Benjamin Weiss: Ergodic theory beyond amenable groups

In the last few years there has been great progress in extending the classical aspects of ergodic theory to actions of non-amenable groups. I will survey a part of this activity and in particular present a new proof of Kolmogorov's theorem that isomorphic Bernoulli shifts have the same base entropy. This new proof applies almost verbatim to Bernoulli shifts over any sofic group

Marie Claude Arnaud: Lyapunov exponents for twisting dynamics

At the end of the 80s', J. Mather extended his 2-dimensional Aubry-Mather theory to the case of higher dimensional dynamical systems. For twisting Lagrangian dynamics, he proved the existence of a lot of minimizing measures. We will explain two recent results for these minimizing measures:
-in the case of Lagrangian dynamics or multidimensional conservative twist maps, we will show that there is a correspondence between the angle of the stable and unstable Oseledet's bundle and the size of the smallest positive Lyapunov exponent;
-for Lagrangian dynamics we will discuss some relationships between the shape of the support of the measure and the Lyapunov exponents.
The main tools for proving such results are the Green bundles (bundles that were introduced by L.W. Green in Riemannian geometry) and we will explain the main properties of these bundles.

Jairo Bochi: Optimization of Lyapunov exponents.

Given a linear cocycle over a hyperbolic basic dynamics T (e.g., a shift), we are interested in the T-invariant measures that maximize or minimize the Lyapunov exponent of the cocycle. It seems that typically such measures have low complexity (zero entropy). We show that this conjecture holds true for 2-dimensional one-step cocycles satisfying assumptions of dominance and non-overlapping. This is a joint work with Michal Rams (Warsaw).

Idris Assani: Pointwise convergence of non conventional ergodic averages for commuting actions

We report on work in progress on the pointwise convergence of non-conventional ergodic averages in the case of powers of a single transformation and more generally when the transformations involved in these sums commute and generate a free action.

Dalia Theresiu*:* Polynomial decay of correlation for Gibbs Markov semiflows: upper and lower bounds.Upper bounds for polynomial decay of correlation in the setting of Gibbs Markov semiflows has been previously established in a paper of Ian Melbourne (Melbourne, 09). In work in progress with Ian Melbourne we obtain lower bounds by exploiting an operator renewal equation for flows (previously established in a paper of Melbourne and myself) and developing new, adequate techniques
.**Francesco Cellarosi**: Continued fraction digit averages and MacLaurin's Inequalities.A classical result of Kinchin says that for almost every real number x, the geometric mean of the first n digits in the continued fraction expansion of x converges to a number K=2.685… as n tends to infinity. On the other hand, for almost every x, the arithmetic mean of the first n digits

tends to infinity. There is a sequence of refinements of the classical Arithmetic Mean – Geometric Mean inequality (called MacLaurin's inequalities) involving the k-th root of the k-th elementary symmetric mean, where k ranges from 1 (arithmetic mean) to n (geometric mean). We analyze what happens to these means for typical real numbers, when k is a function of n. We obtain sufficient conditions to ensure convergence / divergence of such means.
Joint work with Steven J. Miller and Jake L. Wellens.

Alexander Kachurovskii : Estimates of the rates of convergence in von Neumann's and Birkhoff's ergodic theorems

Estimates of the rates of convergence will be given in the talk: in von Neumann's ergodic theorem – via the rate of correlations decay,
and via the singularity at zero of the spectral measure of the function being averaged with respect to the corresponding dynamical system; in Birkhoff's
ergodic theorem – via convergence rate in von Neumann's ergodic theorem, and via large deviations rate of decay. The reasons of naturalness of
obtaining these very estimates, are explained. Estimates of convergence rates in both ergodic theorems are given for important in applications classes of dynamical systems, including some well-known billiards and Anosov systems. The talk is based on my joint survey with Ivan Podvigin.

Azadeh Kaleghi: Nonparametric multiple change point estimation in stationary ergodic time series

Given a heterogeneous time series sample, it is required to find the points in time (called change points) at which the probability distribution generating the time series have changed. The number of change points may be known or unknown. It is assumed that the data between every pair of consecutive change points have been generated by an arbitrary (unknown) stationary ergodic process distribution. We adopt a fully non-parametric approach to the
problem. No modeling independence, mixing or parametric assumptions are made; for example, the changes may be only in the form of the long-range dependence. Algorithms for solving this problem are proposed and are shown to be asymptotically consistent in this general framework. The proposed algorithms can be implemented efficiently.

Yonatan Gutman: Dynamical Embedding in Cubical Shifts with a View towards Physics

Consider an experiment on a dynamical system (X,T) where only one smooth observable $f:X\rightarrow [0,1]$ can be measured meaningfully.
According to the discrete version of the celebrated Takens' Theorem, as proven by Sauer,Yorke and Casdagli, allowing for a small change in
f and under some conditions on the periodic points, one can reconstruct the system on a compact invariant set (e.g. an attractor) A
through a time-delayed mapping $x\mapsto (f(x),f(Tx),\ldots,f(T^{2n-1}x))$, if the upper box dimension of A is strictly less than
n. We generalize this theorem to the continuous setting, replacing upper box dimension by covering dimension. It is well known the latter

may be finite while the first is infinite. The new theorem also yields a sharp generalization of the Jaworski's Embedding Theorem for finite
dimensional topologicalsystems. Related to this circle of ideas we consider the two-dimensional Navier-Stokes Equations from fluid mechanics and show how to embed an associated infinite-dimensional discrete model into a cubical shift $(([0,1]^{d})^{\mathbb{N}},shift)$.

Jean Pierre Conze : Quenched CLT for random walks by commuting automorphisms on compact abelian groups.

El H. Abdalahoui- A non-singular transformation whose Spectrum has Lebesgue component of multiplicity one.

In this talk, I present a recent work with Prof. M. Nadkarni in which we give a partial positive answer to the Banach problem. Indeed, we construct a 2-point extension of ergodic conservative non-singular generalized odometer whose admits a Lebesgue component of multiplicity one in its spectrum. The proof is based on the construction of ultraflat polynomials. I will further present a part of my recent work with Prof. Nadkarni on the flat polynomials issue in the class of Newman polynomials and Littlewood polynomials.

Arkady Tempelman: Pointwise ergodic theorems for bounded Lamperti representations of amenable groups in a space $L^\alpha, \alpha>1$.

Pointwise, maximal and dominated ergodic theorems for "weighted" averages for bounded Lamperti representations of amenable σ-compact locally compact groups in $L^\alpha(\Omega,\mathcal F,m)$ for a fixed $\alpha, 1<\alpha<\infty)$ are proved (in particular, these theorems imply ergodic theorems for positive group representations and group actions). We discuss various conditions on the "weights" under which these theorems hold. As a special case, Ces\`aro averages with respect to tempered and weakly tempered sequences of sets are considered.

Adam Kanigowski: On multiple mixing and Ratner's property for a class of mixing special flows over irrational rotations.

Guy Cohen: Ritt operators and convex combinations of products of conditional expectations

We extend the solution of Burkholder's conjecture for products of conditional expectations, obtained by Delyon and Delyon for L_2 and by Cohen for L_p, $1<p<\infty$, to the context of Badea and Lyubich: {\it Let T be a finite convex combination of operators T_j which are products of finitely many conditional expectations. Then $T^n f$ converges a.e.for every $f \in L_p$, $1<p<\infty$, with $\sup_n |T^nf| \in L_p$.}
The proof uses the work of Le Merdy and Xu on positive L_p contractions satisfying Ritt's resolvent condition.

Tushar Das: Extremal measures

A major direction within the field of metric Diophantine approximation on manifolds has been to study the class of extremal measures. These are finite Borel measures which do not charge the set of very well approximable points (VWA) in Euclidean space. In the early ’00s Dmitry Kleinbock, Elon Lindenstrauss and Barak Weiss introduced a geometric condition on a measure they named friendliness and showed that it implied extremality. It turns out that many interesting measures do not satisfy Kleinbock, Lindenstrauss and Weiss’s condition but are nevertheless extremal. We study a new geometric condition that is stronger than extremality, though more flexible than friendliness. We present a few of our results that show various classes of measures (mainly dynamically defined) — e.g. conformal measures of infinite IFSs and Patterson-Sullivan measures for geometrically finite Kleinian groups — satisfy our condition and therefore turn out to be extremal. It is of interest that such results could not previously be resolved using pre-existing technology. This is ongoing joint work with Lior Fishman (North Texas), David Simmons (Ohio State) and Mariusz Urba\'nski (North Texas).

Ryo Moore: A Uniform Wiener-Wintner Ergodic Theorem for Double Recurrence Averages

We show that Bourgain’s almost everywhere double recurrence theorem can be extended to a Wiener Wintner theorem to double recurrence averages. We will highlight the main ideas and tools used to derive this result. This is a joint work with I. Assani and D. Duncan.

Anima Nagar: Transitive points in the induced system.

Given a system (X,T), where X is a compact metric space and T is a self map on X, we look into the dynamics of the induced system (2^X,T)
where 2^X is the space of all non-empty closed subsets of X. We look into the structure of transitive points in this induced system. We investigate
the structure of such transitive points and discuss their implications on the dynamical properties of (X,T).

Regis Varao: Ergodic theory and metric behavior of invariant foliations.

In a joint work with A. Tahzibi and G. Ponce we have given an example of a conservative partially hyperbolic diffeomorphism on T^3 for which there is a set of full volume which intersect each center leaf in only one point. I will discuss this result as well some related questions concerning the metric behavior of the invariant foliations.

Michael Lin: Powers of some averages of group actions and of L_p representations