

# Title & Abstract

## **Computability and computational complexity in dynamics: can we trust numerical predictions of limiting behavior of orbits?**

Michael Yampolsky (University of Toronto)

Abstract: The development of the modern subject of dynamical systems went hand-in-hand with numerical modeling. However, the theoretical basis of such modeling has remained largely unexplored and offers exciting challenges. What can and cannot be computed about the behavior of a dynamical system? I will give an overview of some of the recent results and directions of study.

## **Title: Ergodic and statistical properties of smooth systems**

Adam Kanigowski (University of Maryland)

Abstract: We will discuss main properties that describe chaoticity of a system. We will focus on ergodic (K and Bernoulli) properties and also statistical (decay of correlations, limit theorems) properties. We plan to discuss their appearance and interactions in the class of smooth diffeomorphisms.

## **Genus of dynatomic curves tends to infinite**

Junyi Xie (Peking University)

Abstract: Given a non-isotrivial one-parameter family of rational functions, we prove that the genus of dynatomic curves tends to infinity. As a consequence, we prove a geometric version of the Uniform Boundedness Conjecture proposed Morton-Silverman for one-parameter families of rational functions.

We also proved the higher dimensional version under mild conditions. Our proof uses arithmetic equidistribution, woven currents, and bifurcation theory.

## **Title: Local Marked Spectral Determination for $\mathbb{Z}_2$ -symmetric planar billiards close to the disk**

Jacopo De Simoi (University of Toronto)

Abstract: Given a planar domain with sufficiently regular boundary, one can study periodic orbits of the associated billiard problem. Periodic orbits possess a rich and intricate structure: it is then natural to ask how much information about the domain is encoded in the set of lengths of such orbits. The quantum analog of this question is the celebrated Laplace inverse problem, or "Can one hear the shape of a drum?"

We prove Marked (Marked) Dynamical Spectral Determination among  $\mathbb{Z}_2$ -symmetric smooth convex domains close to the disk: if any two such domains have the same Marked Length Spectrum, they must necessarily be isometric domains. This substantially improves the deformational result obtained in a prior work with Kaloshin and Wei.

**Title: Complex Henon maps with Julia sets of positive measure**

Artur Avila (University of Zurich)

Abstract: TBC

**Spectral rigidity of expanding circle maps**

Vadim Kaloshin (Institute of Science and Technology Austria)

Abstract: For a smooth expanding circle map  $f$ , the (unmarked) Lyapunov spectrum of  $f$  of order  $n \geq 1$  is defined as the set of multipliers along periodic orbits of period  $n$ . The union of all these sets is analogous to the union of lengths of all closed geodesics on, for example, negatively curved surfaces -- the classical length spectrum. In the talk, I will show that as smooth expanding circle map  $f$  of degree  $d \geq 2$ , under certain assumption of sparsity of its Lyapunov spectrum, can't be perturbed with an arbitrary small smooth perturbation so that its Lyapunov spectrum stays the same. The proof uses the Whitney extension theorem, a quantitative Lifshits theorem and a novel iterative scheme. This is a joint work with K. Drach.