Book of Abstracts

Andorra Week

IberoSing International Workshop 2026

July 6--8, 2026

Universitat d'Andorra, Andorra

Contents

Andorra Abstracts

Line configurations and 4-manifold topology

Paolo Aceto

Université de Lille

Abstract

After a brief introduction to configurations in the combinatorial and geometric settings, we will introduce the notion of topological realization which leads to questions in 4-manifold topology. We will recall previous results on non realizability by Ruberman-Starkston and then discuss improvements via different techniques.

The Gauss-Manin system of an ICIS

Guillem Blanco

Universitat Politècnica de Catalunya

Abstract

The Gauss-Manin system of an isolated hypersurface singularity is a classical example of a regular holonomic D-module carrying a Hodge filtration. Its relevance comes from the connection with the local Bernstein-Sato polynomial, the monodromy, and the spectrum of the singularity. In this talk, we will define the Gauss-Manin system of an isolated complete intersection singularity (ICIS) and study its Hodge filtration using deformation theory and local cohomology modules. In particular, we will relate the Hodge filtration to a generalized Brieskorn lattice. Moreover, using recent results on rational and Du Bois singularities, we will recover the microlocal structure and the link with b-functions, generalizing the hypersurface case.

Decorated trees and numerical semigroups

Pierrette Cassou-Noguès

Université de Bordeaux

Abstract

The link between the two subjects is classical if we think about semigroups associated to singularities of algebraic plane curves and their trees. In this talk we want to enlarge the classes of objects that can be involved in the relation between the two topics.

Derived Arc Spaces

Roi Docampo

University of Oklahoma

Abstract

We study jet schemes and arc spaces in the context of derived algebraic geometry. Explicitly, we consider the jet and arc functors in the category of schemes and study their animations to the category of derived schemes---what we call the derived jet and arc spaces. We show that the derived constructions agree with the classical versions when the base scheme is smooth, or more generally for local complete intersection log canonical singularities, giving a derived interpretation to a theorem of Mustaţă. For more singular spaces we get new singularity invariants in the form of higher homotopy groups. We also study cotangent complexes for derived jet and arc spaces, generalizing previous formulas for sheaves of differentials of classical jet and arc spaces. Several applications are obtained. Specifically, we revisit recent results on the local structure of arc spaces from the lens of cotangent complexes, giving more unified proofs and removing unnecessary hypotheses. In particular, we extend a version of Reguera's curve selection lemma for arc spaces to the case of non-perfect base fields. This is joint work with L. E. Miller and C. E. Overton-Walker.

Nash Blowups Fail to Resolve Singularities

Álvaro Liendo

Universidad de Talca

Abstract

Resolution of singularities in characteristic zero was established by Hironaka, whose approach relies on a sequence of blowups along carefully chosen centers. Although effective, this method involves a variety of non-canonical choices. In order to obtain a canonical procedure, Nash proposed the blowup that now bears his name, raising the question of whether its iteration suffices to resolve all singularities. In joint work with Federico Castillo, Daniel Duarte, and Maximiliano Leyton-Álvarez, we construct toric counterexamples showing that in dimensions at least four the iterated Nash blowup does not lead to a resolution. For the non-normalized Nash blowup, we further obtain a counterexample already in dimension three, while the normalized case in dimension three remains open. I will discuss these counterexamples and place them in the broader context of the resolution problem.

A theory to study metric degenerations: Moderately Discontinuous Algebraic Topology

María Pe Pereira

Universidad Complutense de Madrid (IMI)

Abstract

In the same way algebraic topology gives a language to talk about properties of topological spaces up to homeomorphism (more precisely, up to homotopy), we give a theory to talk about metric degenerations where the metric and dynamical information matters.

In the works [1] and [2] we developed a first version where we impose subanalytic hypothesis (which is roughly speaking as asking the spaces and mappings to be triangulable). In this talk I will explain the more general framework of continuous families of metric spaces we are working on.

[1] With J. Fernández de Bobadilla, S. Heinze, E. Sampaio, *Moderately Discontinuous Homology*, Communications on Pure and Applied Mathematics, Volume 75, Issue 10, p. 2123--2200. doi:10.1002/cpa.22013. Also available in arXiv:1910.12552v3.

[2] With J. Fernández de Bobadilla and S. Heinze, *Moderately Discontinuous Homotopy*, International Mathematics Research Notices, Volume 2022, Issue 23, December 2022, Pages 18346--18400. doi:10.1093/imrn/rnab225. Available in arXiv:2007.01538.

Lagrangian tori at radius zero

Tomasz Pełka

Jagiellonian University

Abstract

Consider a maximally degenerate family of Calabi-Yau varieties over a punctured disk. A version of the SYZ conjecture predicts, roughly speaking, that the Gromov-Hausdorff limit of the fibers is an affine manifold B with singularities in codimension 2; and sufficiently close to this limit, the fibers admit a special Lagrangian torus fibration over B. It is then expected that dualizing such a fibration one gets mirror Calabi-Yau varieties. In my talk, I will explain how to construct Lagrangian torus fibrations which, in some sense, approximate the conjectured ones. They emerge naturally ``at radius zero'', i.e. at the boundary of the A'Campo space, extending the given family from the punctured disk to the annulus. This is joint work with J. F. de Bobadilla.

Open problems about deformations of singular mappings

Guillermo Peñafort Sanchis

Universitat de València

Abstract

The Milnor fibration plays a central role in the study of deformations of singular hypersurfaces. Its analogue for map-germs is provided by Thom-Mather theory. We survey several open problems concerning the topology of disentanglements, versal deformations and topological invariance, and discuss their connections with classical questions about singular hypersurfaces.

Handles on complex links and vanishing cycles

Patrick Popescu-Pampu

Université de Lille

Abstract

I will present joint work with Pablo Portilla Cuadrado. Consider a germ $(X, 0)$ of complex analytic variety with isolated singularity. We look at the Milnor fibers M_f of germs f of holomorphic functions on $(X, 0)$ without critical points in a pointed neighborhood of 0. By definition, the complex link L_X of $(X, 0)$ is the Milnor fiber of a generic element of the maximal ideal of the local ring of $(X, 0)$. Building on and generalizing results of Milnor, Lê, Perron, Siersma, and Tibăr, we show that M_f can be obtained from L_X by attaching handles. Our main contribution is to identify these handles geometrically: their core balls extend inside L_X to quadratic vanishing cycles associated with Morsifications of f on X.

Topological equisingularity for families of curves

Antoni Rangachev

Institute of Mathematics and Informatics, Bulgarian Academy of Sciences

Abstract

I will show that the Milnor number of a reduced curve is a Zariski upper semicontinuous invariant. As an application I will prove that the constancy of the Milnor number in a family of reduced curves is equivalent to topological equisingularity. This is joint work with Bengus-Lasnier and Gaffney.

Contributed talks

Birational Zeta Functions

Tom Biesbrouck

KU Leuven

Abstract

The motivic zeta function is a classical and rich invariant in singularity theory. In this talk, I will report on joint work with N. Budur, J. Nicaise and W. Veys where we define a birational analog of the motivic zeta function of a reduced polynomial in terms of minimal models. It admits an intrinsic meaning in terms of contact loci of arcs, an analog of a result of Denef and Loeser in the motivic case. We show that for local plane curve singularities the poles of the birational zeta function essentially coincide with the poles of the motivic zeta function.

Computational decomposition of minimal polynomial for quasi-ordinary hypersurface branch truncation

João Cabral

Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa

Abstract

In this talk, we introduce a computational algorithm for decomposing irreducible quasi-ordinary hypersurfaces defined by a minimal polynomial f and a branch ζ with s characteristic exponents. Our approach begins by truncating ζ into a sequence $\widetilde{\zeta}_1, \widetilde{\zeta}_2, \ldots, \widetilde{\zeta}_s$, where each $\widetilde{\zeta}_i$ retains the first i characteristic exponents and defines a hypersurface Y_i with minimal polynomial f_i. We prove that for every i and j satisfying $1 \leq i < s-1$ and $i+1 \leq j \leq s$, the polynomial f_i is an i-semi-root of f_j, and we establish support properties of each f_i. The algorithm leverages both the semigroup structure and the support of the involved polynomials through an iterative elimination process. Our results provide a systematic framework for the semi-root decomposition of a truncated quasi-ordinary branch. This talk is based on joint work with Ana Casimiro, accepted for publication in Experimental Mathematics.

Canonical and functorial stratifications of singularities in characteristic 0

Vicente Monreal

HHU Düsseldorf

Abstract

In this talk we will discuss existence of canonical and functorial stratifications of singularities in characteristic 0. The stratifications to be presented, called riso-stratifications, were introduced in local contexts by Bradley-Williams and Halupczok using non-archimedean and model-theoretic methods. Recent work proved that they are embedding independent and can be computed étale locally, upgrading their construction into a canonical and functorial stratification process that works for schemes of finite type over fields of characteristic 0. We will also discuss a first algebraic obstruction for these stratifications and a conjecture aimed at giving a positive answer to the question of compatibility with classical resolution of singularities in characteristic 0.