Fall 2014

- **September 12**

  Speaker: Alexander Borisov (Binghamton University)
  Title: Dynamical properties of reductions of integer polynomial maps.

  Abstract: Integer polynomial maps and their reductions module primes are among the simplest mathematical objects. Yet very little is known about their dynamical properties. I will describe several interesting examples and pose some questions and conjectures. Most of the talk will be accessible to most graduate sudents.

- **September 19**

  Speaker: Alexander Borisov (Binghamton University)
  Title: Integer ratios of factorials, cyclic quotient singularities, Nyman-Beurling approach to the Riemann Hypothesis, and algebraic hypergeometric series.

  Abstract: The topics listed in the title are in fact very closely related to each other. I will explain the connections between them and outline some natural open questions in this area.

- **October 10**

  Speaker: Robert Benedetto (Amherst College)
  Title: Bounding Postcritically Finite Maps over Number Fields.

  Abstract: A rational function f(z) is said to be postcritically finite (PCF) if all of its critical points have finite forward orbit under repeated application of f. Examples include monomials x^n, Chebyshev polynomials, and Lattes maps (which arise from elliptic curves), but there are many others. In this talk, we will discuss joint work with Ingram, Jones, and Levy, proving that for any number field K and degree d>1, there are only finitely many non-Lattes PCF maps of degree d in K(z). The proof rests on a deep result of McMullen combined with some p-adic analysis.

- **October 17**

  Speaker: Evan Dummit (University of Rochester)
  Title: Counting Number Fields by Discriminant.

  Abstract: The problem of analyzing the number of number field extensions L/K with bounded (relative) discriminant has been the subject of renewed interest in recent years, with significant advances made by Ellenberg-Venkatesh, Kable-Yukie, and (especially) Bhargava. I will give an overview of the history of this problem and what results are known (or conjectured), and then discuss my work on a series of generalizations, using similar techniques to Ellenberg-Venkatesh, for giving an upper bound on the number of extensions L/K with fixed degree, bounded relative discriminant, and specified Galois closure.

- **October 31**

  Speaker: Patrick Milano (Binghamton University)
  Title: Elliptic Curves and Mordell's Theorem

Abstract: The first part of this talk will be an introduction to elliptic curves. In the second part of the talk I'll outline a proof of Mordell's Theorem, which says that the group of rational points on an elliptic curve over Q is finitely generated.

- **November 4 (Cross-listing with the Combinatorics Seminar, 1:15-2:15 in OW 100-E)**

Speaker: Emanuele Delucchi (Fribourg, Switzerland)
Title: Toric Arrangements – Towards Setting Up a Combinatorial Theory

Abstract: Recent work of De Concini, Procesi, and Vergne on vector partition functions gave a new impulse to the study of toric arrangements from algebraic, topological, and combinatorial points of view. In this context, many new discrete structures have appeared in the literature, each describing some aspect of the theory (i.e., either the arithmetic-algebraic one or the topological one) and trying to mirror the combinatorial framework which revolves around arrangements of hyperplanes. I will give a quick overview of the state of the art and, taking inspiration from some recent results of topological flavor, I will try to suggest a possible approach towards unifying these different objects.

- **November 7**

Speaker: Micah Loverro (Binghamton University)
Title: Reducing an elliptic curve modulo p and the Sato-Tate conjecture.

Abstract: Click here.

- **November 14**

Speaker: Farbod Shokrieh (Cornell University)
Title: Non-archimedean abelian varieties, uniformization, and faithful tropicalization.

Abstract: The skeleton of a Berkovich analytic space is a subspace onto which the whole space deformation retracts. For an abelian variety, the skeleton is a real torus with an “integral structure”. I will discuss “faithful tropicalization” of abelian varieties in terms of non-archimedean and tropical theta functions. The solution relies on interesting combinatorial facts about lattices, matroids, and Voronoi decompositions. This talk is based on joint projects with Tyler Foster, Joe Rabinoff, and Alejandro Soto.

- **December 5**

Speaker: Daniel Vallieres (Binghamton University)
Title: Abelian Artin L-functions at s=0.

Abstract: We'll define some new arithmetical objects, called evaluators, which have not been studied before. These evaluators are intimately linked with the special value s=0 of S-truncated L-functions attached to abelian extensions of number fields. We'll see that a certain rationality property of these evaluators is equivalent to Stark's conjecture over Q as formulated by Tate. If time permits, we will also start to look at some of their arithmetical properties which is more delicate.

- **December 12**

Speaker: Amod Agashe (Florida State University)
Title: A generalization of Kronecker's first limit formula.

Abstract: The classical Kronecker's first limit formula gives the constant term in the Laurent expansion of a certain two variable Eisenstein series, which in turn gives the constant term in the Laurent expansion of the zeta function of a quadratic imaginary field. We will recall this formula and sketch how it can be generalized to more general Eisenstein series and zeta functions of arbitrary number fields.