Jan Bohr
Biholomorphism rigidity for transport twistor space

Abstract: Transport twistor spaces are degenerate complex 2-dimensional manifolds, which can be associated with any oriented Riemannian surface. The complex geometry of these spaces is intricately linked to the geodesic flow of the surface. We prove that biholomorphisms between the
transport twistor spaces of simple or Anosov surfaces exhibit rigidity: they must be, up to a constant rescaling and the antipodal map, the lift of an orientation preserving isometry. (Joint work with F. Monard and G.P. Paternain).

Mihajlo Cekić
Quasi-Fuchsian flows and the coupled vortex equations

Abstract: In 1992, Ghys introduced a remarkable class of flows called quasi-Fuchsian flows. Namely, for a pair of metrics g_1 and g_2 of constant curvature -1 on a closed surface M, corresponding to points in Teichmueller space [g_1] and [g_2], respectively, he constructed an Anosov flow \phi_{[g_1], [g_2]} on the bundle of positive half-lines over M, whose weak stable and unstable foliations are smoothly conjugated to that of the geodesic flows of g_1 and g_2, respectively. In fact, in 1993 Ghys also showed that any Anosov flow on a 3-manifold with smooth weak stable/unstable bundles is smoothly conjugate to a quasi-Fuchsian flow or a suspension of a diffeomorphism of the 2-torus (up to finite covers).

In this talk, I will give an alternative 'PDE theoretic' description of quasi-Fuchsian flows as certain thermostat flows on the unit tangent bundle of the Blaschke metric uniquely determined by a conformal class on M and a holomorphic quadratic differential, satisfying `coupled vortex equations'. Joint work with Gabriel Paternain.

Gilles Courtois
Horospherical rigidity

Abstract: On a simply connected negatively curved manifold, the horospheres are spheres centered at a point at infinity. They also are the projections of the strong (un)-stable leaves of the (un)-stable
foliation of the geodesic flow. We will study relations between their dynamical and geometrical aspects and show: the horospheres of a closed negatively curved manifold of dimension at least three is hyperbolic if and only if the horospheres are isometric to the Euclidean space.

Brice Flamencourt
Locally conformally product structures

Abstract: A Weyl structure on a conformal manifold (M,c) is a torsion-free connection D which preserves the conformal class. This structure is said to be closed if D is locally the Levi-Civita connection of a metric in c, and exact if this property is global.

When M is compact, a closed, non-exact Weyl structure induces a canonical Riemannian

metric h on its universal cover, which has at most two factors. If D has reducible and non-flat holonomy, (M,c,D) is called a Locally Conformal Product (LCP) structure.

In this talk, I will present fundamental examples of LCP manifolds, including the one originally given by Matveev and Nikolayevky using solvmanifolds, as well as the OT manifolds in the case t=1, before giving more general constructions which highlight a close link with number theory. I will also discuss LCP structures defined on a conformal manifold (M,[g]) in the case where g has special holonomy, and the obstructions that then arise.

Tristan Humbert

Entropy rigidity near real and complex hyperbolic metrics

Abstract: Topological entropy is a measure of the complexity of a dynamical system. The variational principle states that topological entropy is the supremum over all invariant probability measures of the metric entropies. For an Anosov flow, the supremum is uniquely attained at a measure called the measure of maximal entropy (or Bowen-Margulis measure).

An important example of Anosov flow is given by the geodesic flow on a negatively curved closed manifold. For these systems, another important invariant measure is given by the Liouville measure: the smooth volume associated to the metric.

A natural question, first raised by Katok is to characterize for which negatively curved metrics the two measures introduced above coincide. The Katok's entropy conjecture states that it is the case if and only if g is a locally symmetric metric. The conjecture was proven by Katok for surfaces but remains open in higher dimensions.

In this talk, I will explain how one can combine microlocal techniques introduced by Guillarmou-Lefeuvre for the study of the marked length spectrum with geometrical methods of Flaminio to obtain Katok's entropy conjecture in neighborhoods of real and complex hyperbolic metrics (in
all dimensions).

Gerhard Knieper

Maximal stretch, Lipschitz maps and manifolds of negative curvature

Abstract: Motivated by the work of Thurston on best Lipschitz maps and maximal stretched geodesic laminations on Teichmüller spaces we discuss generalizations for Riemannian metrics of variable negative curvature.

This is based on joint work with Xian Dai.

Eveline Legendre

From Kähler Ricci solitons to Calabi-Yau Kähler cones

Abstract: In this talk I will explain a recent result obtained in collaboration with V.Apostolov and A. Lahdili (UQAM, Canada) where we show that the cone over the

product of a smooth Fano manifold, carrying a Kähler Ricci soliton, with a complex projective space of sufficiently large dimension is a Calabi Yau cone. This can be seen as an asymptotic version of a conjecture by Mabuchi and Nikagawa. The proof relies on the theory of weighted cscK metrics and the talk will be mostly a gentle introduction to these objects.

Vladimir Matveev
Bernhard Riemann 1861 revisited: existence of flat coordinates for an arbitrary bilinear form

Abstract: We generalize the celebrated foundational results of Bernhard Riemann and Gaston Darboux: we give necessary and sufficient conditions for a bilinear form to be flat. More precisely, we give explicit necessary and sufficient conditions for a tensor field of type (0, 2) which is not necessarily symmetric or skew-symmetric, and is possibly degenerate, to have constant entries in a local coordinate system.

Results are joint with S. Bandyopadhyay, B. Dacorogna and M. Troyanov

Martin Mion-Mouton
Lorentzian metrics with conical singularities and bi-foliations of the torus

Abstract: The constant curvature Lorentzian metrics having a finite number of conical singularities offer new examples of geometric structures on the torus, naturally generalizing the analogous Riemannian case. In the latter, works of Troyanov show that the data of the conformal structure
and of the angles at the singularities entirely classify the metrics with conical singularities. In this talk, we will introduce the Lorentzian metrics with conical singularities, construct some examples,
and present a rigidity phenomenon reminiscent of Troyanov's work: de-Sitter tori with a singularity of fixed angle are determined by the topological equivalence class of their lightlike bifoliation. Time permitting, we will see that this geometrical question is intimately linked to a dynamics problem on piecewise smooth circle diffeomorphisms.

Frédéric Paulin
Equidistribution of common perpendiculars in negative curvature

Abstract: Let M be a Riemannian manifold with pinched negative sectional curvature. When the Bowen-Margulis measure m on the unit tangent bundle of M is finite and mixing for the geodesic flow, we prove that the Lebesgue measures along the common perpendiculars of length at most t between two closed locally convex subsets, counted with multiplicities and lifted to the unit tangent bundle, equidistribute to m as t tends to infinity. When M is locally symmetric with finite volume and the geodesic flow is exponentially mixing, we give an error term for the asymptotic.

Simon Salamon
From four to six to seven dimensions

Abstract: Four-dimensional self-dual Einstein manifolds (and orbifolds) with positive scalar curvature form the basis for the construction of special geometries in higher dimensions (particularly 6,7,8) with varying levels of integrability. This talk will focus on the case of 3-Sasakian and nearly parallel G_2 metrics that either fibre over a 4-manifold, or (like the 7-sphere and Berger's space SO(5)/SO(3)) admit an action by SO(4) of cohomogeneity one. The aim is to describe the respective structures in terms of hypersurfaces locally isomorphic to SO(4), with generalizations in mind. This is joint work with Ragini Singhal.

Lorenz Schwachhöfer
Integrability conditions for torsion free connections with curvature conditions

Abstract: We consider the problem of describing torsion free connections whose curvature satisfies certain linear conditions, e.g. has restricted holonomy. Typically, this problem leads to an Exterior Differential System. We show that the integrability conditions of this system may be described algebraically, and we obtain some results on the local moduli space of such connections. This is joint work with E. Basurto.

Gregor Weingart
Quaternionic Bisectional Curvature

Abstract: Quaternionic bisectional curvature is a direct generalization of the holomorphic sectional curvature of Kähler manifolds to quaternionic Kähler manifolds studied in two recent articles by Uwe Semmelmann et al. I my talk I want to give a concise description of the results on quaternionic bisectional curvature obtained in these articles, focussing on the calculation of the curvature tensors of the twistor and 3-Sasaki spaces associated to a quaternionic Kähler manifold of positive scalar curvature.