UNIVERSITÀ ROMA TRE
GEOMETRY OF MODULI OF VECTOR BUNDLES ON CURVES AND SPECIAL VARIETIES

PHD COURSE

General Information

Instructor: Alessandro Verra (Roma Tre)
Duration of the course: 20 hours

Schedule: Thursdays, 11:00 - 13:00, Room M6

First lecture: Thursday November 27

Description of the course

Let C be a smooth and irreducible complex curve of genus g. In the course we will present some of the more important moduli spaces of vector bundles over C from the point of view of their projective immersions. This will lead to highlight several varieties with special features, which turn out to be examples of such moduli spaces or of Brill-Noether loci contained in them. A remarkable example is the classical quartic hypersurface of Coble in $\mathbb{P}^6$, which is the projective model of the moduli space $SU_C(2, \mathcal{O}_C)$ of semistable vector bundles of rank 2 and trivial determinant over a non-hyperelliptic curve of genus 3.

After recalling the main notions concerning line bundles and Picard varieties of curves, in the course we will focus on vector bundles over C of rank $r \geqslant 2$.

We will study with particular attention the generalized theta divisor, which generates the Picard group of $SU_C(r, \mathcal{O}_C)$ and governs the projective realizations of this moduli space, along with the rich projective geometry related to it.

The course is intended to highlight, along with the analysis of the moduli spaces of bundles themselves, classical and moderns aspects of the geometry which connects the theory of curves with other remarkable subjects.