

May 8th - All talks in Cockins Hall 240

9:30 am Coffee and bagels available outside of CH240

10:00am - Niki Myrto Mavraki - Arithmetic equidistribution and simultaneously preperiodic points in families of rational maps

Motivated by a question of Zannier, it was shown by Baker and DeMarco that for any fixed complex numbers a and b and integer $d \geq 2$, there are infinitely many $t \in \mathbb{C}$ such that a and b are both preperiodic under iteration by $f_t(z) = z^d + t$ if and only if $a^d = b^d$. Their result has been generalized to other families of rational maps f_t by various authors. A key ingredient in their proofs is an arithmetic equidistribution theorem for small points with respect to an adelic measure, proved independently by Baker–Rumely and Favre–Rivera-Letelier. In this talk we will first motivate Baker-DeMarco’s theorem and its generalizations and show how they were inspired by conjectures in arithmetic geometry. We then describe how most 1-parameter families of rational maps fail to satisfy the adelic hypothesis in the aforementioned equidistribution theorem. To extend the scope of Baker-DeMarco’s strategy, we generalize the notion of an adelic measure to that of a quasi-adelic measure and present an equidistribution theorem for quasi-adelic measures. We then connect our work back to questions arising in the theme of unlikely intersections and to an old question concerning the variation of the canonical height in families of rational maps. This is joint work with Hexi Ye.

11:00 - 11:30am Break

11:30am - Noelle Sawyer - Area and Partial Length Spectrum Data

The marked length spectrum of a metric on a compact Riemannian manifold records the length of the shortest closed curve in each free homotopy class. Let S be a surface. It is known that an inequality between the marked length spectra of two metrics of negative curvature on S implies a corresponding inequality between the areas with respect to the metrics. Using some dynamical tools, I will show that the same conclusion holds if the inequality only holds on particular subsets of the fundamental group.

12:30 - 2pm Lunch on your own

02:00pm - Meagan Carney - Extremes for Energy-Like Observables on Hyperbolic Systems

We consider an ergodic, measure-preserving dynamical system (T, X, μ) equipped with an observable $\phi : X \rightarrow \mathbb{R}$. Given the stochastic process $X_n(x) = \phi(T^n(x))$, we establish an extreme value law for the sequence of maxima $M_n = \max_{k \leq n} X_k$ where ϕ is an *energy-like* observable and (T, X, μ) is hyperbolic. Observables of this form have the property that the set of maximization is a curve rather than a single point. We obtain rigorous results in the case of Anosov diffeomorphisms, Sinai dispersing billiards and coupled expanding maps.

03:15pm Plenary Talk - Ralf Spatzier - Commuting Hyperbolic Diffeomorphisms and Flows and their Rigidity Problems

Commuting hyperbolic diffeomorphisms and flows seem to be rare and have very special properties. We call this rigidity phenomena. I will introduce these objects, explain some examples, results and discuss some basic mechanisms at the heart of these results.

4:30pm Poster Session (with refreshments) in Math Tower 724

May 9th - NOTE CHANGES IN LOCATION

9:30 - 10am Coffee and bagels in Math Tower 724

10:00am in Denney Hall 253 - Zhiqiang Li - Prime orbit theorems in complex dynamics

Analogues of the Riemann zeta function were first introduced into geometry by A. Selberg and into dynamics by M. Artin, B. Mazur, and S. Smale. Analytic studies of such dynamical zeta functions yield quantitative information on the distribution of closed geodesics and periodic orbits.

We obtain Prime Orbit Theorem in complex dynamics outside of hyperbolic maps, for a class of maps called expanding Thurston maps f . More precisely, we show that the number of primitive periodic orbits of f , ordered by a weight on each point induced by a non-constant real-valued Hölder continuous function on S^2 satisfying some additional regularity conditions, is asymptotically the same as the logarithmic integral, with an exponentially small error term. Such a result follows from our quantitative study of the holomorphic extension properties of the associated dynamical zeta functions and dynamical Dirichlet series.

In particular, the above result applies to postcritically-finite rational maps whose Julia set is the whole Riemann sphere. Moreover, we prove that the regularity conditions needed here are generic; and for a Lattès map f , a continuously differentiable function satisfies

such a condition if and only if it is not cohomologous to a constant. This is a joint work with T. Zheng.

11:00 - 11:30am Break in Math Tower 724

11:30am in CH240 - Alena Erchenko - Flexibility and obstructions in a fixed conformal class

In this talk, we discuss the flexibility of metric entropy and restrictions on topological entropy of geodesic flow on closed surfaces of negative Euler characteristic with smooth non-positively curved Riemannian metrics with fixed total area in a fixed conformal class. These results are closely related to the geometry in the considered class of metrics. In particular, we obtain a collar lemma, a thick-thin decomposition, and precompactness in this class. We also discuss some open questions and the extension of some of the results to metrics of fixed total area in a fixed conformal class with no focal points and with certain integral bounds on the positive part of the Gaussian curvature.