WORKSHOP IN ALGEBRAIC GEOMETRY

SCHEDULE

December 17, 2019

14:00–14:50 T. Beckmann
15:00–15:50 V. Benedetti
Break
16:30–17:20 I. Spelta

December 18, 2019
9:30–10:20 A. Rapagnetta
10:30–11:20 F. Meazzini
Break
12:00–12:50 R. Winter

TITLES AND ABSTRACTS

Birational Geometry of moduli spaces of stable objects on Enriques surfaces

Thorsten Beckmann

The geometry of K3 and Enriques surfaces is deepy intertwined. In this talk, we study this connection for the moduli spaces of stable objects. Using wall-crossing for K3 surfaces obtained by Bayer and Macri', we employ Chow-theoretic results to deduce similiar statements for Enriques surfaces. Applications to the birational geometry of the moduli spaces will be discussed.

The geometry of the Coble cubic

Vladimiro Benedetti

The Coble cubic is the unique cubic in the projective space $\mathbb{P}^8$ whose singular locus is a given abelian surface A. Its geometry has been studied, among others, by Beauville, Ortega, Dolgachev, Nguyen. It has been proven that its projective dual (a sextic hypersurface) is directly related to a moduli space of sheaves on a curve of genus 2, whose Jacobian is A itself. By using the language of orbital degeneracy loci, we are able to enrich the geometric description of these varieties. In particular, we will show how to construct the Kummer fourfold associated to A and how to describe the law group of A in a strikingly similar way to the description of the low group of plane cubics. This is a joint work with Laurent Manivel and Fabio Tanturri. The talk will start by recalling the fact that a smooth hyperelliptic curve can be embedded into an abelian surface if the genus of the curve is at most 5.

On the Kaledin-Lehn formality conjecture

Francesco Meazzini

Kaledin-Lehn conjectured the formality for the DG-Lie algebra of derived endomorphisms of any polystable sheaf on a K3 surface. The relevance of the formality conjecture relies in its consequences concerning the geometry of the moduli space of semistable sheaves on the K3. The conjecture was proven after several contributions mainly due to Kaledin-Lehn themselves, Zhang, Yoshioka, Arbarello-Saccà, Budur-Zhang. We propose an alternative algebraic approach to the problem, eventually proving that the formality conjecture holds on any smooth minimal projective surfaces of Kodaira dimension 0. This is a joint work with R. Bandiera and M. Manetti.

The Hodge numbers of O'Grady's 10-dimensional irreducible symplectic manifold

Antonio Rapagnetta

I report on a joint work with M.A. de Cataldo and G. Sacca' where we determine the Hodge diamond of the ten dimensional irreducible symplectic manifold discovered by O'Grady.

Infinitely many totally geodesic subvarieties via Galois covering of elliptic curves

Irene Spelta

We will speak about totally geodesic subvarieties of $\mathcal{A}_g$ which are generically contained in the Torelli locus. Coleman-Oort conjecture says that for genus g large enough such varieties should not exist. Nevertheless if $g \leq 7$ there are examples obtained as families of Jacobians of Galois coverings of curves $f : C \to C'$, where C' is a smooth curve of genus g'. All of them satisfy a sufficient condition, which we will denote by $(*)$.
We will describe this condition. First, it gives us a bound on the genus g' which we use to say that there are only 6 families of Galois coverings of curves of $g' \geq 1$ which yield Special subvarieties of $\mathcal{A}_g$. Then we use $(*)$ again to study the Prym maps of the families described above: we will prove that they are fibered, via their Prym map, in curves which are totally geodesic. In this way we get infinitely many new examples of totally geodesic subvarieties of $\mathcal{A}_2$, $\mathcal{A}_3$ and $\mathcal{A}_4$.

Density of rational points on a family of del Pezzo surfaces of degree 1

Rosa Winter

Let S be a del Pezzo surface of degree 1 of the form $y^2 = x^3 + Az^6 + Bw^6$ in the weighted projective space $\mathbb{P}_{\mathbb{Q}}(2, 3, 1, 1)$ with coordinates (x, y, z, w), with A, B nonzero. Let $\mathcal{E}$ be the elliptic surface obtained by blowing up the base point of the anticanonical linear system of S. In this talk I show that if S contains a rational point $P = (x_0, y_0, z_0, w_0)$ with z_0, w_0 unequal to 0, and such that the corresponding point on $\mathcal{E}$ is non-torsion on its fiber, then the set of rational points on S is dense with respect to the Zariski topology. I will compare this result to previous results on density of rational points on del Pezzo surfaces. This is joint work with Julie Desjardins.