Marian Aprodu

Title: Vector bundles and syzygies

Abstract: For curves embedded in a surface with special geometry, the Brill-Noether theory is controlled by objects globally defined on the surface. This phenomenon was discovered by R. Lazarsfeld in the eighties and it was applied to the Gieseker-Petri conjecture. We plan to discuss recent applications of vector bundle techniques in the syzygy theory.

Maksym Fedorchuk

Title: Log minimal model program of $\overline M_g$ via GIT and stacks

Herbert Lange

Title: Prym varieties

Atsushi Noma

Title: Generic inner projections of projective varieties and an application to the positivity of double point divisors

Abstract: Generic projection of a projective variety plays an important role in projective geometry of algebraic varieties. In this talk, we discuss

a) the nonbirational centers of projections of a projective variety; and

b) the exceptional divisor of a generic inner projection of a projective variety.

As an application, we study the positivity of double point divisors of a smooth projective variety.

Giorgio Ottaviani

Title: Beilinson theorem and syzygies

Abstract: Beilinson theorem describes the derived category of coherent sheaves on projective space P^n. In particular it gives crucial informations which are helpful to construct a resolution of a sheaf by knowing its cohomology modules. Many classical results can be proved in this way, like Castelnuovo-Mumford criterion, Horrocks splitting criterion and its generalization to sheaves, Hilbert-Burch resolution of arithmetically Cohen-Macaulay codimension two subvarieties, Hilbert syzygy Theorem. This approach is useful in the construction of syzygies of special varieties. In the case of the Veronese variety and other homogeneous varieties, this approach can be combined with representation theory and quiver techniques. If time allows, we will sketch about Ulrich sheaves and supernatural bundles, and their role in Betti tables.