

Seminar & Events Bulletin: Topology

07-01-2012 to 06-30-2013

Thursday, September 20, 2012

3:00pm-4:00pm **Topology** -- Peter Scott (UM) *A combinatorial approach to harmonic maps* -- 3866 East Hall

Friday, October 05, 2012

4:00pm-5:00pm **Topology** -- William Abram (University of Michigan) *The equivariant complex cobordism ring of a finite abelian group* -- 3088 East Hall

Thursday, October 25, 2012

3:00pm-4:00pm **Topology** -- Andres Sambarino (Orsay) *An extension of the Weil-Petersson metric on the Hitchin component(s).* -- 3866 East Hall

Thursday, November 01, 2012

3:00pm-4:00pm **Topology** -- Jose Manuel Gomez (Johns Hopkins University) *Spaces of homomorphisms, homotopy colimits and filtrations of the classifying space of a compact Lie group* -- 3866 East Hall

Thursday, November 08, 2012

3:00pm-4:00pm **Topology** -- Michael Usher (University of Georgia) *Links and critical points* -- 3866 East Hall

Thursday, December 06, 2012

3:00pm-4:00pm **Topology** -- Indira Chatterji (Université d'Orléans) *The median class for groups acting on CAT(0) cube complexes* -- 3866 East Hall

Thursday, January 17, 2013

3:00pm-4:00pm **Topology** -- Grigori Avramidi (University of Chicago) *Symmetries of aspherical manifolds* -- 3866 East Hall

Thursday, January 31, 2013

3:00pm-4:00pm **Topology** -- Priyam Patel (Rutgers) *Quantifying Residual Finiteness and LERF-ness in Terms of Geometric Data* -- 3866 East Hall

Wednesday, March 13, 2013

3:00pm-4:00pm **Topology** -- Michael Hopkins (Harvard University) *Ziwei Lecture II: Equivariant Homotopy Theory and the Solution to the Kervaire Invariant Problem* -- 1372 East Hall

Thursday, March 14, 2013

3:00pm-4:00pm **Topology** -- Michael Hopkins (Harvard University) *Ziwei Lecture III: Equivariant multiplicative closure* -- 3088 East Hall

Thursday, March 21, 2013

12:00am-12:00am **Topology** -- Asaf Hadari (Yale) *Homological Shadows of Attracting laminations* -- 3866 East Hall

Thursday, March 28, 2013

3:00pm-4:00pm **Topology** -- Thomas Koberda (Yale) *Curve complexes for right-angled Artin groups.* -- 3866 East Hall

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Thursday, April 18, 2013

3:00pm-12:00am **Topology** -- Guillaume Dreyer (Notre Dame) *Parametrizing Hitchin components* -- 3866

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Abstracts

Topology

Thursday, September 20, 2012, 3:00pm-4:00pm

3866 East Hall

Peter Scott (UM)

A combinatorial approach to harmonic maps

In joint work with Joel Hass, we have described a combinatorial approach to harmonic maps, and some applications. In this talk, I will summarize the relevant basic facts about smooth harmonic maps, and then explain our combinatorial version. Then I will discuss some applications.

Topology

Friday, October 05, 2012, 4:00pm-5:00pm

3088 East Hall

William Abram (University of Michigan)

The equivariant complex cobordism ring of a finite abelian group

The calculation of the non-equivariant cobordism ring due to Milnor and Quillen was one of the great successes of algebraic topology. Equivariantly, Kriz described tom Dieck's stable equivariant complex cobordism ring $(MU_G)_*$, in the case $G = \mathbb{Z}/p$, as the pullback of a diagram of rings arising from the Tate diagram for $MU_{\mathbb{Z}/p}$. We extend this work to the case of G a finite abelian group, where we describe $(MU_G)_*$ as the inverse limit over certain G -spectra $F(S)_*$ indexed over chains of subgroups of G . In the case $G = \mathbb{Z}/p^n$, we get a simple description of $(MU_G)_*$ as the n -fold pullback of a diagram of rings. In the general case, we are still able to compute the algebraic structure of $F(S)_*$ explicitly. I will discuss this computation in some detail.

Topology

Thursday, October 25, 2012, 3:00pm-4:00pm

3866 East Hall

Andres Sambarino (Orsay)

An extension of the Weil-Petersson metric on the Hitchin component(s).

A Hitchin component is a connected component of the space of representations of the fundamental group of a closed hyperbolic surface to $PSL(n, \mathbb{R})$, that naturally contains the Teichmüller space (called the Fuchsian locus) of the surface.

The purpose of the talk is to explain a recent work in collaboration with M. Bridgeman, D. Canary and F. Labourie where a (mapping class group invariant-) Riemannian metric on the Hitchin components is constructed. This metric extends the Weil-Petersson metric on the Fuchsian locus.

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Topology

Thursday, November 01, 2012, 3:00pm-4:00pm

3866 East Hall

Jose Manuel Gomez (Johns Hopkins University)

Spaces of homomorphisms, homotopy colimits and filtrations of the classifying space of a compact Lie group

In the first part of this talk we introduce spaces of homomorphisms in Lie groups and discuss some results related to these spaces. Then we show how one can get a natural filtration of BG using spaces of homomorphism. The first space in this filtration is particularly interesting and we show how to study it using homotopy colimits. Some applications and computations will be provided.

Topology

Thursday, November 08, 2012, 3:00pm-4:00pm

3866 East Hall

Michael Usher (University of Georgia)

Links and critical points

An extremely useful principle in the calculus of variations--originally due to Rabinowitz et al. and widely used to find solutions to elliptic boundary value problems and periodic orbits of Hamiltonian systems--asserts that if a suitably well-behaved functional separates the two components of a nontrivial link, then a minimax procedure gives rise to a critical point of the functional, with control over the corresponding critical value. I will present a refinement of this in the model case of Morse functions on compact manifolds, showing that such a function has more critical points than required by the Morse inequalities if and only if it separates a link with nonzero linking number; indeed, there is a precise characterization of the exact number of critical points in terms of the behavior of the function with respect to links. The proof is based on an analysis of the Morse-Smale-Witten complex, using ideas borrowed from chain-level symplectic Floer theory.

Topology

Thursday, December 06, 2012, 3:00pm-4:00pm

3866 East Hall

Indira Chatterji (Universit  d'Orl ans)

The median class for groups acting on CAT(0) cube complexes

I will discuss bounded cohomology, as well as CAT(0) cube complexes. For a non-elementary action on a CAT(0) cube complex, we construct a cohomology class that we call median class, and prove the non-vanishing of it. We apply this result to establish a super-rigidity result. This is joint work with T. Fernos and A. Iozzi, and this talk will be accessible to non-specialists.

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Thursday, January 17, 2013, 3:00pm-4:00pm

3866 East Hall

Grigori Avramidi (University of Chicago)

Symmetries of aspherical manifolds

I will describe some results bounding the isometry groups of Riemannian metrics on aspherical manifolds and of the lifted metrics on their universal covers. The general theme is that topological properties of an aspherical manifold often restrict the symmetries of an arbitrary complete Riemannian metric on that manifold. I will illustrate this by explaining why on a finite volume irreducible locally symmetric manifold, no metric has more symmetry than the locally symmetric metric. Possibly, I will also discuss why moduli space is a minimal orbifold.

Topology

Thursday, January 31, 2013, 3:00pm-4:00pm

3866 East Hall

Priyam Patel (Rutgers)

Quantifying Residual Finiteness and LERF-ness in Terms of Geometric Data

This talk will begin by defining residual finiteness (RF) and locally extended residual finiteness (LERF) for groups, followed by a brief history of the results that study the connection between these algebraic properties and the fundamental groups of surfaces and 3-manifolds. We will then describe what it means to quantify these group properties and present the results that quantify RF-ness and LERF-ness of hyperbolic surface groups in terms of geometric data. If time permits, we will conclude with an overview of similar techniques used to quantify residual finiteness for particular hyperbolic 3-manifold groups.

Topology

Wednesday, March 13, 2013, 3:00pm-4:00pm

1372 East Hall

Michael Hopkins (Harvard University)

Ziwei Lecture II: Equivariant Homotopy Theory and the Solution to the Kervaire Invariant Problem

Our solution to the Kervaire invariant problem made essential use of group actions in algebraic topology. In this talk I will describe some of the basic ideas in equivariant homotopy theory and how they are used to study the Kervaire invariant problem.

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Topology

Thursday, March 14, 2013, 3:00pm-4:00pm

3088 East Hall

Michael Hopkins (Harvard University)

Ziwet Lecture III: Equivariant multiplicative closure

The "multiplicative closure" of a set of elements in a commutative ring is the set of all products of powers of those elements. One of the innovations used in our solution to the Kervaire invariant problem revealed an unexpected subtlety in the analogue of this notion in equivariant homotopy theory. In this talk I will describe this analogy and explain the subtlety and the structures needed to deal with it.

Topology

Thursday, March 21, 2013, 12:00am-12:00am

3866 East Hall

Asaf Hadari (Yale)

Homological Shadows of Attracting laminations

Let S be a surface with punctures, and let $f \in \text{Mod}(S)$ be a pseudo-Anosov mapping class. Associated to f is an attracting lamination L , which is the limit under the forward orbit of f of any closed curve on S . We address the following question - is there a natural way to associate to L some natural object in the homology of S ? If so, can it be described using some limiting process? What would such an object tell us about f ? We show that there is indeed such an object, and that it possesses a surprising amount of structure. For instance, if f is in the Torelli group, then the homological lamination will be a convex polyhedron with rational vertices.

Topology

Thursday, March 28, 2013, 3:00pm-4:00pm

3866 East Hall

Thomas Koberda (Yale)

Curve complexes for right-angled Artin groups.

I will discuss an analogue of the curve complex for right-angled Artin groups and describe some of its properties. I will then show how it guides parallel results between the theory of mapping class groups and the theory of right-angled Artin groups. This represents joint work with S. Kim.

Topology

Thursday, April 18, 2013, 3:00pm-12:00am

3866

Guillaume Dreyer (Notre Dame)

Parametrizing Hitchin components