SCHEDULE

40th Texas Geometry and Topology Conference

University of Texas at Austin

October 10–12, 2008

- The conference takes place in Robert Lee Moore Hall (RLM).
- Note that the ground floor of RLM is the fourth floor.
- All talks are in the mathematics lecture room, RLM 6.104.
- The reception and all breaks are in the Vaughn Lounge, RLM 12.104.

Friday, October 10

5:00–7:00 Registration and complimentary buffet

7:00–8:00 Hossein Namazi: ***Splittings, Hyperbolic Geometry and Models***

Abstract: We try to explore how gluing maps and in particular combinatorics of Heegaard splittings affect the geometry of a 3-manifold. This will lead to an approach to find an effective geometrization for large classes of 3-manifolds. Even more, in these cases, the splitting provides a combinatorial model for the geometry. The talk is mostly based on joint work with Jeff Brock, Yair Minsky and Juan Souto.

Saturday, October 11

9:00–10:00 Coffee, tea, juice, and bagels

10:00–11:00 Yi Ni: ***Dehn surgeries that reduce the Thurston norm of a fibered manifold***

Abstract: Suppose K is a knot on the fiber of a surface bundle over the circle. If we do surgery on K with slope specified by the fiber, then the Thurston norm of the homology class of the fiber decreases in the new manifold. We show that the converse is also true. Namely, if a Dehn surgery on a winding number 0 knot in a fibered manifold reduces the Thurston norm of the homology class of the fiber, then the knot lies on the fiber and the slope is the natural one.

11:30–12:30 Chikako Mese: ***Harmonic maps in singular spaces***

Abstract: The connection between harmonic maps and representations of discrete groups has been studied extensively in recent years. A harmonic map is classically defined between Riemannian manifolds and is a critical point of the energy functional. The seminal work of Gromov and Schoen on p-adic rigidity initiated the study of harmonic maps in the singular setting. The main topic of this talk will harmonic maps from a Riemannian complex to metric spaces of non-positive curvature. We discuss existence and regularity issues as well as the application to rigidity problems in geometric group theory.

12:30–2:00 Lunch

2:00–3:00 Stefano Vidussi: ***Twisted Alexander polynomials and fibered 3-manifolds***

Abstract: I will discuss how twisted Alexander polynomials detect fibered 3-manifolds.

3:00–3:30 Coffee, tea, and cookies

3:30–4:30 Joel Hass: ***Harmonic maps and the stabilization of Heegaard splittings***

Abstract: A geometric view of the collection of Heegaard splittings of a hyperbolic manifold has been emerging recently. We combine this with a method of controlling surfaces via a deformation to harmonic maps. As an application, we give examples for each genus greater than one of a 3-manifold with a pair of genus g Heegaard splittings whose smallest common stabilization has genus $2g$. All previously known examples had a commons stabilization of genus $g + 1$. This is joint work with Abigail Thompson and Bill Thurston.

5:00–6:00 Jeff Cheeger: ***Differentiable structures on metric measure spaces***

Abstract: Rademacher's theorem on the almost everywhere differentiability of real-valued Lipschitz functions on $\mathbb{R}^n$ can be generalized to metric measure spaces for which the measure is doubling and such that between every pair of points there exist "sufficiently many" curves of finite length. Examples include fractals such as nilpotent Lie groups with Carnot metrics. It follows that there is a unique bi-Lipschitz invariant differentiable structure, which enables one to do first order calculus. This has applications, e.g. to bi-Lipschitz nonembedding theorems. We will give an overview of the subject, including a description of some recent progress.

7:00–9:00 Conference *bienvenidos* – Texas style (Cuatro's)

The *bienvenidos* is free for graduate students and costs $15 for faculty and guests.

Sunday, October 12

9:00–10:00 Coffee, tea, juice, and bagels

10:00–11:00 Lewis Bowen: ***Free subgroups of lattices***

Abstract: Let G be any locally compact, unimodular, metrizable group. The main result of the talk, roughly stated, is that if $F < G$ is any finitely generated free group and $\Gamma < G$ any lattice, then up to a small perturbation and passing to a finite index subgroup, F is a subgroup of Γ. This result has recently been used by Lackenby, Long and Reid to show that, for cocompact Kleinian groups, LERF implies the Lubotzky–Sarnak conjecture. Another application, due to Lackenby, is that every Kleinian group that contains a finite noncyclic subgroup is either finite, virtually free, or contains a surface subgroup.

11:30–12:30 Tom Farrell: ***The space of negatively-curved metrics on a closed manifold***

Abstract: This talk will be a report on recent joint work with Pedro Ontaneda where we show that the space of Riemannian metrics with negative sectional curvatures on a closed smooth manifold $\mathcal{M}$ of dimension > 9 is disconnected (in fact has infinitely many path components). We also show that for certain $\mathcal{M}$ (sufficiently large finite covers of manifolds supporting nonarithmetic hyperbolic metrics) the moduli space of such metrics is also disconnected. And we have some non-vanishing results about the higher homotopy (homology) groups of these spaces. Finally we apply these results to study bundles whose fibers are diffeomorphic to $\mathcal{M}$ and each fiber supports a negatively curved Riemannian metric.