.

Jornadas de Geometría

September 21–22, 2017

UNC Universidad Nacional de Córdoba

FAMAF Facultad de Matemática, Astronomía, Física y Computación

Schedule

All talks will be held at Aula Magna (FaMAF)

	THURSDAY	FRIDAY
10:00 – 10:50	**Andrada**	**Vittone**
10:50 – 11:20	coffee	coffee
11:20 – 12:10	**Moroianu**	**Semmelmann**
12:10–14:30	lunch	lunch
14:30 – 15:20	**Cagliero**	**Grama**
15:20 – 15:50	coffee	coffee
15:50 – 16:40	**Godoy**	**Lauret**

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Speakers

The following abstracts are presented in alphabetical order by author

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Adrián ANDRADA
Universidad Nacional de Córdoba – CONICET
Vaisman solvmanifolds

A Hermitian manifold (M, J, g) is called Vaisman if it is locally conformal Kähler and the corresponding Lee form θ is parallel. Recall that the Lee form is a closed 1-form which is related to the fundamental 2-form ω by $d\omega = \theta \wedge \omega$.

In this work we study solvmanifolds (i.e., compact quotients of a simply connected solvable Lie group by a discrete subgroup) equipped with invariant Vaisman structures. We obtain a complete description of the corresponding solvable Lie algebras in terms of Kähler flat Lie algebras and suitable derivations, and we establish relations with Sasakian and co Kähler structures. Families of examples in any dimension are exhibited.

Joint work with M. Origlia.

Leandro CAGLIERO
Universidad Nacional de Córdoba – CONICET
The Nash-Moser Theorem for exact sequences of R. Hamilton and deformations of low dimensional Lie algebras

The Nash-Moser Theorem for exact sequences of R. Hamilton roughly states that if the composition of two smooth functions F and G is zero, say $G \circ F = 0$, and the associated complex in the tangent spaces is exact, then, locally, the image of F is the zero set of G.

This result, among many other applications, implies the well known general principle of deformation theory that says that a given algebraic structure μ is rigid if $H^2(\mu, \mu) = 0$.

In this talk we will recall the precise statement of the Nash-Moser Theorem, we will give a proof of the above general principle, and we will present some of its applications to the study of finite dimensional rigid Lie algebras.

Yamile GODOY
Universidad Nacional de Córdoba – CONICET
Interpolation of geometric structures compatible with a pseudo Riemannian metric

Generalized complex structures were introduced by N. Hitchin in 2003. In a smooth manifold theses structures interpolate between complex and symplectic structures.

Given a pseudo Riemannian manifold (M, g), we define four generalized geometric structures on M. Each of them interpolate between two geometric structures on M compatible with g.

We present some properties of the new structures, compute the typical fibers of their twistor bundles and give examples for M a Lie group with a left invariant metric.

Lino GRAMA
Universidade Estadual de Campinas
Variational aspects of homogeneous geodesics on generalized flag manifolds and applications

In this talk we will discuss conjugate points along homogeneous geodesics in generalized flag manifolds. This is done by analyzing the second variation of the energy of such geodesics. We will also discuss the behavior of certain conjugate points under the homogeneous Ricci flow points in the complex projective space $\mathbb{C}P^{2n+1} = Sp(n+1)/U(1) \times Sp(n)$. This is a joint work with Rafaela do Prado.

Jorge Lauret
Universidad Nacional de Córdoba – CONICET
Solitons

The concept of soliton goes beyond Ricci flow and includes geometric structures and different kinds of geometric flows in complex, symplectic and G_2 geometry. We will survey in this talk on the role played by solitons in providing canonical or distinguished geometric structures on Lie groups, in the existence problem of solitons for different flows as well as in their structure and classification.

Andrei Moroianu
Université Paris-Sud
Conformally related Riemannian metrics with non-generic holonomy

We show that if a compact connected n-dimensional manifold M has a conformal class containing two non-homothetic metrics g and $\tilde{g} = e^{2\varphi} g$ with non-generic holonomy, then after passing to a finite covering, either $n = 4$ and $(M, g, \tilde{g})$ is an ambikähler manifold, or $n \geq 6$ is even and $(M, g, \tilde{g})$ is obtained by the Calabi Ansatz from a polarized Hodge manifold of dimension $n-2$, or both g and $\tilde{g}$ have reducible holonomy, M is locally diffeomorphic to a product $M_1 \times M_2 \times M_3$, the metrics g and $\tilde{g}$ can be written as $g = g_1 + g_2 + e^{-2\varphi} g_3$ and $\tilde{g} = e^{2\varphi}(g_1 + g_2) + g_3$ for some Riemannian metrics g_i on M_i, and φ is the pull-back of a non-constant function on M_2.

Uwe Semmelmann
Universität Stuttgart
Killing tensors on Riemannian manifolds

Killing tensors are symmetric tensors such that the complete symmetrization of the covariant derivative vanishes. They are well studied in physics, in particular since they define first integrals, i.e. functions constant on geodesics.

In my talk I will introduce a formalism for studying Killing and conformal Killing tensors. Using this notation I will discuss the most important properties and mention a few recent results, e.g. the non-existence on compact manifolds with negative sectional curvature and a classification result on Riemannian products. Moreover I will describe several examples of Killing tensors.

My talk is based on two joint articles with K. Heil and A. Moroianu.

Francisco Vittone
Universidad Nacional de Rosario – CONICET
The nullity distribution of homogeneous spaces

Given a Riemannian manifold M, the nullity subspace at p is given by the set of vectors that annihilate the curvature tensor, i.e.,

$$\mathcal{N}_p := \{v \in T_pM \,:\, R(v, \cdot) = 0\}.$$

The existence of a nontrivial nullity distribution in a symmetric space, readily implies that this space has an Euclidean factor. In this talk we investigate the validity of this property for homogeneous spaces, introducing some obstructions on its geometry by means of Killing fields and the so-called Kostant connection. This is a joint work with Carlos Olmos and Antonio Di Scala.