Fall 2023

- **August 29**
  Speaker: N/A
  Title: Organizational Meeting
  Abstract: We will discuss plans for this semester

- **September 5** 4:15-6:15 pm Special Event: PhD Defense
  Speaker: Sarah Lamoureux (Binghamton)
  Title: Arithmetic Differential Operators on Compact DVRs
  Abstract: Let R be a compact DVR and S=\hat{R}^{ur} the completion of its maximal unramified extension. We investigate the relationship between so-called `arithmetic differential operators' and analytic maps in three contexts: maps S^d\to S, maps R^d\to S, and maps with domain the R-points of a smooth affine scheme of finite type over R.

- **September 12**
  Speaker: Sailun Zhan (Binghamton)
  Title: Waring problem for matrices over finite fields
  Abstract: The Waring problem for matrices is to address whether matrices over a ring can be expressed as a sum of two kth powers of matrices. We prove that for all integers k>=1, for all q>=(k−1)^4 + 6k, and for all m>=1, every matrix in M_m(Fq) is a sum of two kth powers. We also study the case when the matrices are invertible, cyclic, or split semisimple, when k is coprime to p, or when m is sufficiently large. We give a criterion for the Waring problem in terms of stabilizers. This is a joint work with Krishna Kishore and Adrian Vasiu.

- **October 3**
  Speaker: Sayak Sengupta (Binghamton)
  Title: Action of SL_2
  Abstract: A standard group action in complex analysis is the action of $GL_2(\mathbb{C})$ on the Riemann sphere $\mathbb{C}\cup\{\infty\}$ by linear fractional transformations. It is known that this action is transitive; in fact, if $GL_2(\mathbb{C})$ is replaced by $SL_2(\mathbb{C})$, the transitivity of the action is still maintained. One can see, by following similar arguments, that if $\mathbb{C}$ is replaced by any field K, the action is also transitive. However, the action of $SL_2(\mathbb{R})$ on the Riemann sphere is not transitive. In this talk we will briefly review the actions of SL_2 described above, and then we will look at the special case of $SL_2(\mathcal{O}_K)$ acting on K, where K is a number field, and $\mathcal{O}_K$, is its corresponding ring of integers.

- **October 10**
  Speaker: Sayak Sengupta (Binghamton)
  Title: Modular forms and discrete matrix group actions
  Abstract: In this talk we will continue our discussion from last week. In particular, we will introduce congruence subgroups and modular forms on a few congruence subgroups.

- **November 7**
  Speaker: Mithun Veettil (Binghamton)
  Title: Wreath Product of Groups and Indicatrix Polynomial of a Group Action
  Abstract: First, we will define the wreath product of finite groups. Then we will define a polynomial called ”indicatrix of a group” that captures the fixed points of the action of the group on some set. It turns out that the indicatrix behaves ”nicely” upon taking the wreath product. If time permits, we shall

go through specific examples; we will compute the indicatrix of the symmetric group on k letters, S_k, acting naturally on {1,2,...,k}.

- **November 14**
  Speaker: Alexander Borisov (Binghamton)
  Title: An update on the search for Keller maps
  Abstract: This is a continuation of some of my previous talks, on my ongoing search for the counterexamples to the two-dimensional Jacobian Conjecture. It will be based on the last section of my 2020 paper on frameworks: http://people.math.binghamton.edu/borisov/documents/papers/Frameworks_EJC_final.pdf. I will also talk about the connection between chains of exceptional curves and cyclic quotient singularities, the Farey fraction encoding (from Patrick Carney's thesis) and a present a new framework, which is somewhat different from those in the above paper.

- **November 28** (by Zoom: Zoom link)
  Speaker: Daodao Yang (CICMA)
  Title: Large values of derivatives and logarithmic derivatives of zeta and L-functions
  Abstract: An important topic in analytic number theory is the study of extreme values of zeta and L-functions. In this talk, I will report some of my recent work on large values of derivatives and logarithmic derivatives of zeta and L-functions. If time permits, I will also discuss GCD sums, log-type GCD sums, and Dirichlet character sums, which are related topics.

- **December 5**
  Speaker: Hari Asokan (Binghamton)
  Title: GIT quotient of SL_g action on symmetric matrices
  Abstract: The special linear group SL_g acts on the vector space of symmetric matrices, V_g by congruence action. This action extends to (V_g)^{r+1}. We will discuss the GIT quotient and the invariant ring of this action.