

Ronnie Pavlov

CONTACT INFORMATION

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EDUCATION

The Ohio State University Columbus, OH

Ph.D. in Mathematics, 2007

- Dissertation: “Some Results on Recurrence and Entropy”
- Advisor: **Professor Vitaly Bergelson**

M.S. in Mathematics, 2003

- Master’s Thesis: “Subwords of Sturmian Sequences”
- Advisor: **Professor Vitaly Bergelson**

B.S. in Mathematics, 2000

CURRENT POSITION

Professor, University of Denver, **September 2020 - present**

PREVIOUS POSITIONS

Associate Professor, University of Denver, **September 2014 - present**

Assistant Professor, University of Denver, **September 2010 - August 2014**

Postdoctoral Fellow, University of British Columbia, **August 2007 - August 2010**

RESEARCH INTERESTS

Dynamical systems and ergodic theory, specifically symbolic dynamics in multiple dimensions

PUBLICATIONS (†: STUDENT CO-AUTHOR)

[1] *Subsystems of transitive subshifts with linear complexity* (with Andrew Dykstra and Nic Ormes), submitted.

[2] *The relationship between word complexity and computational complexity in subshifts* (with Pascal Vanier), submitted.

[3] *On entropy and intrinsic ergodicity of coded subshifts*, submitted.

[4] *Extender sets and measures of maximal entropy for subshifts* (with Felipe García-Ramos), *J. Lond. Math. Soc.*, **100** (2019), no. 3, 1013–1033.

[5] *On the complexity function for sequences which are not uniformly recurrent* (with Nic Ormes), *Contemp. Math.*, **736** (2019), 125–138.

[6] *One-sided almost specification and intrinsic ergodicity* (with Vaughn Climenhaga), *Ergodic Theory Dynam. Systems*, **39** (2019), no. 9, 2456–2480.

[7] *On non-uniform specification and uniqueness of the equilibrium state in expansive systems*, *Non-linearity*, **32** (2019), no. 7, 2441–2466.

[8] *Factor maps and embeddings for random \mathbb{Z}^d shifts of finite type* (with Kevin McGoff), *Israel J. Math.*, **230** (2019), no. 1, 239–273.

[9†] *Follower, predecessor, and extender entropies* (with Thomas French), *Monatsh. Math.*, **188** (2019), no. 3, 495–510.

[10†] *A characterization of the sets of periods within shifts of finite type* (with Madeline Doering), *Involve*, **12** (2019), no. 2, 203–220.

- [11] *Factoring onto \mathbb{Z}^d subshifts with the finite extension property* (with Raimundo Briceño and Kevin McGoff), Proc. Amer. Math. Soc., **146** (2018), no. 12, 5129–5240.
- [12] *Topologically completely positive entropy and zero-dimensional topologically completely positive entropy*, Ergodic Theory Dynam. Systems, **38** (2018), no. 5, 1894–1922.
- [13] *Strong spatial mixing in homomorphism spaces* (with Raimundo Briceño), SIAM J. Discrete Math., **31** (2017), no. 3, 2110–2137.
- [14] *On factors of \mathbb{Z}^d SFTs and intrinsic ergodicity* (with Kevin McGoff), Ergodic Theory Dynam. Systems, **37** (2017), no. 2, 621–645.
- [15[†]] *Subshifts with slowly growing numbers of follower sets* (with Thomas French and Nic Ormes), Contemp. Math., **678** (2016), 192–203.
- [16] *Random \mathbb{Z}^d -shifts of finite type* (with Kevin McGoff), J. Mod. Dyn., **10** (2016), no. 2, 287–330.
- [17] *Extender sets and multidimensional subshifts*, (with Nic Ormes), Ergodic Theory Dynam. Systems, **36** (2016), no. 3, 908–923.
- [18] *On intrinsic ergodicity and weakenings of the specification property*, Adv. Math. **295** (2016), 250–270.
- [19] *Representation and poly-time approximation for pressure of \mathbb{Z}^2 lattice models in the non-uniqueness region*, (with Stefan Adams, Raimundo Briceño, and Brian Marcus), J. Stat. Phys. **162** (2016), no. 4, 1031–1067.
- [20] *An integral representation for topological pressure in terms of conditional probabilities*, (with Brian Marcus), Israel J. Math., **207** (2015), no. 1, 395–433.
- [21] *Entropies realizable by block gluing shifts of finite type* (with Michael Schraudner), J. Anal. Math., **126** (2015), 113–174.
- [22] *Classification of sofic projective subdynamics of multidimensional shifts of finite type* (with Michael Schraudner), Trans. Amer. Math. Soc., **367** (2015), 3371–3421.
- [23] *Entropy and measures of maximal entropy for axial powers of subshifts* (with Tom Meyerovitch), Proc. London Math. Soc., **109** (2014), no. 4, 921–945.
- [24] *A characterization of topologically completely positive entropy for shifts of finite type*, Ergodic Theory Dynam. Systems, **34** (2014), no. 6, 2054–2065.
- [25] *Shifts of finite type with nearly full entropy*, Proc. Lond. Math. Soc., **108** (2014), no. 1, 103–132.
- [26] *One dimensional Markov random fields, Markov chains and topological Markov fields* (with N. Chandgottia, G. Han, B. Marcus, and T. Meyerovitch), Proc. Amer. Math. Soc., **142** (2014), no. 1, 227–242.
- [27] *Computing bounds for entropy of stationary \mathbb{Z}^d Markov random fields* (with Brian Marcus), SIAM J. Discrete Math., **27** (2013), no. 3, 1544–1558.
- [28] *Independence entropy of \mathbb{Z}^d -shift spaces* (with Erez Louidor and Brian Marcus), Acta. Appl. Math., **126** (2013), 297–317.
- [29] *Approximating entropy for a class of \mathbb{Z}^2 Markov random fields and pressure for a class of functions on \mathbb{Z}^2 shifts of finite type* (with Brian Marcus), Ergodic Theory Dynam. Systems, **33** (2013), no. 1, 186–220.
- [30] *A class of nonsofic multidimensional shift spaces*, Proc. Amer. Math. Soc. **141** (2013), no. 3, 987–996.

[31] *Approximating the hard square entropy constant with probabilistic methods*, Ann. Probab. **40** (2012), no. 6, 2362–2399.

[32] *Perturbations of multidimensional shifts of finite type*, Ergodic Theory Dynam. Systems **31** (2011), no. 2, 483–526.

[33] *Multidimensional sofic shifts without separation and their factors* (with Michael Boyle and Michael Schraudner), Trans. Amer. Math. Soc. **362** (2010), no. 9, 4617–4653.

[34] *Some counterexamples in topological dynamics*, Ergodic Theory Dynam. Systems **28** (2008), no. 4, 1291–1322.

INVITED
PRESENTATIONS

Non-uniform specification properties on subshifts Sep. 2019
Dynamics, Equations and Applications (DEA) 2019, AGH University, Krakow, Poland

Minimal subsystems and ergodic measures for subshifts of linear complexity Apr. 2019
2019 Workshop on Dynamical Systems and Related Topics, University of Maryland

Minimal subsystems and ergodic measures for subshifts of linear complexity Mar. 2019
Eastern Illinois Integrated Conference in Geometry, Dynamics, and Topology, Eastern Illinois U.

Extender sets and measures of maximal entropy Oct. 2018
University of Houston Dynamics Seminar, Houston, Texas

Extender sets and measures of maximal entropy Aug. 2018
Workshop on Symbolic Dynamics, UBC (Vancouver)

Non-uniform specification properties Aug. 2017
Current Trends in Dynamical Systems and the Mathematical Legacy of Rufus Bowen, UBC (Vancouver)

Non-uniform specification properties for subshifts Apr. 2017
Northwest Dynamics Day, University of Washington

Non-uniform mixing and intrinsic ergodicity Apr. 2017
Carolina Dynamics Symposium, UNC Charlotte

Nearest-neighbor tilings in one and two dimensions (plenary lecture) Apr. 2017
Annual meeting of the Michigan MAA section, Ferris State University

Non-uniform mixing properties and intrinsic ergodicity for subshifts Mar. 2017
Dynamics Seminar, University of Texas at Austin

Entropy and mixing for multidimensional shifts of finite type (3-day invited course) Jan. 2017
Thematic week: New advances in symbolic dynamics, CIRM (Marseille)

Computation of topological entropy for \mathbb{Z}^2 shifts of finite type Jan. 2017
Université Paris 11 ergodic theory and dynamical systems seminar

Shifts of finite type with nearly full entropy Jan. 2017
Université Paris 11 ergodic theory and dynamical systems seminar

Weakened specification properties and intrinsic ergodicity for subshifts Nov. 2016
Dynamics Seminar, the Ohio State University

- Random subshifts of finite type: an introduction* Oct. 2016
Workshop in Analytic and Probabilistic Combinatorics, BIRS (Banff)
- Computation of topological entropy for \mathbb{Z}^2 shifts of finite type* Jun. 2016
2016 Computability in Europe 2016, Université Paris 13
- Almost specification and intrinsic ergodicity* Apr. 2016
2016 Workshop on Dynamical Systems and Related Topics, University of Maryland
- Almost specification and intrinsic ergodicity* Apr. 2016
Sectional Meeting of the AMS, University of Utah
- Multidimensional Symbolic Dynamics (5-day invited course)* Jan. 2016
2016 Winter School in Recent Trends in Nonlinear Science, University of Sevilla, Spain
- Computation of topological entropy for \mathbb{Z}^d shifts of finite type* Oct. 2015
Sectional Meeting of the AMS, Loyola University
- Specification properties and intrinsic ergodicity for subshifts* Apr. 2015
2015 Workshop on Dynamical Systems and Related Topics, University of Maryland
- Specification properties and intrinsic ergodicity for subshifts* Dec. 2014
2014 Workshop on Symbolic Dynamics of Finitely Presented Groups, Santiago, Chile
- A characterization of topologically completely positive entropy for shifts of finite type* Jan. 2014
2014 Joint Meetings of the American Mathematical Society, Baltimore, Maryland
- Limiting entropy of d -dimensional axial powers of subshifts* Aug. 2013
Mathematical Congress of the Americas 2013, Guanajuato, Mexico
- Shifts of finite type with nearly full entropy* Jun. 2013
Automata Theory and Symbolic Dynamics Workshop, UBC (Vancouver)
- Shifts of finite type with nearly full entropy* Apr. 2013
Sectional Meeting of the AMS, University of Colorado
- Shifts of finite type with nearly full entropy* Dec. 2012
School on Information and Randomness 2012, Puerto Varas, Chile
- Entropy and mixing for multidimensional symbolic systems (mini-course: 4 talks)* Dec. 2012
DySyCo school in Dynamical Systems and Computation, Santiago, Chile
- Limiting entropy of d -dimensional axial powers of subshifts* Jan. 2012
First Franco-Chilean Congress in Dynamics and Combinatorics, Baie de Somme, France
- Notions of subdynamics for multidimensional shifts of finite type* Jun. 2011
Journées du groupe de travail SDA2, Caen, France
- Shifts of finite type with nearly full entropy* Feb. 2011
Workshop on Ergodic Optimization, BIRS (Banff)
- Limiting d -dimensional nearest neighbor entropy of shifts of finite type* Dec. 2010
School on Information and Randomness 2010, Pucón, Chile
- Limiting entropy and independence entropy of d -dimensional shift spaces* Dec. 2010
2010 Canadian Mathematical Society Winter Meeting, UBC (Vancouver)

Estimating the topological entropy of \mathbb{Z}^2 shifts of finite type Feb. 2010
Thematic week: On multi-dimensional subshifts and tilings, CIRM (Marseille)

Estimating the entropy of a \mathbb{Z}^d shift of finite type with probabilistic methods Jul. 2009
1st PRIMA Congress, University of New South Wales, Australia

\mathbb{Z}^d shifts with restricted subshifts and factors May 2008
Interdisciplinary Mathematical and Statistical Techniques 2008, Univ. Memphis

AWARDED FUNDING (EXTERNAL TO DU)

- PI, Simons Collaboration Grant number 637141, dates Sept. 2019 - Aug. 2024. Funded in amount of \$42,000.
- Co-PI (with Nic Ormes), NSF Proposal number DMS-1700530, for Pingree Park Dynamical Systems Workshop 2017. Funded in amount of \$25,000.
- PI, NSF grant number DMS-1500685, title “Topics in Symbolic Dynamics,” dates Jun. 2015 - May 2018. Funded in amount of \$161,416.
- Co-PI (with Nic Ormes), NSF Proposal number DMS-1418490, for Pingree Park Dynamical Systems Workshop 2014. Funded in amount of \$25,000.
- Awarded \$1,800 by AMS for travel to Mathematical Congress of the Americas, Aug. 2012.
- Co-PI (with Nic Ormes), NSF Proposal number DMS-1113584, for Pingree Park Dynamical Systems Workshop 2011. Funded in amount of \$25,000.

AWARDS AND HONORS

- Nominated as University of Denver Faculty Career Champion in 2017
- Sole recipient of university-wide Pioneer award for University of Denver faculty in 2016
- Nominated for divisional award for Excellence in Research in 2018
- Nominated for divisional award for Outstanding Junior Faculty in 2012
- Nominated for divisional awards for Excellence in Teaching in 2012, 2015, 2016
- Winner of Postdoc Teaching Award at UBC Mathematics Department in 2008
- Winner of Graduate Teaching Award at Ohio State University Mathematics Department in 2006

GRADUATE RESEARCH SUPERVISED

- Dennis Pace, earned Ph.D. in 2018
- Thomas French, earned Ph.D. in 2016

UNIVERSITY SERVICE

- Served as University of Denver calculus coordinator: 2018-present
- Served as director of University of Denver Math (tutoring) Center: 2017-present
- Designed and oversaw DU math department’s exhibit for STEMosphere K-7 outreach event: 2015
- Supervised DU math department’s Putnam Exam Practice Sessions: 2010-present
- Served on DU math department Undergraduate Committee: 2012-present
- Served on DU Faculty Senate: 2016-2018
- Organized DU math department’s Analysis and Dynamics Seminar: 2012-2014

PROFESSIONAL SERVICE

- Reviewed for Mathematical Reviews (approx. 2 – 3 per year): 2012-present
- Refereed for various journals (approx. 8 – 10 per year), including Proceedings of the London Math Society, Transactions of the AMS, Proceedings of the AMS, Discrete Contin. Dyn. Syst. Series A, Ergodic Theory Dynam. Systems, Forum of Mathematics Sigma, Theoret. Comput. Sci.: 2010-present
- Co-organizing special session (with Scott Schmieding) at AMS-MAA joint meetings: 2020
- Co-organized 5-day workshop at BIRS-Oaxaca: 2019
- Co-organized 4th-6th Pingree Park Dynamics Workshops (with Nic Ormes): 2011, 2014, 2017
- Co-organized special session (with Nic Ormes) at AMS Fall Western Sectional meeting: 2016
- Served on Program Committee and refereed proceedings volume for AUTOMATA (International Workshop on Cellular Automata and Discrete Complex Systems): 2011 and 2017
- Reviewed ECOS-CONICYT grant proposal for Franco-Chilean collaboration: 2012