Spring 2022

- **February 1**
  Speaker: N/A
  Title: Organizational Meeting
  Abstract: We will discuss plans for this semester

- **February 8**
  Speaker: Sailun Zhan (Binghamton)
  Title: Monodromy of rational curves on K3 surfaces of low genus
  Abstract: In many situations, the monodromy group of enumerative problems will be the full symmetric group. In this talk, we introduce a similar phenomenon on the rational curves in |O(1)| on a generic K3 surface of fixed genus over C as the K3 surface varies.

- **February 15**
  Speaker: Sayak Sengupta (Binghamton)
  Title: Nilpotent and nilpotent modulo polynomials over Z
  Abstract: We will define and describe two new kinds of polynomials over Z, named nilpotent and nilpotent modulo polynomials in one variable. These polynomials are truly fascinating and have some amazing behaviors. We will study these properties in this talk.

- **February 22**
  Speaker: Sayak Sengupta (Binghamton)
  Title: Nilpotent and nilpotent modulo polynomials over Z (part II)
  Abstract: We will define and describe two new kinds of polynomials over$Z$, named nilpotent and nilpotent modulo polynomials in one variable. These polynomials are truly fascinating and have some amazing behaviors. We will study these properties in this talk.

- **March 1**
  Speaker: Alexander Borisov (Binghamton)
  Title: Projective approach to the two-dimensional Jacobian conjecture: an introduction
  Abstract: This is a first in a series of 2-3 talks aimed at explaining my approach to the two-dimensional Jacobian Conjecture, using methods of projective geometry. I am planning to discuss some foundational material, like divisors and divisor classes, intersection theory, canonical class, and adjunction formulas.

- **March 8**
  Speaker: Alexander Borisov (Binghamton)
  Title: Projective approach to the two-dimensional Jacobian conjecture: an introduction, Part 2
  Abstract: I will continue my talk from March 1, focusing on the theory of complex projective surfaces.

- **March 22**
  Speaker: Andrew Lamoureux (Binghamton)
  Title: Arithmetic Differential Operators over Compact DVRs
  Abstract: In 2011, Alexandru Buium, Claire C. Ralph, and Santiago Simanca proved that a map f: Z_p → Z_p is an 'arithmetic differential operator or order m' if and only if it is 'analytic of level m'. Both notions can be generalized first to maps f: R^d → R, where R is a compact DVR, and then to maps f: X(R) → Y(R), where X and Y are two smooth affine schemes of finite type over R. In this talk, we will see that these notions are still equivalent in this more general context and that every analytic map of manifolds f:X(R) → Y(R) is analytic of level m for some m.

- **March 29**
  Speaker: Stephen Pietromonaco (UBC)
  Title: The Enumerative Geometry of Orbifold K3 Surfaces
  Abstract: A few of the most celebrated theorems in enumerative geometry (both predicted by string theorists) surround curve-counting for K3 surfaces. The Yau-Zaslow formula computes the honest number of rational curves in a K3 surface, and was generalized to the Katz-Klemm-Vafa formula computing the (virtual) number of curves of any genus. In this talk, I will review this story and then describe a recent generalization to orbifold K3 surfaces. One interpretation of the new theory is as producing a virtual count of curves in the orbifold, where we track both the genus of the curve and the genus of the corresponding invariant curve upstairs. As one example, we generalize the counts of hyperelliptic curves in an Abelian surface carried out by Bryan-Oberdieck-Pandharipande-Yin. This is work in progress with Jim Bryan.

- **April 5**
  Speaker: Andrew Lamoureux (Binghamton)
  Title: Arithmetic Differential Operators over Compact DVRs, part 2
  Abstract: This is the continuation of the March 22 talk. In 2011, Alexandru Buium, Claire C. Ralph, and Santiago Simanca proved that a map f: Z_p → Z_p is an 'arithmetic differential operator or order m' if and only if it is 'analytic of level m'. Both notions can be generalized first to maps f: R^d → R, where R is a compact DVR, and then to maps f: X(R) → Y(R), where X and Y are two smooth affine schemes of finite type over R. In this talk, we will see that these notions are still equivalent in this more general context and that every analytic map of manifolds f:X(R) → Y(R) is analytic of level m for some m.

- **April 12**
  Speaker: Hari Asokan (Binghamton)
  Title: Chow rings and Steiner's conic problem
  Abstract: This is the first in the two talks aimed to discuss a classical problem in enumerative geometry (Steiner's conic problem). In this talk we will define Chow rings of varieties, compute them for some easy examples and explore some properties.

- **April 19**
  Speaker: Xuqiang Qin (UNC)
  Title: Birational geometry of the Mukai system on a K3 surface
  Abstract: The Mukai system on a K3 surface is a moduli space of torsion sheaves, admitting a Lagrangian fibration given by mapping each sheaf to its support. In this talk, we will focus on a class of Mukai systems which are birational to Hilbert scheme of points. Using the wall crossing technique from Bridgeland stability, we decompose the birational map into a sequence of flops. As a result, we give a full description of the birational geometry of such a Mukai system. This is based on joint work with Justin Sawon.

- **April 26**
  Speaker: Alexander Borisov (Binghamton)
  Title: Projective approach to the two-dimensional Jacobian conjecture: an introduction. Part 3.
  Abstract: This is the third in a series of talks aimed at explaining my approach to the two-dimensional Jacobian Conjecture, using methods of projective geometry.

- **May 3**
  Speaker: Hari Asokan (Binghamton)
  Title: Chow rings and Steiner's conic problem, part 2
  Abstract: This is the continuation of the talk from April 12.

- **May 10**

  Speaker: Aranya Lahiri (UCSD)

  Title: Irreducibility of rigid analytic vectors in p-adic principal series representations

  Abstract: For the L-rational points $G:=\mathbb{G}(L)$ of a p-adic reductive group, let $Ind^G_B(\chi)$ be the continuous p-adic principal series representations. Here L is a finite extension of $\mathbb{Q}_p$, B is the Borel subgroup corresponding to a maximal torus T and χ is a character of T. We will consider the globally analytic vectors of the pro-p Iwahori group I in the principal series representations. This is done by endowing the pro-p Iwahori with a p-valuation and subsequently giving it a structure of a rigid analytic group, thus generalizing the work of Lazard. The main result of this talk will be the topological irreducibility of these globally analytic vectors under certain assumptions on χ. This is a generalization of works of Clozel and Ray in the case of $G:= GL_n(L)$. This is joint work with Claus Sorensen.

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