

Workshop in Dynamical Systems: France and Latin America

November 5-6, 2026 · IME-USP

Auditório Antonio Gilioli, Bloco A

Organizers

Carlos Matheus (CNRS/École Polytechnique, France)

Françoise Dal'Bo (Université de Rennes, France)

Rafael Potrie (Universidad de la República, Uruguay)

Yuri Lima (IME-USP, Brazil)

Thursday, November 5

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| 10:00-11:00 | Fabio Tal · IME-USP, Brazil
Essential factors: chaotic models for surface homeomorphisms |
| 11:00-12:00 | León Carvajales · Universidad de la República, Uruguay
Hilbert entropy of a projective pair of pants |
| 14:00-15:00 | Edhin Mamani · UFRJ, Brazil
Left-handed geodesic flows of the 3-axial ellipsoid |
| 15:00-16:00 | Sergi Burniol · Universidad de la República, Uruguay
Strong stable sets on hyperbolic surfaces |

Friday, November 6

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| 10:00-11:00 | Ali Tahzibi · ICMC-USP, Brazil
Measures of maximal unstable entropy for Anosov diffeomorphisms |
| 11:00-12:00 | Santiago Martinchich · Universidad de la República, Uruguay
Invariant sets for homeomorphisms of hyperbolic 3-manifolds |
| 14:00-15:00 | Matéo Ghezal · IME-USP, Brazil
Unstable laminations of Anosov surface endomorphisms in the absence of compact leaves |
| 15:00-16:00 | Viveka Erlandsson · Universidad de la República, Uruguay
Distribution of random multi-curves of given type |

Abstracts

November 5

Fabio Tal

IME-USP, Brazil | November 5 | 10:00-11:00

Title: Essential factors: chaotic models for surface homeomorphisms

A central problem in surface dynamics is to find simplified models that capture the essential dynamical features of a homeomorphism without losing important information about its complexity. In this talk, I will describe a construction that associates to every homeomorphism of a closed surface isotopic to a pseudo-Anosov map (possibly relative to a finite invariant set) a canonical factor, defined on the same surface, which retains important dynamical invariants while exhibiting remarkably strong chaotic properties. This essential factor is topologically mixing, has dense periodic points and a dense family of rotational horseshoes, and possesses a unique topological homoclinic class. Moreover, it preserves rotation sets and translation lengths on the fine curve graph. For smooth diffeomorphisms, we also show that the essential factor has a unique measure of maximal entropy, which is fully supported and Bernoulli. This is joint work with Alejo García-Sassi, Sylvain Crovisier and Yuri Lima.

León Carvajales

Universidad de la República, Uruguay | November 5 | 11:00-12:00

Title: Hilbert entropy of a projective pair of pants

Let P be a surface homeomorphic to a sphere with three open disks removed. The space of isotopy classes of hyperbolic metrics on P is homeomorphic to $\mathbb{R}^3$. Hence, given three real numbers we recover a nice geodesic flow on P and we may in particular analyse its entropy. In this talk I will explain how to estimate this entropy in terms of the initial parameters. Moreover, if time permits I will explain how to generalise this to the space of convex real projective structures on P . This is joint work with Xian Dai, Beatrice Pozzetti and Anna Wienhard.

Edhin Mamani

UFRJ, Brazil | November 5 | 14:00-15:00

Title: Left-handed geodesic flows of the 3-axial ellipsoid

In 2009 E. Ghys introduced the so-called left-handed property for some class of 3-flows. It has to do with how periodic orbits of the flow (considered as oriented closed curves in S^3) are linked. One of his motivations was the dynamical consequences of this property, in particular, the construction of Birkhoff sections for the flow. Then, Dehornoy characterized left-handedness in the context of geodesic flows of negatively curved 2-orbifolds. Recently, Florio and Hryniewicz showed that the geodesic flow of (S^2, g) for some Riemannian metric with positive curvature is left-handed if the pinching is greater than 0.7225. In this talk we analyze the left-handedness of geodesic flows coming from 3-axial ellipsoids with the induced metric of $\mathbb{R}^3$.

Abstracts

Sergi Burniol

Universidad de la República, Uruguay | November 5 | 15:00-16:00

Title: Strong stable sets on hyperbolic surfaces

On the unit tangent bundle of a hyperbolic surface, the dynamical strong stable sets of the geodesic flow do not always coincide with their geometric counterparts, the stable horocycles. In a joint work with Françoise Dal'Bo, we show that the strong stable set of a vector is strictly larger than its stable horocycle if and only if the injectivity radius along the associated geodesic ray is not bounded away from zero and the ray does not diverge through a cusp. In that case, the strong stable set is an uncountable union of stable horocycles. Moreover, this phenomenon is abundant, in a sense I will make precise. The proof is based on the construction of geodesic rays winding around infinitely many short closed curves, which can be geodesics, horocycles or hypercycles. This idea goes back to Bellis in the case of closed geodesics.

November 6

Ali Tahzibi

ICMC-USP, Brazil | November 6 | 10:00-11:00

Title: Measures of maximal unstable entropy for Anosov diffeomorphisms

In this talk, we discuss measures maximizing entropy along the strong unstable foliation for partially hyperbolic Anosov diffeomorphisms on tori with an expanding center bundle. We present a geometric construction based on Margulis families of measures and the semiconjugacy to the linear model, yielding a measure of maximal unstable entropy whose conditional measures along center leaves are equivalent to volume. This measure coincides with the equilibrium state for the potential given by the negative logarithm of the center Jacobian. Our approach provides a new proof of a result of Humbert, extending it to C^2 regularity, and clarifies why maximizing unstable entropy does not, in general, imply maximizing total entropy. This is joint work with Sylvain Crovisier.

Santiago Martinchich

Universidad de la República, Uruguay | November 6 | 11:00-12:00

Title: Invariant sets for homeomorphisms of hyperbolic 3-manifolds

Let f be a minimal homeomorphism in a hyperbolic 3-manifold which is homotopic to the identity. Must every point in the universal cover have zero escape rate to infinity? That is, if F is the lift of f to the universal cover that is obtained by lifting the homotopy from the identity, is it true that $\lim_{n \rightarrow \infty} (1/n)d(x, F^n(x)) = 0$ for every x ? I will discuss this question and related ones based on a joint work with E. Gomes and R. Potrie.

Abstracts

Matéo Ghezal

IME-USP, Brazil | November 6 | 14:00-15:00

Title: Unstable laminations of Anosov surface endomorphisms in the absence of compact leaves

Anosov maps is a fundamental example of dynamical systems which had been studied intensively for more than 50 years. They enjoy many strong geometrical and dynamical properties and constitute a nice framework to understand. One of these remarkable properties is the existence of invariant foliations tangent to the stable and unstable bundles. A very natural object to study is then compact laminations saturated by those leaves, as their topological properties have strong dynamical consequences.

Recently, Avila, Crovisier and Wilkinson studied this question in the case of Anosov diffeomorphism and proposed a new self-transversality criterion to tackle this question. In particular, they proved, together with Eskin, Potrie and Zhang, that any Anosov diffeomorphism on the three torus has a minimal strong unstable foliation. A key ingredient relies on the fact that the linear part of such maps (i.e. its action on the fundamental group) has only irrational eigenvalues.

If one wants to study the non-invertible case, some of the techniques developed by Avila-Crovisier-Eskin-Potrie-Wilkinson-Zhang are not available anymore and new important phenomena appear. Indeed, the lack of a stable foliation and, more importantly, the fact that the linear part may have integer eigenvalues make the situation more complicated. In an upcoming joint work with Bruno Santiago and Rafael Potrie, we address this problem supposing first the absence of compact strong unstable leaves. We show that for such Anosov endomorphisms of surface, even in the case where the linear part is reducible, the strong unstable foliation must be minimal.

Viveka Erlandsson

Universidad de la República, Uruguay | November 6 | 15:00-16:00

Title: Distribution of random multi-curves of given type

Mirzakhani obtained the asymptotic growth of the number of multi-curves of fixed topological type of length at most L on a hyperbolic surface, as L grows. Being able to count them, one gets a natural way to pick a multi-curve at random, and one can ask what properties a random curve of fixed type has. For example, how do the length vectors of the individual components of the multi-curve distribute? Mirzakhani answered this question in the case that the multi-curve is a pair of pants decomposition, and Liu as well as Arana-Herrera generalized her result to other simple multi-curves. In this talk I will explain these results and discuss a different approach to the problem which both gives a new proof of these results and generalizes them to the non-simple case and to more general metrics such as any Riemannian metric on the surface.