Stokes. <i>arXiv preprint arXiv:1911.01561</i> , submitted 2019. Jacob Bedrossian, Alex Blumenthal and Samuel Punshon-Smith. Almost-sure exponential mixing of passive scalars by the stochastic Navier-Stokes equations. <i>arXiv preprint arXiv:1905.03869</i> , submitted 2019. Jacob Bedrossian, Alex Blumenthal and Samuel Punshon-Smith. Lagrangian chaos for models in fluid mechanics. <i>arXiv preprint arXiv:1809.06484</i> , submitted 2018. Alex Blumenthal and Yun Yang. Positive Lyapunov exponent for random perturbations of predominantly expanding multimodal circle maps. <i>arXiv preprint arXiv:1805.09219</i> , submitted, 2018. Blumenthal, Alex, Jacopo De Simoi, and Ke Zhang. Diffusion limit for a slow-fast standard map. <i>Communications in Mathematical Physics</i> (2019): 1-24.	

Alex Blumenthal and Lai-Sang Young. Equivalence of physical and SRB measures in random dynamical systems. *Nonlinearity* 32(4): 1494, 2019.

Alex Blumenthal. Statistical Properties for Compositions of Standard Maps with Increasing Coefficient. *Ergodic Theory and Dynamical Systems*, pp. 1-44., doi:10.1017/etds.2019.115.

Blumenthal, Alex, and Yuri Latushkin. The Selgrade decomposition for linear semiflows on Banach spaces. *Journal of Dynamics and Differential Equations* 31.3 (2019): 1427-1456.

Alex Blumenthal, Jinxin Xue and Lai-Sang Young. Lyapunov exponents and correlation decay for random perturbations of some prototypical 2D maps. *Communications in Mathematical Physics* 359(1), 347-373, 2018.

Alex Blumenthal and Lai-Sang Young. Absolute continuity of stable foliations for mappings of Banach spaces. *Communications in Mathematical Physics*, 354 (2), 591-619, 2017.

Alex Blumenthal, Jinxin Xue and Lai-Sang Young. Lyapunov exponents for random perturbations of some area-preserving maps including the standard map. *Annals of Mathematics* 185 (1), 285-310, 2017.

Alex Blumenthal and Ian D Morris. Characterization of dominated splittings for operator cocycles acting on Banach spaces. *arXiv preprint arXiv:1512.07602*, to appear in *Journal of Differential Equations*, 2019.

Alex Blumenthal and Lai-Sang Young. Entropy, volume growth and SRB measures for Banach space mappings. *Inventiones mathematicae*, 207 (2), 833-893, 2017.

Alex Blumenthal. A volume-based approach to the multiplicative ergodic theorem on Banach spaces. *Discrete and Continuous Dynamical Systems*, 36(5):2377-2403, 2016.

Alex Blumenthal and Bastien Fernandez. Population dynamics of globally coupled degrade-and-fire oscillators. *Journal of Dynamics and Differential Equations*, pages 1-25, 2014.

Alex Blumenthal and Bastien Fernandez. Asymptotic periodicity in networks of degrade-and-fire oscillators. *Physica D: Nonlinear Phenomena*, 323:49-56, 2016.

CONFERENCE AND SEMINAR TALKS *Lagrangian chaos and scalar mixing for models in fluid mechanics*, Georgia Tech CD-SNS Colloquium (February 17, 2020)

Lagrangian chaos and scalar mixing for models in fluid mechanics, SIAM Conference on Analysis of Partial Differential Equations 2019 (December 12, 2019)

Lyapunov exponents for small random perturbations of predominantly hyperbolic volume-preserving diffeomorphisms, including the Standard Map, Virginia Tech Dynamics Seminar (November 4, 2019)

Lyapunov exponents for small random perturbations of predominantly hyperbolic volume-preserving diffeomorphisms, including the Standard Map, Rutgers University Dynamics Applied and Computational Math Seminar (October 25, 2019)

Lagrangian chaos and mixing for models in fluid mechanics, Smooth and homogeneous

dynamics workshop, ICTS, Bangalore (September 23, 2019)

Lagrangian chaos and scalar mixing for models in fluid mechanics, Johns Hopkins University, Baltimore, Burger's Symposium 2019 (May 30, 2019)

Lagrangian chaos and scalar mixing for models in fluid mechanics, University of Maryland, College Park, Dynamics Seminar (May 2, 2019)

Lagrangian chaos and scalar mixing for models in fluid mechanics, University of Missouri, Columbia, KUMUNU Conference (April 27, 2019)

Equivalence of physical and SRB measures for random dynamical systems, Georgia Tech, Atlanta, Special Dynamics Seminar (April 3, 2019)

Lagrangian chaos for models in fluid mechanics, University of Texas, Austin, Analysis Seminar (March 13, 2019)

The Multiplicative Ergodic Theorem: Background, Applications and Extensions, University of Texas, Austin, Groups and Dynamics Seminar (March 12, 2019)

Chaotic regimes for random dynamical systems, Colloquium, University of Florida, Gainesville (February 1, 2019)

Chaotic regimes for random dynamical systems, Dynamics Seminar, Boston University. (January 29, 2019)

Chaotic regimes for random dynamical systems, Colloquium, Duke University. (January 24, 2019)

Chaotic regimes for random dynamical systems, Colloquium, Georgia Institute of Technology. (January 17, 2019)

Chaotic regimes for random dynamical systems, Colloquium, Michigan State University. (January 14, 2019)

Chaotic regimes for random dynamical systems, Colloquium, Texas A&M University. (November 28, 2018)

Positive Lyapunov exponents for random perturbations of the Chirikov Standard Map, Symplectic Geometry and Dynamical Systems Seminar, Institute for Advanced Study, Princeton University. (November 19, 2018)

Lagrangian chaos for models in fluid mechanics, 1141st AMS Sectional Meeting, University of Delaware. (September 30, 2018)

Random perturbations of predominantly hyperbolic systems, Minisymposium on random dynamical systems, Dynamics Days Europe XXXVIII, Loughborough University, UK. (September 5, 2018)

Random perturbations unlock hyperbolicity, Probability Seminar, University of Maryland. (April 18, 2018)

Random perturbations of predominantly hyperbolic systems, New Developments in Open Dynamical Systems and Their Applications, Banff International Research Station.

(March 20, 2018)

SRB measures for infinite-dimensional dynamical systems with potential applications to PDE, Mathematics Department Colloquium, University of Minnesota. (March 8, 2018)

SRB measures for infinite-dimensional dynamical systems with potential applications to PDE, Dynamics Seminar, University of Toronto. (February 7, 2018)

SRB measures for infinite-dimensional dynamical systems with potential applications to PDE, Dynamics Seminar, Boston University. (January 30, 2018)

Statistical properties of the Standard Map with increasing coefficient, Dynamics Seminar, University of Maryland. (November 2, 2017)

Lyapunov exponents for small random perturbations of predominantly hyperbolic two-dimensional volume-preserving diffeomorphisms, including the Standard Map, Dynamics Seminar, University of Delaware. (October 17, 2017)

Statistical properties of the Standard Map with increasing coefficient, Semiannual Workshop in Dynamical Systems and Related Topics, Penn State University. (October 8, 2017)

Lyapunov exponents for small random perturbations of predominantly hyperbolic two-dimensional volume-preserving diffeomorphisms, including the Standard Map, Bowen Legacy Conference, University of British Columbia. (August 1, 2017)

Smooth ergodic theory for Banach space mappings, Equadiff 2017, Slovak Institute of Technology, Slovakia. (July 25, 2017)

SRB measures for Banach space mappings, 1129th AMS Sectional Meeting, Hunter College. (May 7, 2017)

Lyapunov exponents for small random perturbations of predominantly hyperbolic two-dimensional volume-preserving diffeomorphisms, including the Standard Map, Dynamical Systems Seminar, University of Maryland. (March 16, 2017)

Statistical properties for nonautonomous compositions of standard maps with increasing coefficient, Dynamical Systems Seminar, Courant Institute. (March 2, 2017)

Lyapunov exponents for small random perturbations of predominantly hyperbolic two-dimensional volume-preserving diffeomorphisms, including the Standard Map, Advances in Ergodic Theory, Hyperbolic Dynamics & Statistical Laws, Australia National University. (December 2, 2016)

Lyapunov exponents for small random perturbations of predominantly hyperbolic two-dimensional volume-preserving diffeomorphisms, including the Standard Map, Semiannual Workshop in Dynamical Systems and Related Topics, Penn State University. (October 27, 2016)

Entropy, volume growth and SRB measures for Banach space mappings, Hale conference on Dynamics and Evolutions Equations, CIRM, France. (March 23, 2016)

A volume-based approach to the multiplicative ergodic theorem and related results, Dif-

ferentiation Equations Seminar, University of Missouri (December 1, 2015)

Entropy, volume growth and SRB measures for Banach space mappings, 26th Fall meeting of the Semi-annual Workshop in Dynamical Systems and Related Topics, Penn State University. (October 23, 2015)

Entropy, volume growth and SRB measures for Banach space mappings, Dynamical Systems Seminar, University of Maryland. (September 17, 2015)

Entropy, volume growth and SRB measures for Banach space mappings, Dynamical Systems Seminar, University of Chicago. (May 14, 2015)

Entropy, volume growth and SRB measures for Banach space mappings, Dynamical Systems Seminar, Courant Institute. (April 30, 2015)

The multiplicative ergodic theorem for Banach space cocycles, Dynamical Systems Seminar, Courant Institute. (April 4, 2014)

Discrete and continuum degrade-and-fire oscillators, Dynamical Systems Seminar, Courant Institute. (November 1, 2012)

TEACHING
EXPERIENCE

Spring	2020	Instructor, MATH 461 Linear Algebra, University of Maryland
Fall	2019	Instructor, STAT 410 Introduction to Probability Theory, University of Maryland
Fall	2018	Instructor, MATH 240 Linear Algebra, University of Maryland
Fall	2017	Instructor, MATH 115 Precalculus, University of Maryland
Spring	2016	Teaching Assistant, MATH-UA.264 Chaos and Dynamical Systems, New York University
Spring	2015	Teaching Assistant, MATH-UA.264 Chaos and Dynamical Systems, New York University
Fall	2014	Teaching Assistant, MATH-UA.262 Ordinary Differential Equations, New York University
Spring	2014	Teaching Assistant, MATH-UA.325 Analysis, New York University
Fall	2012	Grader for MATH-GA 2451 Complex Analysis, New York University
Spring	2011	Teaching Assistant, MATH V3050 Discrete Time Models in Finance, Columbia University
Fall	2010	Teaching Assistant, MATH W4062 Introduction to Modern Analysis II, Columbia University

MENTORSHIP

May 2018 - present: Informally advising UMD graduate student Hamid Al-Saqban on a project studying central limit theorems for the convergence of Lyapunov exponents of linear cocycles over hyperbolic dynamics and the Kontsevich-Zorich Cocycle.

September 2019 - present: Informally advising UMD graduate student Kyle Liss on a project studying optimal rates of geometric ergodicity for the stochastic Navier-Stokes equation.

September 2017 - February 2019: Informally advised TU Berlin graduate student Vitalii Senin on a project extending results in entropy theory to isotropic SDE on noncompact spaces.

May 2015 - April 2016: Mentored NYU Master's student Krishnan Mody in a supervised learning of topics in differential geometry and the ergodic theory of Anosov flows.

June 2015 - May 2016: Mentored NYU undergraduate Raghav Singhal in a supervised learning of topics in network theory.

HONORS AND AWARDS	2018	ICCM Best Paper Award for <i>Lyapunov exponents for random perturbations of some area-preserving maps including the standard map</i> International Congress of Chinese Mathematicians
	2017	ICCM Distinguished Paper Award for <i>Lyapunov exponents for random perturbations of some area-preserving maps including the standard map</i> International Congress of Chinese Mathematicians
	2011 – 2016	Henry MacCracken Fellowship New York University Graduate School of Arts and Sciences
	2007	Semifinalist, Intel Science Talent Search
	2007	Semifinalist, US Physics Olympiad
	PRESS	2019
GRANTS	2016	NSF Mathematical Sciences Postdoctoral Fellowship (2016 - 2019). Award no. 1604805. Total award: \$150,000.
ACTIVITIES	2020	Organizing the Virtual CDSNS Colloquium at Georgia Tech, Atlanta, Georgia
	2019	Taught 8-hour mini-course on hyperbolic dynamics at Tsinghua University, Beijing, China
	2019	Attended 2019 Graduate Advising Workshop at the Ohio State University, Columbus, Ohio
	2018–2019	Co-organizer for UMD Semiannual Workshop on Dynamical Systems, held in April 2019
	2016	TA at Houston Summer School on Dynamics
	2012 – 2016	Organizer for Dynamical Systems Seminar Courant Institute at New York University
	2011 – 2012	Volunteer SAT tutor for NY Cares
	2009 – 2011	Organizer for the Undergraduate Mathematics Society Columbia University

In addition, I have refereed articles for the following journals: Journal of Dynamics and Control Systems, Stochastic Processes and their Applications, Communications in Mathematical Physics, Advances in Mathematics, Stochastic Processes and their Applications, SIAM Journal on Mathematical Analysis, Journal of Evolution Equations, Journal of Dynamics and Differential Equations, Journal of Modern Dynamics, Archiv der Mathematik, Proceedings of the Edinburgh Mathematical Society, and Dynamical Systems: International Journal.