

## *Tentative Schedule from 25 May to 29 May 2015*

### **Monday 25 May 2015**

11:00 - 12:30 Registration  
14:00-14:15 Welcome  
14:15-15:00 Donatella Iacono  
15:15 - 16:00 Francesco Polizzi  
16:15 - 17:00 Giovanni Mongardi

### **Tuesday 26 May 2015**

10:00 - 10:45 Donatella Iacono  
10:45 - 11:15 Coffee break  
11:15 -12:00 Marco Andreatta  
15:00 - 15:45 Roberto Pignatelli  
16:00 - 16:45 Giovanni Mongardi

### **Wednesday 27 May 2015**

10:00 - 10:45 Gilberto Bini  
10:45 - 11:15 Coffee break  
11:15 -12:00 Francesco Polizzi  
15:00 - 15:45 Marco Andreatta  
16:00 - 16:45 Roberto Pignatelli

### **Thursday 28 May 2015**

10:00 - 10:45 Donatella Iacono  
10:45 - 11:15 Coffee break  
11:15 -12:00 Marco Andreatta  
15:00 - 15:45 Francesco Polizzi  
16:00 - 16:45 Gilberto Bini

### **Friday 29 May 2015**

10:00 - 10:45 Giovanni Mongardi  
10:45 - 11:15 Coffee break  
11:15 -12:00 Roberto Pignatelli  
15:00 - 15:45 Gilberto Bini

From Tuesday to Friday, we are going to organise some informal talks after the end of scheduled lectures.

## **Programs**

### **Marco Andreatta (Università degli Studi di Trento)**

#### **Rational Curves on Projective Varieties**

After recalling some basic facts on rational curves on a general class of varieties, among which Fano manifolds, we will illustrate some notions on splitting families of rational curves and use them to deduce characterisation of numerous varieties. Finally, we will give some examples of rational curves on four dimensional symplectic varieties.

### **Gilberto Bini (Università degli Studi di Milano)**

#### **Chow Groups of Projective Varieties**

We will recall some basic facts on algebraic cycles and their relation with (singular) cohomology classes. In particular, we will illustrate some standard material on Chow groups and the class homomorphism.

### **Donatella Iacono (Università di Bari "Aldo Moro")**

#### **Some Deformation Theory**

We will recall some basic facts on deformation theory and moduli spaces with particular attention to the moduli spaces of surfaces of general type and stable sheaves.

### **Giovanni Mongardi (Università degli Studi di Milano)**

#### **Hyperkähler Manifolds**

After recalling some basic properties, we will illustrate some examples, in particular those coming from moduli spaces of sheaves. Next, we will recall the notion of monodromy and apply it in the same context as that of the famous Torelli Theorem. Finally, we will study the geometry of rational curves on K3 surfaces.

### **Roberto Pignatelli (Università degli Studi di Trento)**

#### **Surfaces of general type**

In the first part of these lectures, we will discuss deformation invariants, exceptional curves (mainly of the first kind and A-D-E) and minimal models of algebraic surfaces. Afterwards, we will focus on surfaces of general type, thus giving some key examples, illustrating the standard inequalities among their invariants (the so-called "geography"), and discussing Bombieri's theorem on pluricanonical maps and some of its applications. Time permitting, we will also discuss log-canonical singularities of surfaces.

### **Francesco Polizzi (Università della Calabria)**

#### **K3 Surfaces**

After recalling the definition of K3 surfaces, we will focus on some important examples, such as complete intersections, double covers of projective plane and Kummer surfaces. Next, we will focus on linear systems, as well as cones (the Kähler and the effective one) on K3 surfaces. Time permitting, we will illustrate the structure of the moduli spaces of K3 surfaces.