

UGA Topology seminar

Mon May 22, 2017

8:30am Registration

Calendar: UGA Topology seminar
Created by: mathuga@gmail.com

9am Coffee/Tea

Calendar: UGA Topology seminar
Created by: mathuga@gmail.com

9:30am Alan Reid "Profinite rigidity in low-dimensions"

Calendar: UGA Topology seminar
Created by: Will Kazez

Description:

A finitely generated residually finite group G is called profinitely rigid if whenever a finitely generated residually finite group H satisfies $H \cong \text{wh}\{G\}$ then $H \cong G$. Although by now there are many examples of groups that are not profinitely rigid (including the fundamental groups of certain closed 3-manifolds) there seems to be a growing sense that when G is a free group, surface group or the fundamental group of a finite volume hyperbolic 3-manifold, things are different and these will be profinitely rigid. We will discuss recent developments.

10:30am Refreshments

Calendar: UGA Topology seminar
Created by: mathuga@gmail.com

11am Mladen Bestvina "Boundary amenability for $\text{Out}(F_n)$ "

Calendar: UGA Topology seminar
Created by: Will Kazez

Description:

The motivation for the talk is the recent result, joint with Vincent Guirardel and Camille Horbez, that $\text{Out}(F_n)$ admits a topologically amenable action on a Cantor set. This implies the Novikov conjecture for $\text{Out}(F_n)$ and its subgroups. Most of the talk will be an introduction to boundary amenability and ways to prove it for simpler groups.

12pm Lunch Break

Calendar: UGA Topology seminar
Created by: mathuga@gmail.com

2pm Rachel Roberts "From finite depth spines to CTFs"

Calendar: UGA Topology seminar
Created by: mathuga@gmail.com

Description:

I will describe a construction of (codimension one) co-oriented taut foliations (CTFs) of 3-manifolds. It follows from this construction that if K is a composite, alternating, or Montesinos knot, then the L-space conjecture of Ozsvath and Szabo holds for any 3-manifold obtained by Dehn surgery along K . This work is joint with Charles Delman.

3pm Refreshments

Calendar: UGA Topology seminar
Created by: mathuga@gmail.com

UGA Topology seminar

3:30pm Sheel Ganatra, "Liouville sectors and localizing Fukaya categories"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

We introduce a new class of non-compact symplectic manifolds, called Liouville sectors, and show they have well-behaved, covariantly functorial Fukaya categories. Stein manifolds frequently admit coverings by Liouville sectors, which can then be used to study the Fukaya category of the total space. Our first main result in this setup is a local criterion for generating the (global) Fukaya category. One of our goals, using this framework, is to obtain a combinatorial presentation of the Fukaya category of any Stein manifold. This is joint work (in progress) with John Pardon and Vivek Shende.

Tue May 23, 2017

9am Coffee/Tea

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

9:30am Jeremy Kahn, "Applications and Frontiers in Surface Subgroups"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

In 2009 V. Markovic and the speaker proved that there are ubiquitous nearly geodesic surface subgroups in the fundamental groups of closed hyperbolic 3-manifolds. Since then there have been many attempts---and some noteworthy successes---to extend these results to other settings, including lattices in other Lie groups, nonuniform lattices, δ -hyperbolic groups, and the mapping class group. After a review of the fundamental principles and methods, I will try to describe some of the successes, some of the difficulties, and some of the applications of these kinds of results.

10:30am Refreshments

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

11am

Ko Honda "Semi-global Kuranishi charts and the definition of contact homology"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

In this talk I will explain how to define the full contact homology algebra for any contact manifold and show that it is an invariant of the contact manifold. Our approach uses a simplified version of Kuranishi perturbation theory, consisting of "semi-global" Kuranishi charts (for example, if a relevant moduli space of holomorphic maps is compact, then we only need one chart). This is joint work with Erkao Bao.

12pm Lunch Break

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

UGA Topology seminar

2pm Kathryn Mann "Automatic continuity for homeomorphism groups"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

Many (but not all) examples of real Lie groups G have a unique Lie group structure, meaning that every abstract isomorphism $G \rightarrow G$ is necessarily continuous. In this talk, I'll discuss a recent stronger result for groups of homeomorphisms of manifolds: every homomorphism from $\text{Homeo}(M)$ to any other separable topological group is necessarily continuous. This is part of a broader program to show that the topology and algebraic structure of the group of homeomorphisms (or diffeomorphisms) of a manifold M are intimately linked, and also deeply connected to the topology of M itself. Time permitting, I will give some applications to understanding groups acting on manifolds, and to the structure of groups of germs of homeomorphisms using joint work with F. Le Roux.

3pm Refreshments

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

3:30pm David Gay "Trisections of 4-manifolds"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

This will be a survey of the developing theory of trisections of 4-manifolds. The philosophy is that trisections are to 4-manifolds as Heegaard splittings are to 3-manifolds, and this analogy has opened a door between 3-dimensional and 4-dimensional thinking; I hope to show you some nice examples and rich questions that arise from moving back and forth through that door.

8pm

John Etnyre "Studying smooth manifolds and embeddings via contact geometry"

Where: Physics Building, Room 202

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

Recently great progress has been made in studying embeddings, in particular knot theory, using contact geometry. To a manifold one can naturally associate a symplectic manifold, its cotangent bundle, and a contact manifold, its unit cotangent bundle. Moreover to a submanifold the co-normal construction produces a Legendrian submanifold of this contact manifold. This allows one to use contact geometry to study isotopy classes of embeddings. In this introductory talk we will discuss this general construction and various amazing conjectures about it. We will also discuss how to use Legendrian contact homology to create powerful invariants of isotopy classes of embeddings. Recently these ideas have been used to construct complete invariants of knots in the 3-sphere and conjecturally explain relations between the colored HOMFLY polynomials.

Wed May 24, 2017

9am Coffee/Tea

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

9:30am Dave Gabai "The 4-Dimensional Light Bulb Theorem"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

We generalize the classical light bulb theorem to four dimensions. I.e. a smooth 2-sphere in $S^2 \times S^2$ that intersects $S^2 \times 0$ once and is homologous to $0 \times S^2$ is smoothly isotopically standard.

UGA Topology seminar

10:30am Refreshments

Calendar: UGA Topology seminar
Created by: mathuga@gmail.com

11am Yasha Eliashberg "Weinstein structures revisited"

Calendar: UGA Topology seminar
Created by: Will Kazez
Description:
I will review the status of some old and new problems concerning Weinstein symplectic manifolds.

12pm Lunch Break

Calendar: UGA Topology seminar
Created by: mathuga@gmail.com

2pm Andy Wand "Filtering the Heegaard Floer contact invariant"

Calendar: UGA Topology seminar
Created by: mathuga@gmail.com
Description:
The modern development of contact geometry in 3 dimensions has seen several (due to Giroux, Wendl, Latschev and Wendl, Hutchings, and others) invariants of contact structures meant in some sense to measure non-(Stein/symplectic)-fillability of the structure. We will discuss a new approach which uses Heegaard Floer homology to define an invariant with a similar aim, but which has several desirable properties lacking in earlier approaches. Time permitting, we will discuss some examples and applications. This is joint with joint work with Kutluhan, Matic, and Van Horn-Morris.

3pm Refreshments

Calendar: UGA Topology seminar
Created by: mathuga@gmail.com

3:30pm Juliette Bavard "Around a big mapping class group"

Calendar: UGA Topology seminar
Created by: Will Kazez
Description:
The mapping class group of the plane minus a Cantor set naturally appears in many dynamical contexts, including group actions on surfaces, the study of groups of homeomorphisms on a Cantor set, and complex dynamics. In this talk, I will present the 'ray graph', which is a Gromov-hyperbolic graph on which this big mapping class group acts by isometries (it is an equivalent of the curve graph for this surface of infinite topological type). In particular, I will present a description of the Gromov-boundary of the ray graph in terms of long rays in the plane minus a Cantor set. This description is a joint work with Alden Walker.

5:30pm Q&A

Video call: Join video call
Where: Physics Building, Room 202
Calendar: UGA Topology seminar
Created by: jpinzon@uemail.iu.edu
Description: By and for graduate students?

Thu May 25, 2017

9am Coffee/Tea

Calendar: UGA Topology seminar
Created by: mathuga@gmail.com

UGA Topology seminar

9:30am

Helmut Hofer "Feral Pseudoholomorphic Curves as a Bridge between Dynamics and Topology"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

The existence of invariant subsets for a flow is a classical question in dynamics. Periodic orbits are such examples, but even they are difficult to find. Theories like symplectic field theory use periodic orbits to build symplectic invariants for odd-dimensional manifolds with a stable Hamiltonian structure and symplectic cobordisms having boundaries of such type. Having a stable Hamiltonian structure is a very strong condition, but one knows that without it periodic orbits might not exist, i.e. the building blocks for the theory are gone. It would be hard to believe that a symplectic cobordism suddenly ceases to have any meaningful symplectic properties. In this talk we present strong evidence that there is still a lot of structure. A new class of feral pseudoholomorphic curves relates symplectic properties to more general closed invariant subsets. As one of the applications we answer a question raised by M. Herman during his 1998 ICM talk by showing that a compact regular Hamiltonian energy surface in \mathbb{R}^4 has a proper closed invariant subset. This is joint work with Joel W. Fish, UMB.

10:30am Refreshments

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

11am Stefan Friedl "Polytope invariants of groups and manifolds"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

We associate a formal difference of polytopes to large classes of groups and manifolds and we discuss the topological content of this polytope invariant. For example we will see that for 3-manifolds the polytope invariant equals the Thurston norm polytope.

12pm Lunch Break/Reimbursement Paperwork

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

Description:

Secretaries will stick around to help process your paperwork and receipts while you are still in town. Be prepared with all necessary paperwork.

2pm Steven Frankel, "Calegari's conjecture for quasigeodesic flows"

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

Description:

Abstract: We will discuss two kinds of flows on 3-manifolds: quasigeodesic and pseudo-Anosov. Quasigeodesic flows are defined by a tangent condition, that each flowline is coarsely comparable to a geodesic. In contrast, pseudo-Anosov flows are defined by a transverse condition, where the flow contracts and expands the manifold in different directions. When the ambient manifold is hyperbolic, there is a surprising relationship between these apparently disparate classes of flows. We will show that a quasigeodesic flow on a closed hyperbolic 3-manifold has a coarsely contracting-expanding transverse structure, a generalization of the strict transverse contraction-expansion of a pseudo-Anosov flow. This behavior can be seen "at infinity," in terms of a pair of laminar decompositions of a circle, which we use to prove Calegari's flow conjecture: every quasigeodesic flow on a closed hyperbolic 3-manifold can be deformed into a pseudo-Anosov flow.

3pm Refreshments

Calendar: UGA Topology seminar

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UGA Topology seminar

3:30pm Jacob Rasmussen "Floer homology of manifolds with torus boundary"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

Let Y be a compact 3-manifold with boundary a surface of genus g . Following Auroux, the bordered Floer homology of Y can be interpreted as an object of the partially wrapped Fukaya category of $\text{Sym}^g S$, where S is the complement of a point in the boundary of Y . When $g=1$, there is a structure theorem for such objects which allows us to concretely interpret them in terms of curves in the punctured torus. I'll give some applications to understanding L-space Dehn fillings and the relation between taut foliations and L-spaces. This is joint work with Jonathan Hanselman and Liam Watson.

8pm Robert Lipshitz "Introduction to Heegaard Floer homology"

Where: Physics Building, Room 202

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

We will outline some of the formal structure of Heegaard Floer homology, sketch the definitions of some of the Heegaard Floer invariants, and give some misleading examples. Time permitting we will also mention some of its applications.

Fri May 26, 2017

9am Coffee/Tea

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

9:30am Speaker, TBA

Calendar: UGA Topology seminar

Created by: Will Kazez

10:30am Refreshments

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

11am Robert Lipshitz "Computing involutive HF-hat"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

Bordered Heegaard Floer homology is an extension of the Heegaard Floer invariant HF-hat to 3-manifolds with boundary. In the first half of the talk we will recall the basics of bordered Heegaard Floer homology and how it can be used to compute the Heegaard Floer invariant HF-hat . In the second half we will extend this algorithm to compute Hendricks-Manolescu's involutive HF-hat . The first half of the talk is joint with Peter Ozsváth and Dylan Thurston, and the second half with Kristen Hendricks.

12pm Lunch Break

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

UGA Topology seminar

2pm

Fernando Coda Marques "The space of cycles, a Weyl's law for minimal hypersurfaces and Morse index estimates"

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

Description:

The space of cycles in a compact Riemannian manifold has very rich topological structure. The space of hypercycles, for instance, taken with coefficients modulo two, is weakly homotopically equivalent to the infinite dimensional real projective space. This reveals the existence of nontrivial k -parameter sweepouts for every k . We will discuss a proof of a Weyl's law conjectured by Gromov (joint work with Liokumovich and Neves) in which the eigenvalues of the Laplacian are replaced by the areas of minimal hypersurfaces constructed by minimax methods. We will also discuss current work with Neves about Morse index bounds in the min-max theory of minimal surfaces and the problem of multiplicity.

3pm Refreshments

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

3:30pm Problem Session

Calendar: UGA Topology seminar

Created by: Will Kazez

Sun May 28, 2017

5:30pm Q&A

Video call: Join video call

Where: Physics Building, Room 202

Calendar: UGA Topology seminar

Created by: jpinzon@uemail.iu.edu

Mon May 29, 2017

9am Coffee/Tea

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

9:30am

John Pardon "Totally disconnected groups (not) acting on three-manifolds"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

Hilbert's Fifth Problem asks whether every topological group which is a manifold is in fact a (smooth!) Lie group; this was solved in the affirmative by Gleason and Montgomery--Zippin. A stronger conjecture is that a locally compact topological group which acts faithfully on a manifold must be a Lie group. This is the Hilbert--Smith Conjecture, which in full generality is still wide open. It is known, however (as a corollary to the work of Gleason and Montgomery--Zippin) that it suffices to rule out the case of the additive group of p -adic integers acting faithfully on a manifold. I will present a solution in dimension three. The proof uses tools from low-dimensional topology, for example incompressible surfaces, minimal surfaces, and a property of the mapping class group.

10:30am Refreshments

Calendar: UGA Topology seminar

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UGA Topology seminar

11am Tao Li "Heegaard genus and degree-one maps"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

An old conjecture in 3-manifold topology says that Heegaard genus of a closed orientable 3-manifold does not increase under any degree-one map. In this talk, we will give a positive answer for certain pinching maps. We will also discuss an application on tunnel numbers of satellite knots.

12pm Lunch Break

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

2pm

Kristen Hendricks "Involutive Heegaard Floer homology and the homology cobordism group"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

Involutive Heegaard Floer homology is a variant on the 3-manifold invariant Heegaard Floer homology which incorporates the data of the conjugation symmetry on the Heegaard Floer complexes, and is in principle meant to correspond to \mathbb{Z}_2 -Seiberg Witten Floer homology. It can be used to obtain two new invariants of homology cobordism and two new concordance invariants of knots, one of which (unlike other invariants arising from Heegaard Floer homology) detects non-sliceness of the figure-eight knot. We introduce involutive Heegaard Floer homology and its associated invariants and use it to give a new criterion for an element in the integer homology cobordism group to have infinite order, similar but not identical to a recent criterion given by Lin-Ruberman-Saviliev. Much of this talk is joint work with C. Manolescu; other parts are variously also joint with I. Zemke or with J. Hom and T. Lidman.

3pm Refreshments

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

3:30pm Mehdi Yazdi "On Thurston's Euler class one conjecture"

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

Description:

In 1976, Thurston proved that taut foliations on closed hyperbolic 3-manifolds have Euler class of norm at most one, and conjectured that, conversely, any Euler class with norm equal to one is Euler class of a taut foliation. We construct counterexamples to this conjecture and suggest an alternative conjecture.

8pm Dan Margalit "Problems and Progress on Mapping Class Groups"

Where: Physics Building, Room 202

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

The mapping class group of a surface is a fundamental object in mathematics. It connects in deep and interesting ways to low-dimensional topology, algebraic geometry, geometric group theory, hyperbolic geometry, and representation theory, to name a few. In this introductory talk, we will discuss some of the open problems about mapping class groups and explain some recent advances.

Tue May 30, 2017

9am Coffee/Tea

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

UGA Topology seminar

9:30am Ian Agol, "Flow and Yamada polynomials of cubic graphs"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

Abstract: We'll discuss Tutte's golden identity for flow polynomials of planar cubic graphs, and an extension to Yamada polynomials of spatial cubic graphs. This explains a curious property of flow polynomials of cubic graphs (mod 5). We conjecture that the golden identity becomes an inequality for non-zero flow polynomials of general cubic graphs which characterizes planarity, and have proved this for certain infinite classes of cubic (non-planar) graphs. We'll introduce the chromatic algebra to help explain these phenomena, and use it to show that the number of flow polynomials of planar cubic graphs grows exponentially with the degree, answering a question of Treumann-Zaslow. This is joint work with Slava Krushkal.

10:30am Refreshments

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

11am Michael Hutchings "Two or infinitely many Reeb orbits"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

We show that every nondegenerate contact form on a closed connected three-manifold, such that the associated contact structure has torsion first Chern class, has either two or infinitely many Reeb orbits. Under these assumptions, there are two orbits only if the three-manifold is the three-sphere or a lens space. The proof involves using embedded contact homology to find a genus zero global surface of section for the Reeb flow, under the additional assumption that there are only finitely many Reeb orbits. This is joint work with Dan Cristofaro-Gardiner and Dan Pomerleano.

12pm Lunch Break

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

2pm Jennifer Hom "Knot concordance in homology spheres"

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

Description:

The knot concordance group C consists of knots in S^3 modulo knots that bound smooth disks in B^4 . We consider C_Z , the group of knots in homology spheres that bound homology balls modulo knots that bound smooth disks in a homology ball. Matsumoto asked if the natural map from C to C_Z is an isomorphism. Adam Levine answered this question in the negative by showing the map is not surjective. We show that the image of C in C_Z is of infinite index. The proof relies on Heegaard Floer homology. This is joint work with Adam Levine and Tye Lidman.

3pm Refreshments

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

3:30pm Eugene Gorsky "On L-space surgeries on links"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

A 3-manifold is called an L-space if its Heegaard Floer homology has minimal possible rank. A link is called an L-space link if all sufficiently large surgeries of the three-sphere along its components are L-spaces. I will review some examples of L-space links, their topological properties, and a surprisingly complicated structure of the set of L-space surgeries on a given link. The talk is based on joint works with Maciej Borodzik, Jennifer Hom and Andras Nemethi.

UGA Topology seminar

8pm Rob Meyerhoff "Low-Volume Hyperbolic 3-Manifolds"

Where: Physics Building, Room 202

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

A hyperbolic 3-manifold is a complete Riemannian 3-manifold of constant sectional curvature -1 . The work of Perelman and Thurston shows that hyperbolic 3-manifolds are the dominant class of 3-manifolds. The most natural geometric invariant for hyperbolic 3-manifolds is the volume. Jorgenson and Thurston proved that the set of volumes of (finite-volume) hyperbolic 3-manifolds is well-ordered. As such, there are all sorts of low-volume questions one can ask: what is the lowest volume for a compact hyperbolic 3-manifold? What is the second lowest volume? What is the lowest volume of a non-compact hyperbolic 3-manifold? In this talk, we will discuss low-volume questions and results.

Wed May 31, 2017

9am Coffee/Tea

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

9:30am Emmy Murphy "The Legendrian DGA of cubic planar graphs"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

Associated to any planar graph of valence 3, we can construct a Legendrian surface, following Treumann-Zaslow. As they showed, the space of sheaves on this Legendrian is essentially equivalent to face coloring of the original graph. In this talk, we explain how to compute the Legendrian contact homology of these Legendrians, combinatorially based on the original graph. We establish in this case that augmentations are sheaves, which gives an original definition of a planar graph coloring. However, the more elaborate structure of the graph is expressed in the degree two differential of the DGA, which we conjecture is related to the monodromy of a spectral network around its poles. We also describe how to see connect sums and Legendrian surgeries in this picture, and compute the cobordism maps. This is joint work with Roger Casals and Kevin Sackel.

10:30am Refreshments

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

11am

Zoltan Szabo "Bordered algebras with matching, and knot Floer homology"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

The aim of this talk is to describe an algebraic method to compute knot Floer homology for knots in S^3 . This method uses chain complexes over Kauffman states, a bordered algebra $A(n, M)$, and DA bimodules. The algebra corresponds to a line with $2n$ marked points and a matching M , which is a fixed-point free involution on $(1, \dots, 2n)$. This is a joint work with Peter Ozsvath.

12pm Lunch Break

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

UGA Topology seminar

2pm

Andy Putman "The high-dimensional cohomology of the moduli space of curves with level structures"

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

Description:

We prove that the moduli space of curves with level structures has an enormous amount of rational cohomology in its cohomological dimension. As an application, we prove that the coherent cohomological dimension of the moduli space of curves is at least $g-2$. Well known conjectures of Looijenga would imply that this is sharp. This is joint work with Neil Fullarton.

3pm Refreshments

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

3:30pm Karen Vogtmann "Walls at the borders of Outer space"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

Motivated by work of Borel and Serre on arithmetic groups, Bestvina and Feighn defined a bordification of Outer space; this is an enlargement of outer space which is highly-connected at infinity and on which the action of $\text{Out}(F_n)$ extends, with compact quotient. We realize this bordification as a deformation retract of Outer space instead of an extension. We use this to give a simpler connectivity proof, and to give a description of the boundary nicely analogous to that of the Borel-Serre boundary of a symmetric space.

7:30pm Pool Party

Where: Legion Pool, Athens, GA 30605, USA

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

Thu Jun 1, 2017

9am Coffee/Tea

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

9:30am

Tom Church, "Stability and vanishing in the high-dimensional cohomology of $SL_n(\mathbb{Z})$ "

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

Abstract: I will explain a new (partly conjectural) kind of stability in the high-dimensional cohomology of arithmetic groups like $SL_n(\mathbb{Z})$, from joint work with Benson Farb and Andrew Putman. This deals with the "codimension- k " cohomology near the TOP dimension (the virtual cohomological dimension), and for $SL_n(\mathbb{Z})$ it implies the cohomology VANISHES there. We have proved this for the codimension-0 and codimension-1 cohomology, but the conjecture remains open beyond there. These results and methods are closely related to classical K-theory; Sander Kupers has recently used the codimension-1 result to give a proof that $K_8(\mathbb{Z}) = 0$, and showed that the full conjecture would imply that $K_{12}(\mathbb{Z}) = 0$.

10:30am Refreshments

Calendar: UGA Topology seminar

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UGA Topology seminar

11 am

Paul Seidel "Lefschetz fibrations, flat connections, and nonnegative paths in SL_2 "

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

The talk will address the structure of (Hamiltonian) Floer homology groups associated to Lefschetz fibrations. This has been a bit of a mystery, since expected the structure of operations is seemingly at odds with the way things are usually defined in Floer cohomology. I will explain how to get a clear picture of that situation, using the notion of flat (or nonnegatively curved) SL_2 connections on surfaces.

12pm **Lunch Break/Reimbursement Paperwork**

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

Description:

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2pm **Eli Grigsby, "Braids and homology-type invariants"**

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

Description:

I'll survey some of the ways in which studying closed braids using homology-type invariants has been and will continue to be useful for tackling problems in low-dimensional topology. I aim to pose more questions than I answer.

3pm **Refreshments**

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

3:30pm **Roger Casals, "Convexity in Engel Topology"**

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

In this talk we will discuss the geometry of Engel structures, maximally non-integrable 2-plane distributions in a 4-manifold. The main result will be an existence h-principle for such a class of distributions, proving surjectivity of the scanning map into the space of complete flags in all homotopy groups; this will be proven by elaborating on the ideas of Cartan and Lorentz prolongations. In addition, we will discuss notions of flexibility in Engel topology.

5:30pm **Q&A**

Video call: Join video call

Where: Physics Building, Room 202

Calendar: UGA Topology seminar

Created by: jpinzon@uemail.iu.edu

Fri Jun 2, 2017

9am **Coffee/Tea**

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

UGA Topology seminar

9:30am Peter Kronheimer "Gauge Theory of spatial graphs I"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

Given a trivalent graph embedded in 3-space, we associate to it an instanton homology group, which is a finite-dimensional $\mathbb{Z}/2$ vector space. Versions of this instanton homology can be constructed based on either $SO(3)$ or $SU(3)$ representations of the fundamental group of the graph complement. For the $SO(3)$ instanton homology there is a non-vanishing theorem, proved using techniques from 3-dimensional topology: if the graph is bridgeless, its instanton homology is non-zero. The $SU(3)$ version can be defined also over the integers or rationals, in which case its dimension is equal to the number of Tait colorings of the graph (essentially the same as four-colorings of the planar regions that the graph defines). It is not unreasonable to conjecture that, if the graph lies in the plane, the $\mathbb{Z}/2$ dimension of the $SO(3)$ homology is also equal to the number of Tait colorings.

10:30am Refreshments

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

11am Tom Mrowka "Gauge Theory of spatial graphs II"

Calendar: UGA Topology seminar

Created by: Will Kazez

Description:

Given a trivalent graph embedded in 3-space, we associate to it an instanton homology group, which is a finite-dimensional $\mathbb{Z}/2$ vector space. Versions of this instanton homology can be constructed based on either $SO(3)$ or $SU(3)$ representations of the fundamental group of the graph complement. For the $SO(3)$ instanton homology there is a non-vanishing theorem, proved using techniques from 3-dimensional topology: if the graph is bridgeless, its instanton homology is non-zero. The $SU(3)$ version can be defined also over the integers or rationals, in which case its dimension is equal to the number of Tait colorings of the graph (essentially the same as four-colorings of the planar regions that the graph defines). It is not unreasonable to conjecture that, if the graph lies in the plane, the $\mathbb{Z}/2$ dimension of the $SO(3)$ homology is also equal to the number of Tait colorings.

12pm Lunch Break

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

2pm Mikhail Ershov "On finiteness properties of the Johnson filtrations"

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

Description:

Let A denote either the automorphism group of a free group of rank n or the mapping class group of an orientable surface of genus n with at most 1 boundary component, and let G be either the subgroup of IA-automorphisms or the Torelli subgroup of A , respectively. I will discuss various finiteness properties of subgroups containing G_N , the N th term of the lower central series of G , for sufficiently small N . In particular, I will explain why (1) If $n \geq 4N-1$, then any subgroup of G containing G_N (e.g. the N th term of the Johnson filtration) is finitely generated (2) If $n \geq 8N-3$, then any finite index subgroup of A containing G_N has finite abelianization. The talk will be based on a joint work with Sue He and a joint work with Tom Church and Andrew Putman

3pm Refreshments

Calendar: UGA Topology seminar

Created by: mathuga@gmail.com

3:30pm Problem Session

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