Holomorphic Foliations and Singularities of Mappings and Spaces
Feuilletages holomorphes et singularités des représentations et des espaces
(Org: **Lev Birbrair** (Univ. Federal do Ceará), **Fernando Cukierman** (Univ. de Buenos Aires), **Dale Cutkosky** (Univ. of Missouri Columbia), **Marcelo Saia** (Univ. de São Paulo/São Carlos), **Jawad Snoussi** (UNAM) and/et **Marcio G. Soares** (University Federal de Minas Gerais))

FUENSANTA AROCA, Universidad Nacional Autónoma de México
Parametrizations with exponents in cones and the algebraic closure of the field of rational functions in several variables.

When working with an algebraically closed field of characteristic zero. Newton-Puiseux theorem asserts that, at a singular point, a plane curve may be parametrized by a Puiseux series. In arbitrary dimension, singularities of hypersurfaces cannot, in general, be parametrized, anyhow, we can assure the existence of parametrizations in "wedges". These parametrizations are represented as Laurent Puiseux series whose support is contained in the translation of a rational strongly convex cone.

With the above result, we may construct different algebraically closed fields containing the field of power series in several variables. Which of these elements are algebraic over the field of power series? We will give some characterizations in terms of the support set.

Joint work with G. Ilardy, V. Saavedra and G. Rond.

EDWARD BIERSTONE, University of Toronto
Global smoothing of a subanalytic set

Semialgebraic and subanalytic sets have become ubiquitous in mathematics since their introduction by Łojasiewicz in the 1960s, following the celebrated Tarski-Seidenberg theorem on quantifier elimination. I will discuss two long-standing questions in real-analytic geometry, on global smoothing of a subanalytic set (an analogue of resolution of singularities), and on transformation of a proper real-analytic mapping to a mapping with equidimensional fibres by global blowings-up of the target (a classical result of Hironaka in the complex-analytic case).

These questions are related: a positive answer to the second can be used to reduce the first to the simpler semianalytic case. It turns out that the second question has a negative answer, in general, and that the first problem nevertheless has a positive solution. (Work in collaboration with Adam Parusiński.)

FELIPE CANO, University of Valladolid
Local Uniformization of Singular Codimension One Foliations

This is a work in collaboration with Miguel Fernández-Duque. We prove the existence of Local Uniformization, in the classical sense of Zariski, for codimension one singular foliations in projective varieties of any dimension. The precise statement is as follows: Let K/k be the field of rational functions of a projective variety over a base field k of characteristic zero. A singular foliation F of codimension one is defined from a birational viewpoint as a 1-dimensional K-vector subspace of the Kähler differentials of K over k, satisfying Frobenius integrability condition. We take a k-valuation ring R of K. We show the existence of a projective model M of K such that F is simple at the center Y of the valuation in M. The definitions of simple points for F is compatible with the known ones in the holomorphic case, in particular with the definitions appearing in the statement of Cano's global reduction of singularities in dimension three.

MAURICIO CORRÊA JR., UFMG
Čech-Bott-Chern cohomology and refined residue theory.

The Bott-Chern cohomology of a complex manifold refines both the de Rham and Dolbeault cohomologies. In this talk, we present a Čech-Bott-Chern cohomology theory. In particular, we present a relative Bott-Chern cohomology and discuss

applications in the refined residue theory. A joint work with Tatsuo Suwa.

ANDRÉ BELOTTO DA SILVA, Université Toulouse III
Local monomialization of a system of first integrals of Darboux type

Given a real- or complex-analytic singular foliation $\mathcal{F}$ with n first integrals of Darboux type $(f_1, \ldots, f_n)$, we prove that there exists a local monomialization of the first integrals. In particular, if $\mathcal{F}$ is generated by the n first integrals, the foliation $\mathcal{F}$ is reduced to monomial singularities.

ALICIA DICKENSTEIN, Universidad de Buenos Aires
Sparse mixed discriminants, toric jacobians, and iterated discriminants

Sparse mixed discriminants characterize those polynomial systems with fixed supports, which define a singular variety. We will discuss the relation between sparse mixed discriminants and the resultant of the given polynomials and their toric jacobian, which yields a multiplicativity formula for sparse mixed discriminants. We will also discuss conditions for mixed discriminants to be computed via iterated discriminants, with possible extra factors coming from the singularities of the discriminantal locus.

ALEXANDRE FERNANDES, Universidade Federal do Ceara
On Lipschitz regularity at infinity of complex algebraic sets

We prove that any complex algebraic subset of $\mathbb{C}^n$ which is Lipschitz regular at infinity is an affine linear subspace of $\mathbb{C}^n$. No restrictions on dimension and codimension are needed. This is a joint work with J. Edson Sampaio.

BRUNA ORÉFICE OKAMOTO, Universidade Federal de São Carlos
Equisingularity of map germs from a surface to the plane.

Let $(X, 0)$ be an ICIS of dimension 2 and let $f : (X, 0) \to (\mathbb{C}^2, 0)$ be a map germ with an isolated instability. We look at the invariants that appear when X_s is a smoothing of $(X, 0)$ and $f_s : X_s \to B_\epsilon$ is a stabilization of f. We find relations between these invariants and also give necessary and sufficient conditions for a 1-parameter family to be Whitney equisingular.

Joint work with J.J. Nuño-Ballesteros and J. N. Tomazella.

JORGE VITORIO PEREIRA, IMPA
Effective algebraic integration in bounded genus

We will describe the Zariski closure of the set of foliations on the projective plane of degree d admitting rational first integrals with fibers having geometric genus bounded by g.

MARIA APARECIDA RUAS, Instituto de Ciências Matemáticas e de Computação-USP
Lipschitz Normal Embeddings in the Space of Matrices

The germ of an algebraic variety is naturally equipped with two different metrics up to bilipschitz equivalence. The inner metric and the outer metric. One calls a germ of a variety Lipschitz normally embedded if the two metrics are bilipschitz equivalent. We prove Lipschitz normal embeddedness of some algebraic subsets of the space of matrices. These include the space $m \times n$ matrices, symmetric matrices and skew-symmetric matrices of rank equal to a given number and their closures, and the upper triangular matrices with determinant 0. We also make a short discussion about generalizing these results to determinantal varieties in real and complex spaces.

This is a joint work with Dmitry Kerner and Helge Moeller Pedersen.

JOSE SEADE, Universidad Nacional Autonoma de México
On the Chern classes of singular varieties

There are several different extensions of the notion of Chern classes to the case of singular varieties. This gives rise to the notion of Milnor classes, which restrict to the usual Milnor number when the variety has only one singular point which is a local complete intersection. In this talk we will speak about new results on Milnor classes obtained with R. Callejas-Bedregal and M. Morgado.