

Titles & Abstracts of Talks

- Bryna Kra (Northwestern University)

Time: Friday, 3:00 - 4:00 PM in 636 SEO

Title: Nilsystems in dynamics

Abstract: The connection between ergodic theory and additive combinatorics dates back to the 1970's, with Furstenberg's proof of Szemerédi's Theorem via ergodic theory. Certain algebraic constraints (arising from nilsystems) play a key role in understanding objects that arise in Furstenberg's proof. More recently, nil-structures have been imported into the finite combinatorial setting, playing a role in finding patterns in the primes. I will give an overview of where nilsystems arise in ergodic theory and topological dynamics, explaining some of the connections to additive combinatorics.

- Alexander Fish (University of Wisconsin)

Time: Friday, 5:00 - 5:45 PM in 636 SEO

Title: Dynamical approach to sumsets in infinite abelian groups

Abstract: We will explain how Furstenberg's correspondence principle can be used to estimate from below the upper Banach density of $A+B$ for sets A and B in a countable infinite abelian group. New results will be discussed for the case B is a Bohr set (almost periodic set). This is joint work with M. Bjorklund (Hebrew University).

- Nimish Shah (Ohio State University)

Time: Saturday, 9:00 – 9:45 AM in 636 SEO

Title: Equidistribution and counting points on orbits of geometrically finite hyperbolic groups

Abstract: In this joint work with Hee Oh, we consider various sphere packing configurations, which happen to be invariant under actions of geometrically finite hyperbolic groups, and estimate the cardinality of spheres of curvature (with respect to euclidean, or spherical, or hyperbolic metric) at most T for some large T . This sphere counting problem is studied by formulating and proving certain “weighted equidistribution” results related to the geodesic flow on the unit tangent bundle of a hyperbolic n -manifold H^n/Γ , where Γ is a geometrically finite discrete group of isometries of H^n .

- Lewis Bowen (Texas A & M University)

Time: Saturday, 10:30 – 11:15 AM in 636 SEO

Title: Entropy in measurable dynamics

Abstract: In 1958, Kolmogorov defined the entropy of a probability measure preserving transformation. Entropy has since been central to the classification theory of measurable dynamics. In the 70's and 80's researchers extended entropy theory to measure preserving actions of amenable groups (Kieffer, Ornstein-Weiss). My recent work generalizes the entropy concept to actions of sofic groups; a class of groups that contains for example, all subgroups of $GL(n, \mathbb{C})$. Applications include the classification of Bernoulli shifts over a free group. This answers a question of Ornstein and Weiss.

- Moon Duchin (University of Michigan)

Time: Saturday, 11:30 – 12:15 noon in 636 SEO

Title: Limit shapes in groups

Abstract: Consider larger and larger metric spheres in a group. Under nice circumstances, these converge to a definite “limit shape” as the radius goes to infinity. For instance in finitely generated nilpotent groups one may use the rescaling homothety in the ambient Lie group to shrink down large spheres, and by work of Pansu (extended by Breuillard) this gives a well-defined limit. For a simple example, in the free abelian group Z^2 , if we take the standard generating set, the limit shape is a diamond (and the limiting metric, for which this is the unit sphere, is the L^1 metric on the plane). It is natural to ask whether the counting measure on the discrete spheres converges to a measure on the limit shape. I'll discuss our work on this question, and give some ergodic applications and some averaging applications for limit shapes. Parts of this project are joint work with Samuel Lelièvre, Christopher Mooney, and Ralf Spatzier.

- Christian Rosendal (University of Illinois at Chicago)

Time: Saturday, 2:30 – 3:15 PM in 636 SEO

Title: Finite approximation, large conjugacy classes, and dynamics of automorphism groups

Abstract: Automorphism groups of first order structures exhibit a number of interesting dynamical phenomena not easily encountered in other topological groups. We shall focus on the existence of large, i.e., dense or even comeagre, conjugacy classes in automorphism groups and see how the existence of these relates to strengthened versions of residual finiteness for countable groups. Moreover, we shall indicate how the existence of comeagre conjugacy classes strongly determines the structure of a topological group.

- Justin Moore (Cornell University)

Time: Saturday, 4:00 – 4:45 PM in 636 SEO

Title: Fast growth in the Folner function for Thompson’s group F

Abstract: While it is not known whether Thompson’s group F is amenable, I will establish a lower bound on the Følner function for F . In particular, I will demonstrate the following: For each generating set, there is a constant $C > 1$ such that if A is a C^{-n} -Følner set in F , then A contains at least $H(n)$ elements, where $H(0) = 0$ and $H(n + 1) = 2^{H(n)}$.

- Roland Roeder (Indiana University – Purdue University Indianapolis)

Time: Sunday, 9:00 – 9:45 AM in 636 SEO

Title: Lee-Yang zeros and rational dynamics in two variables

Abstract: In a classical work, Yang and Lee proved that zeros of certain polynomials (partition functions of Ising models) always lie on the unit circle. Distribution of these zeros control phase transitions in the model. We study this distribution for a special “Migdal-Kadanoff hierarchical lattice”. In this case, it can be described in terms of the dynamics of an explicit rational function in two variables. More specifically, we prove that the renormalization operator is partially hyperbolic and has a unique central foliation. The limiting distribution of Lee-Yang zeros is described by a holonomy invariant measure on this foliation. I will explain both of the above (omitting some details) and describe further questions motivated by our work. This is a joint work with Pavel Bleher and Mikhail Lyubich.

- Alex Clark (University of Leicester)

Time: Sunday, 10:15 – 11:00 AM in 636 SEO

Title: Equicontinuity in foliated spaces

Abstract: After reviewing the structure of minimal equicontinuous flows, we will discuss equicontinuity for foliated spaces and recent results with Hurder on the structure of special classes of minimal equicontinuous foliated spaces we call matchbox manifolds. These results are closely related to our topological characterization of homogeneous matchbox manifolds that we shall also discuss and relate to the characterization of minimal equicontinuous flows. These results lead to natural conjectures for a more general characterization of compact minimal equicontinuous foliated spaces.

- Kevin Pilgrim (Indiana University)

Time: Sunday, 11:15 – 12:00 noon in 636 SEO

Title: On the global topology of polynomial shift loci

Abstract: Let MP_d denote the space of affine conjugacy classes of polynomials of degree $d \geq 2$. The shift locus \mathcal{S}_d , consisting of maps all of whose critical points escape under iteration, has rich topological structure. I will describe some of its features. This is joint ongoing work with Laura DeMarco.