Workshop on Algebraic geometry
16-17-November-2017

Dipartimento di Matematica dell' Università di Milano
Sala di Rappresentanza

Thursday 16

15.15-16.00 Chris Peters, Technical University Eindhoven
On a motivic interpretation of primitive and variable cohomology

Coffee break

16.30-17.15 Stefan Schreieder, LMU München
The Kuga-Satake construction under degeneration

17.30-18.15 Robert Laterveer, IRMA Strasbourg
The generalized Franchetta conjecture for hyperkaehler varieties

Friday 17

9.30-10.15 Chiara Camere, Università di Milano
Moduli spaces of smooth cubic threefolds and of irreducible holomorphic symplectic manifolds

10.30-11.15 René Mboro, Ecole Polytechnique Paris
On 2-cycles on cubic hypersurfaces and related birational invariants

Coffee break

11.45-12.30 Antonio Rapagnetta, Università di Roma Tor Vergata
Singular moduli spaces of sheaves on K3 surfaces

12.45-13.30 Charles Vial, Universitat Bielefeld
The section property for the Chow ring of holomorphic symplectic varieties

Speaker: Chris Peters
Title: On a motivic interpretation of primitive and variable cohomology.
Abstract: Grothendieck introduced Chow motives (for smooth projective varieties) as a vehicle for universal cohomology theories.
The Chow-Künneth conjecture (as formulated by Murre) states roughly that the motive of a variety can be split up as a direct sum of motives
such that each summand only has cohomology in exactly one degree. This conjecture holds in many cases. One can
further ask if subtler decompositions of the cohomology have a motivic interpretation. In this talk I address this for primitive and variable cohomology
and give an application to the motive of certain surfaces like the classical Burniat surfaces and the Sicilian surfaces.

Speaker: Stefan Schreieder
Title: The Kuga-Satake construction under degeneration
Abstract: We extend the Kuga-Satake construction to the case of limit mixed Hodge structures of K3 type. We use this to study the geometry and Hodge theory of degenerations of Kuga-Satake abelian varieties over the punctured disc. This is joint work with A. Soldatenkov.

Speaker: Robert Laterveer
Title: The generalized Franchetta conjecture for hyperkaehler varieties.
Abstract: The generalized Franchetta conjecture as formulated by O'Grady is about algebraic cycles on the universal K3 surface. It is natural to consider a similar conjecture for algebraic cycles on universal families of hyperkaehler varieties. This has close ties to Beauville's conjectural ``splitting property'', and the Beauville-Voisin conjecture (stating that the Chow ring of a hyperkaehler variety has a certain subring injecting into cohomology). I will attempt to give an overview of these conjectures, and present some cases where they can be proven. This is joint work with Lie Fu and Charles Vial.

Speaker: Chiara Camere
Title: Moduli spaces of smooth cubic threefolds and of irreducible holomorphic symplectic manifolds
Abstract: In this talk, I will describe an isomorphism between the moduli space of smooth cubic threefolds, as described by Allcock, Carlson and Toledo, and the moduli space of fourfolds of K3^[2]-type with a special non-symplectic automorphism of order three; then, I will show some consequences of this isomorphism concerning degenerations of non-symplectic automorphisms. This is a joint work in progress with S. Boissière and A. Sarti.

Speaker: René Mboro
Title: On 2-cycles on cubic hypersurfaces and related birational invariants.
Abstract. In view of rationality questions for cubic hypersurfaces over C, we present some (sketch) of results on birational invariants of those hypersurfaces, related to torsion cycles. We will be especially interested in the group CH2(X)tors;AJ = CH3(X)tors;AJ of torsion 2-cycles annihilated by Abel-Jacobi map on cubic 5-folds. The method we use to study this group is a reduction to problems on 1-cycles on the variety of lines F(X) of the cubic. It allows to prove that, for a cubic 5-fold X, CH3(X)tors;AJ is controlled by another birational invariant (CH1(F(X))tors;AJ) but of its variety of lines F(X). If time permits, we will also present some results on 1-cycles of the variety of lines F(X) of hypersurfaces of low degree.

Speaker: Antonio Rapagnetta
Title: Singular moduli spaces of sheaves on K3 surfaces
Abstract:By the Bogomolov decomposition theorem, irreducible holomorphic symplectic manifolds play a central role in the classification of compact Kaehler manifold with numerically trivial canonical bundle.Very recently, Hoering and Peternell completed the proof of the existence of a singular analogue of the Bogomolov decomposition theorem. In view of this result, singular irreducible symplectic varieties (following Greb, Kebekus and Peternell) are singular analogue of irreducible holomorphic symplectic manifolds. In a joint work with Arvid Perego, still in progress, we show that all moduli spaces of sheaves on projective K3 surfaces are singular irreducible symplectic varieties. We compute their Beauville form and the Hodge decomposition of their second integral cohomology, generalizing previous results in the smooth case of Mukai, O'Grady and Yoshioka.

Speaker: Charles Vial
Title: The section property for the Chow ring of holomorphic symplectic varieties.
Abstract: Since the seminal work of Beauville and Voisin on the Chow ring of K3 surfaces, it is believed that the Chow ring of smooth projective holomorphic symplectic manifolds should have properties similar to that of the Chow ring of abelian varieties. One such property, discovered by O'Sullivan, is that the algebra epimorphism from the Chow ring of an abelian variety to its Chow ring modulo numerical equivalence admits a section. In this talk, I will provide evidence for the section property to hold for holomorphic symplectic varieties. This is joint work with Lie Fu.