JAYADEV SIDDHANTA ATHREYA

Personal Information

Name: Jayadev Siddhanta Athreya
Address: Department of Mathematics, University of Washington, Box 354350, Seattle, WA 98195
Email: jathreya@uw.edu
Website: http://faculty.washington.edu/jathreya

Employment

September 2020-current: Professor, University of Washington, Department of Mathematics and Department of the Comparative History of Ideas.
July 2022- current: co-Director, International, Pacific Institute for the Mathematical Sciences
July 2021-July 2022: Interim Director, Pacific Institute for the Mathematical Sciences
August 2015- September 2020: Associate Professor, University of Washington, Department of Mathematics
August 2015- September 2019: Founder and Director, Washington Experimental Mathematics Lab.
August 2010-July 2015: Assistant Professor, University of Illinois, Department of Mathematics.
August 2011-July 2015: Founder and Director, Illinois Geometry Lab.
July 2008-July 2010: Gibbs Instructor, Yale University, Department of Mathematics.
July 2007-June 2008: Instructor, Princeton University, Department of Mathematics.
July 2006-June 2007: Lecturer, Yale University, Department of Mathematics.

Other positions

- Fall 2019, Lead Organizer, Mathematical Sciences Research Institute, program on Holomorphic Differentials in Mathematics and Physics.
- Fall 2018, Simons Visiting Professor, Université Nice Sophia Antipolis
- Spring 2017, Visiting Professor, Aix-Marseille Universite.
- Spring 2015, Research Member, Mathematical Sciences Research Institute, Program on Homogeneous Dynamics.
- August 2012-June 2013, Visiting Assistant Professor, Yale University, Department of Mathematics.
- Maitre de Conference, University of Rennes, June 2009 and May 2008

Degrees

Ph.D: Mathematics, University of Chicago, under Prof. Alex Eskin, June 2006.
M.Sc: Mathematics, University of Chicago, December 2001
B.Sc: Mathematics, Iowa State University, with Honors and Distinction, May 2000

Recent Grants and Awards

Simons Foundation Targeted Institute Grant: for the Pacific Institute for the Mathematical Sciences, $192,000, 2022-2024.
Mellon Course Development Grant: with Timea Tihanyi, $35,000 to develop a new Math + Art course.
NSF PI grant: DMS 2003528, Counting, Curves, and Correlations, Summer 2019-Summer 2022, $308,000.
Royalty Research Fund: Stability Conditions on Categories, $40,000
NSF CAREER Grant: DMS 1351853 and 1559860, Summer 2014-Summer 2019, $450,000.
NSF INCLUDES Grant: with Dave Auckly, Megan Bang, Filiberto Barajas, 2018-2020, $299,761
NSF Workforce Program Grant: with Matt Ando and Jennifer McNeily, Summer 2015-Summer 2018, $ 600,000
Simpson Center Collaboration Grant: with Timea Tihanyi, School of Art. Simpson Center, University of Washington.
Djerassi Resident Artists Program: July 2019 Scientific Madness Program, declined.
NSF PI grant: DMS 1069153, Summer 2011- Summer 2014, $149,702.
Center for Advanced Study Fellowship: University of Illinois, Spring 2013.
Public Engagement Grant: University of Illinois, Spring 2013 and Spring 2014.
Interdisciplinary Innovation Initiative: University of Illinois, with Shen Dillon, John Lambros and Ioannis Chasiotis, College of Engineering, 2012-13.
N. Tenney Peck Teaching Award: Department of Mathematics, University of Illinois, Spring 2012.

Selected Publications

(1) (joint with Mahan MJ and Parthanil Roy), Stable Random Fields, Patterson-Sullivan measures and Extremal Cocycle Growth, Probability Theory and Related Fields, published online May 2022.

(2) (joint with K. Burdzy and M. Duarte) On pinned billiard balls and foldings, to appear, Indiana University Mathematics Journal.

(3) (joint with D. Lee), Translation covers of some triply periodic platonic surfaces, Conformal Geometry and Dynamics, 25 (2021), 34-50

(4) (joint with S. Lalley, J. Sapir, and M. Wroten) Statistical regularities of self-intersections for geodesics on hyperbolic surfaces: local geometric properties, Annales Henri Lebesgue, Volume 4 (2021) , pp. 187-226.

(5) (joint with F. Arana-Herrera) Square-integrability of the Mirzakhani function and statistics of simple closed geodesics on hyperbolic surfaces. Forum Math. Sigma 8 (2020), e9.

(6) (joint with Y. Cheung and H. Masur) Siegel-Veech transforms are in L^2, with an appendix by myself and R. Ruhr, J. Mod. Dyn. 14 (2019), 1-19.

(7) (joint with D. Aulicino and P. Hooper) Platonic solids and high genus covers of lattice surfaces, to appear, Experimental Mathematics.

(8) (joint with A. Ghosh) The Erdös-Szüsz-Turán distribution for equivariant point processes, L'Enseignement Mathématique, volume 64 (2018), 1-21.

(9) (joint with K. Burdzy) Protecting billiard balls from collisions, Arnold Math J. (2020).

(10) (joint with I. Konstantoulas) Lattice deformations in the Heisenberg group, to appear, Groups, Geometry, and Dynamics.

(11) (joint with K. Biswas and A. Ghosh), Cusp excursions on hyperbolic manifolds, to appear in Teichmüller theory and its impact, Editors Lizhen Ji, Athanase Papadopoulos, Weixu Su.

(12) (joint with David Dumas, William Goldman, Sergey Grigorian, Rosemary Guzman, Philipp Hieronymi, Sean Lawton, Anton Lukyanenko, Jeremy Tyson, and Aaron Wilson), Geometry Labs United: An Invitation, Notices of the American Mathematical Society, 2018, volume 65, number 9, 1088-1094.

(13) (joint with D. Aulicino) A Trajectory from a Vertex to Itself on the Dodecahedron, American Mathematical Monthly, volume 126, number 2, 161-162, 2019.

(14) (joint with B. Reznick and J. Tyson), Cantor set arithmetic, American Mathematical Monthly, volume 126, number 1, 4-17, 2019.

(15) (joint with G. Margulis) Values of random polynomials at integer points. J. Mod. Dyn. 12 (2018), 9-16.

(16) (joint with G. Margulis) Logarithm laws for unipotent flows, II. J. Mod. Dyn. 11 (2017), 1-16.

(17) (joint with A. Eskin and A. Zorich) Right-angled billiards and volumes of moduli spaces of quadratic differentials on $\mathbb{C}P^1$. With an appendix by Jon Chaika. Ann. Sci. Éc. Norm. Supér. (4) 49 (2016), no. 6, 1311-1386.

(18) Gap distributions and homogeneous dynamics, Proceedings of the ICM Satellite Conference on Geometry, Topology, and Dynamics in Negative Curvature (London Mathematical Society Lecture Notes Series), volume 425, 1-29, 2016.

(19) (joint with A. Parrish and J. Tseng) Ergodic theory and Diophantine approximation for translation surfaces and linear forms, Nonlinearity, volume 29, Number 8, 2173-2190, 2016.

(20) (joint with S. Chaubey, A. Malik and A. Zaharescu) Geometric statistics of Ford circles. New York Journal of Mathematics 21 (2015) 637-656.

(21) (joint with J. Chaika) The Hausdorff Dimension of Non-Uniquely Ergodic directions in H(2) is almost everywhere 1/2, Geometry and Topology 19 (2015) 3537-3563.

(22) (joint with C. Cobeli and A. Zaharescu) Radial density in Apollonian packings, International Math Research Notices, 2014.

(23) (joint with A. Ghosh and J. Tseng) Spherical averages of Siegel transforms and spiraling of lattice approximations. Journal of London Mathematical Society, (2015) 91 (2).

(24) Random Affine Lattices, Contemporary Mathematics, volume 639, 169-174, 2015.

(25) (joint with J. Chaika and S. Lelievre) The gap distribution of slopes on the golden L. Contemporary Mathematics, volume 631, 47-62, 2015.

(26) (joint with A. Eskin and A. Zorich) Counting generalized Jenkins-Strebel differentials. Geom. Dedicata 170 (2014), 195-217.

(27) (joint with F. Paulin). Logarithm laws for strong unstable foliations in negative curvature and non-Archimedian Diophantine approximation. Groups, Geometry, and Dynamics Volume 8, Issue 2, 2014, pp. 285-309

(28) (joint with Y. Cheung) A Poincaré section for horocycle flow on the space of lattices, International Math Research Notices, 2014, no. 10, 2643-2690.

(29) (joint with A. Ghosh and A. Prasad) Buildings, Extensions, and Volume Growth Entropy, New York Journal of Mathematics, Volume 19 (2013) 1-11.

(30) (joint with M. Boshernitzan) Ergodic properties of compositions of Interval Exchange Maps and Rotations, Nonlinearity 26 (2013) 417-423.

(31) Cusp excursions on parameter spaces, Journal of London Math Society, (2013) 87 (3): 741-765.

(32) (joint with J. Chaika) The distribution of gaps for saddle connection directions, Geometric and Functional Analysis, Volume 22, Issue 6 (2012), 1491-1516.

(33) (joint with A. Bufetov, A. Eskin, and M. Mirzakhani) Lattice Point Asymptotics and Volume Growth on Teichmuller space, Duke Math. J. Volume 161, Number 6 (2012), 1055-1111.

(34) (joint with A. Ghosh and A. Prasad) Ultrametric Logarithm Laws II, Monat. Math., Volume 167, Issue 3 (2012), Page 333-356

(35) (joint with G. Margulis) Logarithm laws for unipotent flows, I. Journal of Modern Dynamics, volume 3, Number 3 (2009), 359-378

(36) (joint with A. Ghosh and A. Prasad) Ultrametric Logarithm Laws I, Discrete and Continuous Dynamical Systems-S, v. 2, no. 2, 337-348, 2009.

(37) Logarithm laws and shrinking target properties, Proceedings of Indian Academy of Sciences (Math. Sci.), Vol. 119, No. 4, September 2009, pp. 541-557.

(38) (joint with G. Forni) Deviation for rational-angled billiards, Duke Math. J. Volume 144, Number 2 (2008), 285-319.

(39) Quantitative recurrence and large deviations for Teichmuller geodesic flow, Geometriae Dedicata (2006), v. 119, 121-140.

(40) Athreya, Jayadev S.; Sethuraman, Sunder. On the asymptotics of discrete order statistics. Statist. Probab. Lett. 54 (2001), no. 3, 243–249

(41) Athreya, Jayadev S.; Fidkowski, Lukasz M. Number theory, balls in boxes, and the asymptotic uniqueness of maximal discrete order statistics. Integers (2000), A3, 5 pp. (electronic).

PhD Advising

- Ioannis Konstantoulas, PhD, University of Illinois, 2014.
- Grace Work, PhD, University of Illinois, 2016, currently Associate Director of Undergraduate Research, University of Wisconsin-Madison.
- Dia Taha, University of Washington, 2019, currently at Heidelberg University.
- Anthony Sanchez, University of Washington, 2021, NSF and Chancellor's postdoc at UCSD.
- Samantha Fairchild, University of Washington, June 2021, postdoc at Max Planck Liepzig.
- Joshua Southerland, University of Washington, June 2022, Zorn postdoc at Indiana University.
- Albert Artiles-Calix, University of Washington, expected graduation June 2024.

Postdoc Mentoring

- Dami Lee, September 2018-current.
- Heather Lee, September 2017-current.
- Jenya Sapir, 2014-2015, currently Assistant Professor at Binghamton University.
- Francesco Cellarosi, 2012-2015, currently Assistant Professor at Queens University.

Recent invited talks

- Plenary Speaker, Bucharest Number Theory Days (in honor of Alexandru Zaharescu on his 60th birthday), June 2021.
- University of Michigan Geometry Seminar, April 2021.
- AMS Central Sectional Meeting Special Session on Number Theory, invited talk, April 2021.
- MAA Southern California/Nevada sectional meeting Invited Address, April 2021.
- Institute for Advanced Study Conversations, IAS, March 2021.
- Quasiworld Seminar, UCLA, February 2021.
- Colloquium, UBC, January 2021.
- Plenary, SUMS conference, James Madison University, November 2020.
- Infosys-Chandrasekharan Virtual Centre for Random Geometry Colloquium, October 2020.
- Colloquium, Azim Premji University, September 2020.
- Colloquium, Penn State University, September 2020.
- Stony Brook University, Dynamics and Renormalization Seminar, September 2020.
- ICERM workshop on Lattice Point Counting, July 2020.
- Combinatorics Seminar, University of Washington, June 2020.
- American Institute of Mathematics, Workshop on Non-Uniformly Hyperbolic Dynamics, July 2019.
- Mapping Class Group Special Session, AMS Western and Central Sectional Meeting, Honolulu, March 2019.
- Colloquium, University of Lethbridge, March 2019

- Minicourse, Surface group representations and Projective Structures, International Center for Theoretical Sciences, Bangalore, December 2018.
- Colloquium, University of Michigan, October 2018.
- Colloquium, University of Puget Sound, October 2018.
- Oberwolfach workshop on Flat Surfaces and Algebraic Geometry, September 2018.
- Flat Surfaces Seminar, Institut Henri Poincaré, September 2018.
- Geometry Seminar, Université Nice Sophia Antipolis, September 2018.
- University of Hong Kong, Number Theory Days, July 2018.
- Geometric and Asymptotic Group Theory with Applications, Seoul, July 2018.
- Rainwater Seminar, University of Washington, May 2018.
- Colloquium, Indian Institute of Science, August 2018.
- Math/Physics Seminar, Jawaharlal Nehru University, August 2018.
- William Rowan Hamliton Memorial Conference, Trinity College, Dublin, August 2017.
- Colloquium, Reed College, April 2017.
- Plenary speaker, Conference on Teichmüller Space, Polygonal Billiard, Interval Exchanges, CIRM Luminy, February 2017.
- Plenary speaker, Conference on Homogeneous Spaces, Diophantine Approximation and Stationary Measures, CIRM Luminy, February 2017.
- Ergodic Theory Seminar, Tata Institute of Fundamental Research, Bombay, January 2017.

Recent Professional Service

- AMS Western Section Program Committee, February 2021-January 2023.
- Chairman, Scientific Committee, Pacific Rim Mathematical Association 2021 Congress.
- Managing Editor, Experimental Mathematics, March 2020-July 2021.
- Royalty Research Fund Committee, September 2020-present.
- Director's Advisory Committee, Pacific Institute of Mathematical Sciences, December 2019- June 2021.
- Special Advisor to the Director, Pacific Institute of Mathematical Sciences, January 2020-June 2021.
- Editorial Board, Illinois Journal of Mathematics, January 2020-present.
- Park City Mathematics Institute, Graduate Steering Committee, 2018-present.
- Lead Organizer, Mathematical Sciences Research Institute program on Holomorphic Differentials and Physics, Fall 2019.
- Organizer, Illustrating Probability and Dynamics, ICERM, November 2019.
- Organizer, Simons Center Workshop on Holomorphic Differentials and Physics, February 2019.
- Member of the Classroom Resource Materials Editorial Board, Mathematical Association of America, 2019-2022.
- Leadership team, Geometry Labs United, 2012-present.

Popular Media

- A New Discovery about Dodecahedrons - Numberphile, 749,000 views as of October 2020.
- Quanta Magazine, Mathematicians Report New Discovery About the Dodecahedron, also appeared in syndication at Wired.com, September 2020.
- Vice, Mathematicians Made a Basic Discovery in Shapes After 2,000 Years, September 2020.
- Consultant for Secrets of the Surface, a documentary on Maryam Mirzakhani.

References

- Alex Eskin, University of Chicago
- Howard Masur, University of Chicago
- John Smillie, Mathematics Institute, Warwick
- Barak Weiss, Tel Aviv University
- Anton Zorich, Institut de Mathématiques de Jussieu
- (teaching) Matt Conroy, University of Washington