Programme on

“Mixing Flows and Averaging Methods”

April 4 – May 25, 2016

organized by

Peter Bálint (TU, Budapest), Henk Bruin (U Vienna), Carlangelo Liverani (U Rome, Tor Vergata), Ian Melbourne (U Warwick), Dalia Terhesiu (U Exeter)

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April 18 – 22, 2016

- **Monday, April 18, 2016**

  10:00 – 10:30 **Opening & Registration**

  10:30 – 11:00 *coffee / tea break*

  11:00 – 12:30 **Omri Sarig**
  Thermodynamic formalism: Lecture 1

  12:30 – 15:00 *lunch break*

  15:00 – 16:00 **Vítor Araújo**
  Stable Foliations: Lecture 1

- **Tuesday, April 19, 2016**

  09:30 – 11:00 **Mark Pollicott**
  Geodesic/Anosov Flows: Lecture 1

  11:00 – 11:30 *coffee / tea break*

  11:30 – 13:00 **Yakov Pesin**
  SRB-Measures: Lecture 1

  13:00 – 15:00 *lunch break*

  15:00 – 16:00 **Vítor Araújo**
  Stable Foliations: Lecture 2

- **Wednesday, April 20, 2016**

  09:30 – 11:00 **Omri Sarig**
  Thermodynamic formalism: Lecture 2

  11:00 – 11:30 *coffee / tea break*

  11:30 – 13:00 **Yakov Pesin**
  SRB-Measures: Lecture 2

  12:00 – 15:00 *lunch break*

  15:00 – 16:00 **Richard Sharp**
  Growth of closed geodesics on regular covers of negatively curved manifolds.

- **Thursday, April 21, 2016**

  09:30 – 11:00 **Mark Pollicott**
  Geodesic/Anosov Flows: Lecture 2

  11:00 – 11:30 *coffee / tea break*

  11:30 – 13:00 **Omri Sarig**
  Thermodynamic formalism: Lecture 3

  13:00 – 15:00 *lunch break*

  15:00 – 16:00 **Vítor Araújo**
  Stable Foliations: Lecture 3

- **Friday, April 22, 2016**

  09:30 – 11:00 **Mark Pollicott**
  Geodesic/Anosov Flows: Lecture 3

  11:00 – 11:30 *coffee / tea break*

  11:30 – 13:00 **Yakov Pesin**
  SRB-Measures: Lecture 3

  13:00 – 15:00 *lunch break*

All talks take place at the ESI, Boltzmann Lecture Hall!

- **Yakov Pesin:** The geometric approach for constructing Sinai-Ruelle-Bowen (SRB) measures.

  Abstract: I will describe a unified approach for constructing SRB measures in dynamics. This approach is pure geometrical and does not require any symbolic model of the system to be considered. In dissipative dynamics SRB measures are natural and physically meaningful measures supported on attractors and they have a rich collection of ergodic properties. In the first lecture I will outline a construction of SRB measures in the case of uniformly hyperbolic attractors. In the second lecture I will explain how to extend this construction to include partially hyperbolic ones. Finally, in the third lecture I will consider the most general case of non-uniformly hyperbolic- chaotic - attractors. The lectures require some basic knowledge from the theory of dynamical systems and ergodic theory but all necessary notions will be introduced and most of relevant results will be stated.

- **Mark Pollicott:** Ergodic properties of geodesic and Anosov flows and related systems.

  Abstract: The topics covered in the three lectures
  (i) Geodesic flows in negative curvature, Gibbs measures, symbolic dynamics, statistical properties (Central Limit Theorems, Large Deviations, etc.). Computational aspects.
  (ii) Rates of mixing for geodesic flows, asymptotic estimates on closed orbits. Frame flows and compact group extensions.
  (iii) Higher Teichmüller theory, entropy and the pressure metric. The Teichmüller geodesic flow.

- **Omri Sarig:** Thermodynamic Formalism for maps with infinite Markov partitions.

  Abstract: Chaotic dynamical systems have many different ergodic invariant probability measures. Thermodynamic formalismßtudies those measures which have regular log Jacobian functions. Such measures are interesting for two reasons: first, they appear naturally in many mathematical contexts; second their theory parallels certain chapters in statistical physics very closely.
  Lecture 1: Invariant measures with regular log Jacobians
  Lecture 2: Ruelle's operator
  Lecture 3: Pressure, equilibrium measures, and phase transitions

- **Vítor Araújo:** Smoothness of the stable foliation versus decay of correlations for Lorenz-like attractors.

  Abstract: We will see why there exists a contracting invariant topological foliation in a full neighborhood for singular hyperbolic attractors. Under certain bunching conditions it can then be shown that this stable foliation is smooth. In particular, the stable foliation for the classical Lorenz equation (and nearby vector fields) is better than C^1. In fact the stable foliation for the Lorenz attractor in classical parameters is at least $C^{1.264}$. Finally, we will also see that Hölder-C^1 smoothness is crucial for recent results on exponential decay of correlations for singular- and hyperbolic attractors.