Monday, June 16.

9:30-10:30 Stéphane Sabourau : *Sweepouts and volume on Riemannian manifolds*

The existence of a closed geodesic on every Riemannian two-sphere can be obtained using a minimax principle on the loop space. This principle extends to the one-cycle space and yields a closed geodesic in this case too. We will present various curvature-free upper bounds on the length of this closed geodesic as well as some generalizations in higher dimensions.

11:00-12:00 Florent Balacheff : *Systolic contact geometry*

Systolic geometry involves many ingredients such as algebraic topology, metric geometry or conformal techniques for instance. In this talk, after briefly recall part of this background, we will explain why contact geometry is a natural setting for the study of isosystolic inequalities and the new perspectives it offers. This is joint work with J.C. Álvarez Paiva and K. Tzanev.

16:00-17:00 Anna Lenzhen : *The Teichmüller metric on Teichmüller spaces*

Let $S = S(g, n)$ be a surface of genus g with n punctures. The Teichmüller space $T(S)$ is the space of all marked conformal structures on S up to isotopy. It is well known that $T(S)$ is homeomorphic to an open ball of dimension $6g - 6 + 2n$. The space caries several natural metrics. I will focus entirely on the Teichmüller metric. It is a complete Finsler metric which is not Riemannian unless S has low complexity: for example, if S is a once-punctured torus, $T(S)$ equipped with the Teichmuller metric is isometric to the hyperbolic plane. Outside some sporadic cases, the geometry of $T(S)$ becomes very interesting. In this expository talk, I will review some classical facts about the metric, and describe recent progress in the study of Teichmüller geometry.

17:30-18:30 John Loftin : *Some projective invariants of convex domains coming from differential geometry*

I will discuss some projective differential geometric invariants of properly convex domains arising from affine differential geometry. Consider a properly convex domain Ω in $R^n \subset RP^n$, and the cone C over Ω in R^{n+1}. Then Cheng-Yau have shown that there is a unique hyperbolic affine sphere which is contained in C and asymptotic to the boundary ∂C. The hyperbolic affine sphere is invariant under special linear automorphisms of C, and carries an invariant complete Riemannian metric of negative Ricci curvature, the Blaschke metric. The Blaschke metric descends to a projective-invariantmetric on Ω.

I will also address the relationship between the Blaschke metric and Hilbert metric, which is recent and is due to Benoist-Hulin. At the end, I will discuss applications to the geometry of real projective structures on surfaces.

Tuesday June 17

9:30-10:30 Bas Lemmens: *Isometries of infinite dimensional Hilbert geometries*

Important examples of Finsler geometries are Hilbert geometries—a natural generalization of hyperbolic geometry introduced by Hilbert. Although Hilbert limited his construction to finite dimensional spaces, it has a straightforward extension to infinite dimensions. In this talk we will discuss the isometries of certain infinite dimensional Hilbert geometries. In particular, we will see how results by De la Harpe concerning the isometries of strictly convex Hilbert geometries, and the characterisation of the isometry groups of Hilbert geometries on finite dimensional simplices, can be extended to infinite dimensions. (Joint work with Mark Roelands and Marten Wortel, see arXiv:1405.4147)

11:00-12:00 Dmitry Burago: *Just so stories about and around Finsler Geometry*

16:00-17:00 Esteban Anduchow and Lazaro Recht: *Metric geometry in homogeneous spaces of the unitary group of a C^*-algebra. Part I. The quotient metric.*

Definition of the quotient norm. Basic properties. Existence of minimal liftings: von Neumann algebras. Finite dimensional cases. Non-uniqueness results. Counter-examples: the unitary Fredholm group.

17:30-18:30 Esteban Anduchow and Lazaro Recht: *Metric geometry in homogeneous spaces of the unitary group of a C^*-algebra. Part II. Minimal curves*

Let $\mathcal{P}$ be of the unitary group $\mathcal{U}_{\mathcal{A}}$ of a C*-algebra $\mathcal{A}$. The main result: in the von Neumann algebra context (i.e. if the isotropy sub-algebra is a von Neumann algebra), for each unit tangent vector X at a point, there is a geodesic $\delta(t)$, which is obtained by the action on $\mathcal{P}$ of a 1-parameter group in $\mathcal{U}_{\mathcal{A}}$. This geodesic is minimizing up to length $\pi/2$.

Wednesday, June 18

9:00-10:00 Marc Troyanov: *The Binet-Legendre metric in Finsler Geometry*

In this talk we give a construction of a Riemannian metric associated to a given Finsler metric on a manifold M. This new construction has good functorial and smoothness properties. In this talk we shortly describe the construction and use it to solve a number of classical problems about transformation groups of Finsler manifolds. In particular we describe all possible conformal transformations, we give a sharp bound on the number of Killing fields and we discuss some results on the structure of locally symmetric Finsler spaces. This is work in common with Vladimir Matveev (published in Geometry and Topoloy).

10:10-11:10 Jacobus Portegies: *Eigenvalues of a Laplace operator on Integral Current Spaces*

In a measure-theoretic sense, supports of integral currents on metric spaces have a local Finsler structure. We use this structure to introduce a Dirichlet energy which leads to a definition of a Laplace operator. Subsequently, we examine how the spectrum of the Laplace operator changes as the underlying currents converge in the intrinsic flat sense.

11:20-12:20 Thomas Barthelmé: *Laplacian and control of eigenvalues on Finsler manifolds*

In this talk, I will start by introducing a Laplace operator on Finsler manifolds, based on an idea of Patrick Foulon, using a dynamical point of view. I will show that, under some reasonable conditions, this operator is in fact the only possible generalization of the Laplacian. In a second part of the talk, I will show how one can obtain a coarse control of eigenvalues and finish by showing that, even if we can't hear the shape of a drum, we can sometimes hear when it is Finslerian. Part of this work is in collaboration with Bruno Colbois.

Thursday, June 19

9:30-10:30 Andreas Bernig : *Minimality of k-planes in normed spaces*

We introduce a new volume definition on normed vector and Finsler spaces. We show that the induced k-area functionals are convex for all k. In the particular case $k = 2$, our theorem implies that Busemann's 2-volume density is convex, which was recently shown by Burago-Ivanov. We also show how the new volume definition is related to the centroid body and prove some affine isoperimetric inequalities.

10:30-11:30 Rafael Ruggiero: *Dynamics and rigidity in Finsler geometry*

We make a survey of recent results about applications of dynamical systems and foliation theory to rigidity problems in Finsler surfaces.

16:00-17:00 Daniel Beltita: *Geometric aspects in representation theory of unitary groups*

Representation theory of unitary matrix groups is a classical topic in the theory of compact Lie groups, where a crucial role is played by positive definite invariant bilinear forms on their corresponding Lie algebras and invariant Riemannian structures associated to them. These tools are no longer available when one tries to investigate groups of matrices of infinite size and to classify the representations of these groups. More precisely, infinite-dimensional unitary groups are Lie groups modeled on normed linear spaces whose topology may not be described by any complete scalar product. Therefore some variant of Finsler structures is unavoidable in this study, even on the level of every single tangent space of the manifolds under consideration. An additional difficulty in this study comes from the absence of the Haar measure on non-locally-compact groups. We plan to discuss some basic problems in this area of representation theory and to sketch an approach to them, replacing the finite-dimensional tools of Riemannian structures and Haar measures by a systematic use of metric structures on groups and convexity properties of momentum maps associated to Hamiltonian actions of these groups on some infinite-dimensional symplectic manifolds. This is joint work with Karl-Hermann Neeb.

17:30-18:30 Thomas Wannerer: *Isoperimetric inequalities for quermassintegrals arising in hermitian integral geometry.*

Friday, June 20

9:00-10:00 Hans-Bert Rademacher: *Closed geodesics, string topology and resonance*

The existence and stability of closed geodesics on compact manifolds can be studied using equivariant Morse theory on the free loop space. We present existence results for Riemannian and Finsler metrics and discuss how results from string topology can be used to prove resonance statements.

10:10-11:10 Joe Fu: *A tube formula for Finsler spaces?*

11:20-12:20 Cormac Walsh: *Hilbert isometries*

The question of determining the isometries of a Hilbert geometry was first posed by de la Harpe in the '90s. In studying this question, it is useful to consider a Hilbert geometry as the projective space of a cone, and enlarge the field of study to those maps on the cone that preserve a certain structure called the *gauge*.

It turns out that all Hilbert isometries arise from either gauge-preserving or gauge-reversing maps, and that the latter exist only on symmetric cones. This will allow us to conclude that all Hilbert isometries are collineations unless the cone is a non-Lorentzian symmetric cone.

I will also talk about how similar techniques can be used to determine the isometries of the Thompson metric on a cone.