MEASURE RIGIDITY.

Lectures 1 and 2. Introduction and $\mathbb{Z}^2$ actions by automorphisms of $T^3$.
- Furstenberg problem, algebraic toral examples.
- Suspension construction.
- Lyapunov exponents, Weyl chambers, Lyapunov distributions and foliations.
- Cartan actions and TNS actions.
- Pesin sets and invariant manifolds.
- Conditional measures and entropy (Ledrappier-Young results).
- Measure rigidity for the algebraic examples on $T^3$.

Lectures 3 and 4. Non-uniformly hyperbolic actions of $\mathbb{Z}^k$ on $T^{k+1}$, $k \geq 2$.
- Existence of the semiconjugacy.
- Preservation of Weyl chambers under the semiconjugacy.
- Invariant affine structures on the leaves of Lyapunov foliations.
- Uniform growth estimates along the walls of Weyl chambers.
- Ergodicity along the walls of Weyl chambers ($\pi$-partition trick).
- Invariance properties of conditional measures and absolute continuity.

Lectures 5 and 6. Non-uniformly hyperbolic actions on arbitrary manifolds.
- Lyapunov metric and special time change (synchronization).
- Properties of the time change and invariant “manifolds”.
- $\pi$-partition trick.
- Absolute continuity of conditional measures and conclusion of the proof.
- Further remarks and open questions.

If time permits we shall also discuss uniqueness of the large measure in the non-uniform toral case and other related topics.

References:

2. A. Katok and R. Spatzier, "Invariant measures for higher rank hyperbolic Abelian actions", Erg. Theory and Dynam. Systems, 16 (1996), 751-778,
5. A. Katok and F. Rodriguez Hertz, "Uniqueness of large invariant measures for $\mathbb{Z}^k$ actions with Cartan homotopy data", Journal of Modern Dynamics, 1, N2, (2007), 287–300
6. A. Katok, B. Kalinin, and F. Rodriguez Hertz "Nonuniform measure rigidity". (Preprint)