**LMS Singularity Day

Valencia, 16 June 2015**

Programme

**Morning session**

9:30-10:30 Javier Fernández de Bobadilla (ICMAT-CSIC, Spain)

 *Primitive Cohomology of Projective Complete and non Complete Intersections*

10:30-11:00 Coffee (Aula Pi, Ground Floor of the Faculty of Mathematics)

11:00-12:00 María Alberich Carramiñana (Universitat Politècnica de Catalunya,Spain)

*Computation of multiplier ideals and jumping numbers on rational surface singularities*

12:00-13:00 Carles Bivià Ausina (Universitat Politècnica de València, Spain)

 *Growth at infinity and index of polynomial maps*

**Lunch**

13:30 Restaurant of the Faculty of Pharmacy

**Afternoon session**

15:30-16:30 Andrei Gabrielov (Purdue University, USA)

 *Multiplicity of a polynomial on a trajectory of a polynomial vector field*

16:30-17:30 David Mond (University of Warwick, UK)

 *Severi strata in the discriminant of plane curve singularities —equations and conjectures*

*Note:*
All lectures will take place in the “Salon de Grados” of the Faculty of Mathematics of the University of Valencia.

The meeting is supported by the LMS Scheme 3 grant 31437.

**ABSTRACTS**

**Javier Fernández de Bobadilla**

TBA

 **María Alberich Carramiña**

We will present some new results on the computation of jumping numbers with their multiplicities of any ideal sheaf around a rational surface singularity. More precisely, we will focus on two methods (an iterative one and a direct one) to compute them as well as the whole set of multiplier ideals. When jumping numbers and their multiplicities are encoded all together in a Poincaré series form, we will give a sort of rational expression for it. This is a joint work with J. Àlvarez Montaner, F. Dachs-Cadefau and V. González-Alonso

**Carles Bivià Ausina**

Let F:K^n-> K^n be a polynomial map such that F^{-1}(0) is compact, where K=R or C. Then we show a condition implying that there is a uniform bound for the Lojasiewicz exponent at infinity in certain deformations of F. As a consequence, we obtain results about the invariance of the global index of F under the sum of certain monomials and about the injectivity of F, respectively.

This is part of a joint work with J.A.C. Huarcaya.

**Andrei Gabrielov**

The problem of computing (or at least obtaining an upper bound for) the multiplicity of a polynomial restricted to a trajectory of a polynomial vector field has important applications in control theory and in analytic number theory. The multivariable version of this problem is computing the multiplicity of an isolated zero of a system of Noetherian functions (restrictions of polynomials to integral manifolds of Pfaffian partial differential equations). The multiplicity of such a zero can be expressed in terms of the Euler characteristics of generalized Milnor fibers associated with the system of equations. This provides an effective upper bound on the multiplicity. Recently, these results have been improved by G. Binyamini, and extended by G. Binyamini and D. Novikov to non-isolated intersections.

**David Mond**

This is joint work with Paul Cadman (former PhD student at Warwick) and Duco van Straten.

Let C be a plane curve singularity defined by an irreducible germ f, and let S be the base space of an R\_e-versal deformation F off. Note that F induces a deformation of C, and S can be partitioned according to the sum of the delta invariants of the singular points on the fibres of this deformation. The subsets in this partition are known as Severi strata, and the stratum with highest value is the classical delta constant stratum.

Many years ago Givental and Varchenko showed that the delta constant stratum is Lagrangian with respect to a symplectic form omega obtained by pulling back the intersection form on the vanishing cohomology using a period mapping. We show that all of the Severi strata are co-isotropic with respect to omega, and we give equations for them all, as coefficients of wedge powers of omega with respect to a basis for the module of differential forms with logarithmic poles along the discriminant of the deformation.

We observe some unexpected and unexplained structures, and make some conjectures concerning the Severi strata and the cohomology of the normalisation of the fibres of the deformation.