Saturday, April 8th

An ∗ next to a talk indicates that it is expository in nature.

8:00am-9:00am	*Registration & Coffee & Bagels* **Wells Hall B-122**			
9:00am-10:00am *Plenary Session #1*	Laminations and external angles for similarity pairs *Danny Calegari* **Wells Hall B-115**			
10:00am-10:10am	Short Break			
10:10am-10:40am *Graduate Session #1*	Cohomology algebras of configuration spaces *Megan Maguire* **Wells Hall B-122**	Computing Gromov-Witten invariants via mirror symmetry* *Matei Ionita* **Wells Hall B-117**	Torsion in link homology via chromatic graph cohomology *Daniel Scofield* **Wells Hall B-119**	Linear representations of 3-manifold groups over rings *Montek Singh Gill* **Wells Hall B-115**
10:40am-11:00am	Coffee Break			
11:00am-11:30am *Graduate Session #2*	Perfect Morse functions on low-dimensional orbifolds *Sean Corrigan* **Wells Hall B-122**	Deformations of log symplectic structures on surfaces *Melinda Dawn Lanius* **Wells Hall B-117**	Cobordism maps in embedded contact topology *Jacob Rooney* **Wells Hall B-119**	A distance for circular handle decompositions of knot complements *Kevin Lamb* **Wells Hall B-115**
11:30am-11:40am	Short Break			
11:40am-12:40pm *Young Faculty Session #1*	Polyhedra inscribed in quadrics and their geometry *Sara Maloni* **Wells Hall B-117**		Surgery and low-dimensional topology *Tye Lidman* **Wells Hall B-122**	
12:40-2:10pm	Lunch Break			
2:10-3:10pm *Plenary Session #2*	Relations between geometric and topological notions of ellipticity *Karsten Grove* **Wells Hall B-115**			
3:10-3:20pm	Short Break			
3:20-3:50pm *Graduate Session #3*	The equivalence between G-spaces and orbit presheaves, and generalizations* *Jonathan Rubin* **Wells Hall B-122**	Boundary maps for some hierarchically hyperbolic spaces *Sarah Mousley* **Wells Hall B-117**	Derived geometry in nature* *Surya Raghavendran* **Wells Hall B-119**	Higher order corks *Hannah Schwarz* **Wells Hall B-115**
3:50-4:10pm	Coffee Break			
4:10-5:10pm *Young Faculty Session #2*	Weitzenböck formulae and sectional curvature *Renato Bettiol* **Wells Hall B-117**		The shape of data *Jose Perea* **Wells Hall B-122**	

Sunday, April 9th

An ∗ next to a talk indicates that it is expository in nature.

8:00am-9:00am	*Coffee & Bagels* **Wells Hall B-122**			
9:00am-10:00am *Plenary Session #3*	A generalization of Quillen-Sullivan rational homotopy theory *Mark Behrens* **Wells Hall B-115**			
10:00am-10:10am	Short Break			
10:10am-10:40am *Graduate Session #4*	Connection between connective K-theory and number theory* *Michael Keogh* **Wells Hall B-122**	Mapping Tori and Stable Pairs *Andrew Lee* **Wells Hall B-117**	Knot traces and concordance *Lisa Piccirillo* **Wells Hall B-119**	Local and global minimum of renormalized volume *Franco Vargas Pallets* **Wells Hall B-115**
10:40am-11:00am	Coffee Break			
11:00am-11:30am *Graduate Session #5*	On an integral analog of Quillen's rational homotopy theorem *Jacobson R. Blomquist* **Wells Hall B-122**	Tropicalizing spherical embeddings *Evan Nash* **Wells Hall B-117**	Non-prime 3-manifolds with open book genus 2 *Mustafa Cengizi* **Wells Hall B-119**	2-knots in the 4-sphere* *Maggie Miller* **Wells Hall B-115**
11:30am-11:40am	Short Break			
11:40am-12:40pm *Young Faculty Session #3*	Towers of regular self-covers and linear endomorphisms of tori *Wouter Van Limbeek* **Wells Hall B-117**		Knot concordance and Heegaard Floer homology *Adam Levine* **Wells Hall B-122**	
12:40-1:00pm	Pizza Break			
1:00-1:30pm *Graduate Session #6*	Torsion in Khovanov homology *Sujoy Mukherjee* **Wells Hall B-122**	Constructions of complex surfaces on the Bogomolov-Miyaoka-Yau line *Sumeyra Sakalli* **Wells Hall B-117**	Non-orientable surfaces bounded by knots *Samantha Allen* **Wells Hall B-119**	Log-canonical coordinates for poisson brackets *Nick Ovenhouse* **Wells Hall B-115**
1:30-1:40pm	Short Break			
1:40-2:10pm *Graduate Session #7*	Hierarchies of non-positively curved cube complexes *Teddy Einstein* **Wells Hall B-122**	Solving Nahm's equations by method of spectral curve* *Jason Quinones* **Wells Hall B-117**	Immersed Lagrangian fillings of Legendrian knots *Samantha Pezzimenti* **Wells Hall B-119**	Manifolds of higher rank *Samuel Lin* **Wells Hall B-115**

SATURDAY

Registration & Coffee & Bagels
Wells Hall B-122
8:00 am - 9:00 am

Plenary Session #1
Saturday 9:00 am -10:00 am

Laminations and external angles for similarity pairs (Room B-115)
Danny Calegari (University of Chicago)

The Barnsley-Harrington Mandelbrot set for similarity pairs has many interesting affinities with the "usual" Mandelbrot set. In particular, there is a "coding" of boundary points by data analogous to the "external angle" for points on the boundary of the usual Mandelbrot set. Instead of a single real number - an external angle - there is another parameter, a "scale factor", which can be between 1 and 2, and is 2 when the similarity pair is quasiconformally conjugate (as a conformal dynamical system on its limit set) to (the inverse of) a degree 2 rational map on its Julia set. As with the ordinary external angle, there is associated to the pair (angle, scale factor) a lamination of the circle which parameterizes cut points for the limit set. This is joint work with Alden Walker.

Short Break
10:00 am - 10:10 am

Graduate Session #1
Saturday 10:10 am - 10:40 am

Cohomology algebras of configuration spaces (Room B-122)
Megan Maguire (University of Wisconsin — Madison)
For a manifold X with finite-dimensional cohomology, we know that the cohomology algebra of each unordered configuration space of X is finitely generated, but can we say something stronger about its generators? More precisely, does there exist a D (depending only on X) so that the cohomology algebra of each unordered configuration space of X can be generated in degree at most D? We will answer this question in some cases.

Type: Research

Computing Gromov-Witten invariants via mirror symmetry (Room B-117)
Matei Ionita (University of Pennsylvania)
This is an expository talk aiming to give a brief working definition of Gromov-Witten invariants, and then compute the invariants in the explicit example of the quintic threefold. The method, originally due to Candelas, de la Ossa, Green and Parkes, uses mirror symmetry, a conjectural relation between pairs of Calabi-Yau threefolds (or pairs of families thereof, to be more precise). The result is an identification of a generating function for Gromov-Witten invariants with the series solution of a fourth order ODE, called the Picard-Fuchs equation.

Type: Expository

Torsion in link homology via chromatic graph cohomology (Room B-119)
Daniel Scofield (North Carolina State University)
The categorification of the chromatic polynomial by Helme-Guizon and Rong is isomorphic to Khovanov link homology over a range of homological gradings. Motivated by Hochschild homology, we compute torsion in chromatic homology for certain classes of graphs. As a consequence, we offer insight into $\mathbb{Z}_2$ torsion of certain classes of knots and links.

Type: Research

Linear representations of 3-manifold groups over rings (Room B-115)
Montek Singh Gill (University of Michigan)
The fundamental groups of compact 3-manifolds are known to be residually finite. Motivated by his solutions to Thurston's hyperbolic gluing equations over commutative rings, Feng Luo conjectured that a stronger statement is true, by allowing only finite groups of the form $PGL(2, R)$ where R is some finite commutative ring. We give an equivalent formulation of Luo's conjecture via faithful representations and provide a counterexample. We also discuss the state of the conjecture for geometric 3-manifolds, the setting in which the conjecture arose. This is joint work with Stefan Friedl and Stephan Tillmann.

Type: Research

Coffee Break
10:40 am -11:00 am

Graduate Session #2
Saturday 11:00 am - 11:30 am

Perfect Morse functions on low-dimensional orbifolds (Room B-122)
Sean Corrigan (Saint Louis University)
An equivariant Morse-Bott function on a G-manifold may be lifted to the Borel construction, and it can also descend to a Morse function on the quotient orbifold. In this way, a Morse function on an effective orbifold induces a filtration of a Borel construction, and an orbifold Morse function is *perfect* if the integral homology of the Borel construction may be immediately read from the first page of the corresponding spectral sequence. For 2-dimensional orbifolds, the differentials in this spectral sequence may be understood entirely in terms of the orbifold, and I will present a classification of all orientable 2-orbifolds which admit perfect Morse functions. For orientable 3-dimensional orbifolds whose singular sets contain no trivalent graphs, the differentials in the spectral sequence are similarly easy to compute, but any torsion in the homology of the underlying space will obstruct the existence of a perfect Morse function. On the other hand, there are 4-dimensional orbifolds with perfect Morse functions whose underlying spaces are not torsion-free.

Type: Research

Deformations of log symplectic structures on surfaces (Room B-117)
Melinda Dawn Lanius (University of Illinois at Urbana-Champaign)
A star log symplectic bi-vector on a surface has a degeneracy loci locally modeled by a finite set of lines in the plane intersecting at a point. We will discuss two ways to capture the behavior of their deformations: one 'global' and one more 'local' in flavor. From a global perspective, we classify all star log symplectic structures on compact surfaces up to symplectomorphism by some associated Lie algebroid de Rham cohomology classes. In a more local snapshot, we compute the Poisson cohomology of these structures and discuss the relationship of our classification and the second Poisson cohomology.

Type: Research

Cobordism maps in embedded contact topology (Room B-119)
Jacob Rooney (University of California, Los Angeles)
Embeded contact homology is a $\mathbb{Z}/2$-graded homology theory that has been used to prove topological results on the existence of closed Reeb orbits and embeddings of symplectic 4-manifolds. In this talk, we indicate how exact symplectic cobordisms between contact 3-manifolds induce chain maps on embedded contact homology. This is work in progress.

Type: Research

A distance for circular handle decompositions of knot complements (Room B-115)
Kevin Lamb (University of California, Davis)
For a special class of Heegaard splittings in S^3 derived from circular handle decompositions of knot exteriors, we define a notion of distance in the style of Hempel's distance. Following ideas of Hartshorn, we establish an upper bound on this "circular distance" based on the genus of an essential, closed surface in the knot exterior. Replacing the closed surface by a Seifert surface of the knot, we show that if the knot's exterior has a circular handle decomposition of sufficiently high distance, then a Seifert surface of minimal genus is unique up to isotopy.

Type: Research

Short Break
11:30 am - 11:40 am

Young Faculty Session #1
Saturday 11:40 am - 12:40 pm

Polyhedra inscribed in quadrics and their geometry. (Room B-117)
Sara Maloni (University of Virginia)
In 1832 Steiner asked for a characterization of polyhedra which can be inscribed in quadrics. In 1992 Rivin answered in the case of the sphere, using hyperbolic geometry. In this talk, I will describe the complete answer to Steiner's question, which involves the study of interesting analogues of hyperbolic geometry including anti de Sitter geometry. Time permitting, we will also discuss future directions in the study of convex hyperbolic and anti de Sitter manifolds. (This is joint work with J. Danciger and J.-M. Schlenker.)

Surgery and low-dimensional topology (Room B-122)
Tye Lidman (North Carolina State University)
Dehn surgery is a fundamental construction in three-manifold topology, which consists of removing a tubular neighborhood of a knot and regluing by a homeomorphism. We will describe various aspects of this construction while giving applications to knots, four-manifolds, and other realms of topology. Examples may include the unknotting numbers of knots, Morse functions on four-manifolds, and complex submanifolds of $\mathbb{C}^n$.

Lunch Break
12:40-2:10pm

Plenary Session #2
Saturday 2:10 pm - 3:10 pm

Relations between geometric and topological notions of ellipticity (Room B-115)
Karsten Grove (University of Notre Dame)

Hyperbolic geometry refers to geometry of spaces with constant negative curvature, or more generally to spaces with negative or even nonpositive curvature. Likewise Elliptic geometry refers to geometry of spaces with constant positive curvature, or more generally to spaces with positive or even nonnegative curvature.

In rational homotopy theory, for simplicity of simply connected finite CW complexes X, at most polynomial growth of Betti numbers of the loop space of X is equivalent to X having finite dimensional rational homotopy. In the case where X has infinite dimensional rational homotopy, the dimensions of (sums of) homotopy groups grow exponentially. For this reason such spaces are refereed to as being rationally hyperbolic, and hence those with finite dimensional rational homotopy are called rationally elliptic.

Although these concepts may look rather unrelated we will exhibit and discuss situations where there are natural links between them. This also leads to speculations about potential approaches to fundmental conjectures in geometry due to Bott, Gromov and Hopf.

Short Break
3:10 pm - 3:20 pm

Graduate Session #3
Saturday 3:20 pm - 3:50 pm

The equivalence between G-spaces and orbit presheaves, and generalizations (Room B-122)
Jonathan Rubin (University of Chicago)
I will describe a general approach for proving that the homotopy theories of G-spaces and orbit presheaves are equivalent. This framework produces formally identical arguments for Elmendorf's and Piacenza's theorems, and it clarifies the conceptual significance of commuting fixed point functors with colimits. I will discuss connections to work in progress if time permits.

Type: Expository/Research

Boundary maps for some hierarchically hyperbolic spaces (Room B-117)
Sarah Mousley (University of Illinois at Urbana-Champaign)
There are natural embeddings of right-angled Artin groups G into the mapping class group $Mod(S)$ of a surface S. The groups G and $Mod(S)$ can each be equipped with a geometric structure called a hierarchically hyperbolic space (HHS) structure, and there is a notion of a boundary for such spaces. In this talk, we will answer the following question: does every embedding $\phi : G \to Mod(S)$ extend continuously to a boundary map $\partial G \to \partial Mod(S)$? That is, given two sequences (g_n) and (h_n) in G that limit to the same point in ∂G, do $(\phi(g_n))$ and $(\phi(h_n))$ limit to the same point in $\partial Mod(S)$? No background in HHS structures is needed and the above groups will be defined.

Type: Research

Derived geometry in nature (Room B-119)
Surya Raghavendran (Perimeter Institute)
The BV-BRST formalism in perturbative quantum field theory provides a homological implementation of path integral quantization in settings where various symmetries may be present. This is accomplished by presenting the reduced phase space in a way that is well-suited to doing perturbation theory, ie, as a formal derived stack with some additional structure. This talk will discuss the derived direction of this construction via a finite dimensional toy model, emphasizing operadic structures present on observables. No prior physics background will be assumed.

Type: Expository

Higher order corks (Room B-115)
Hannah Schwartz (Bryn Mawr College)
Examples of topological 4-manifolds with distinct smooth structures abound, but characterizations of the full set of smooth structures on a given 4-manifold remain elusive. It was proved by Curtis-Freedman-Hsiang-Stong and Matveyev that any two homeomorphic, closed, simply-connected smooth 4-manifolds are related by removing and regluing a single compact contractible submanifold, called a cork. This talk will present joint work with Paul Melvin that generalizes this result to any finite list of homeomorphic, closed, simply-connected, smooth 4-manifolds.

Type: Research

Coffee Break
3:50 pm - 4:10 pm

Young Faculty Session #2
Saturday 4:10 pm - 5:10 pm

Weitzenböck Formulae and Sectional Curvature (Room B-117)
Renato Bettiol (University of Pennsylvania)
Classical geometric applications of Weitzenböck formulae establish that manifolds with positive Ricci curvature have vanishing first Betti number, while manifolds with negative Ricci curvature have no nontrivial Killing vector fields. In this talk, I will describe a framework to produce more general Weitzenböck formulae due to Hitchin, and derive two geometric applications that regard sectional curvature. The first implies a certain geometric restriction on 4-manifolds with positive sectional curvature and indefinite intersection form; the second provides a characterization of nonnegative sectional curvature in terms of Weitzenböck formulae for symmetric tensors. This is joint work with R. Mendes (WWU Münster).

The shape of data (Room B-122)
Jose Perea (Michigan State University)
Topology, and particularly algebraic topology, has been used for decades to study the shape of mathematical objects — from surfaces to categories and spaces of functions. Recently some of these same ideas have been adapted to the study of data. I will show in this talk how one can use algebraic topology to probe the shape of data, and provide several examples of how this applies to real world problems.

SUNDAY

Coffee & Bagels
Wells Hall B-122
8:00 am - 9:00am

Plenary Session #3
Sunday 9:00 am - 10:00 am

A generalization of Quillen-Sullivan rational homotopy theory (Room B-115)
Mark Behrens (University of Notre Dame)

Quillen-Sullivan theory encodes a rational homotopy type in either a differential graded rational Lie algebra, or a differential graded rational commutative algebra. The first encodes the rational homotopy groups, with its Whitehead products, and the second encodes the rational cohomology groups, with its cup products. I will describe a generalization of this theory, joint with Charles Rezk, where "rational homotopy theory" is replaced with "unstable v_n-periodic homotopy theory".

Short Break
10:00 am - 10:10 am

Graduate Session # 4
Sunday 10:10 am - 10:40 am

Connections between connective K-theory and number theory (Room B-122)
Michael Keogh (Wayne State University)
Computations of complex connective K-theory of certain metacyclic groups by Bruner and Greenlees have shown a link between Euler classes of connective K-theory and cyclotomic units in corresponding field extensions. We will discuss this general relationship and some specific computations of particular interest.

Type: Expository/Research

Mapping tori and stable pairs (Room B-117)
Andrew Lee (University of Texas at Austin)
In this talk we use a construction of a moduli space of stable pairs over a Riemann surface to produce a Floer-theoretic invariant of a mapping torus for a surface diffeomorphism (together with a choice of line bundle on it). We then describe some consequences and how this construction relates to other 3-manifold invariants. This is joint work with Tim Perutz.

Type: Research

Knot Traces and Concordance (Room B-119)
Lisa Piccirillo (University of Texas at Austin)

In this talk I will introduce a new method for constructing many pairs of distinct knots K_0 and K_1 such that the two 4-manifolds obtained by attaching a 2-handle to B^4 along K_i with framing zero are diffeomorphic. Recall that a pair of knots are said to be (smoothly) concordant if they cobound a smooth properly embedded annulus in $S^3 \times I$, and that the set of knots up to concordance, with the operation connected sum, forms a very interesting group. In recent work with Allison Miller we use the d-invariants of Heegaard Floer homology to obstruct the concordance of some of these K_0 and K_1, thereby disproving a conjecture of Abe. As a consequence we obtain interesting bijective maps on the smooth concordance group via the satellite construction. I will focus on the constructive aspects of this work; in particular no background in Heegaard Floer homology will be assumed and this talk should be broadly accessible.

Type: Research

Local and global minimum of renormalized volume (Room B-115)
Franco Vargas Pallets (University of California, Berkeley)
The renormalized volume V_R is a finite quantity associated to geometrically finite hyperbolic 3-manifolds of infinite volume. In this talk I'll discuss its definition and some properties for acylindrical manifolds, namely local convexity and convergence under geometric limits.

Type: Research

Coffee Break
10:40 am -11:00 am

Graduate Session #5 Sunday 11 am - 11:30 am

On an integral analog of Quillen's rational homotopy theorem (Room B-122)
Jacobson R. Blomquist (Ohio State University)
In this talk I will outline how we resolved that integral chains gives rise to a derived equivalence between spaces and coalgebra complexes over the associated integral homology comonad, after restricting to 1-connected objects. If time permits, I will also describe how we recently resolved that iterated suspension satisfies homotopical descent on objects and morphisms. This is joint work with J.E. Harper.

Type: Research

Tropicalizing Spherical Embeddings (Room B-117)
Evan Nash (Ohio State University)
In tropical geometry, one associates a variety in an algebraic torus with its tropicalization, a piecewise linear object in a real vector space. This leads naturally to the notion of tropicalization of toric varieties, which is tied closely to the well-known combinatorial structure of toric varieties. We give a brief outline of how this theory can be extended to spherical homogeneous spaces and their embeddings, which are generalizations of toric varieties that have similar combinatorial structure.

Type: Research

Non-prime 3-manifolds with open book genus 2 (Room B-119)
Mustafa Cengiz (Boston College)

An open book decomposition of a 3-manifold M induces a Heegaard splitting for M. The *open book genus* of M is the minimum genus among all Heegaard splittings of M induced by open book decompositions. While the Heegaard genus is additive under the connected sum of 3-manifolds, it is not known whether the open book genus is additive or not. In this talk, I will prove that (1) a 3-manifold M has open book genus 1 if and only if $M \cong L(p,1)$ for some $p \neq \pm 1$, and (2) a non-prime 3-manifold M has open book genus 2 if and only if $M \cong L(p,1)\#L(q,1)$ for some $p, q \neq \pm 1$. This, in particular, implies that there is no counter-example to additivity of the open book genus such that the connected sum has open book genus 2. I will prove the result using double branched covers and the theory of Seifert fibered spaces.

Type: Research

2-knots in the 4-sphere (Room B-115)
Maggie Miller (Princeton University)
We will understand banded link diagrams of 2-dimensional knots and an analogue of Reidemeister moves (proof due to Swenton) in this dimension. We will compare the theory of 2-dimensional knots to that of classical (1-dimensional) knots and discuss some open topological problems involving the complement of a 2-knot in the 4-sphere. Depending on time, I may discuss my progress in extending Yoshikawa's enumeration of 2-dimensional knots.

Type: Expository/Research

Short Break
11:30 am -11:40 am

Young Faculty Session #3
Sunday 11:40 am -12:40 pm

Towers of regular self-covers and linear endomorphisms of tori (Room B-117)
Wouter Van Limbeek (University of Michigan)
Let M be a closed manifold that admits a nontrivial cover diffeomorphic to itself. What can we then say about M? Examples are provided by tori, in which case the covering is homotopic to a linear endomorphism. Under the assumption that all iterates of the covering of M are regular, we show that any self-cover is is induced by a linear endomorphism of a torus on a quotient of the fundamental group. Under further hypotheses we show that a finite cover of M is a principal torus bundle. We use this to give an application to holomorphic self-covers of Kaehler manifolds.

Knot concordance and Heegaard Floer homology (Room B-122)
Adam Levine (Princeton University)
Knot concordance concerns the classification of which knots in the 3-sphere bound embedded disks in the 4-ball, along with various generalizations for other 3- and 4-manifolds, and offers an important window on the perplexing differences between topological and smooth 4-manifold theory. I will review the history of this subject, beginning with classical techniques and proceeding to more recent results that rely on the alphabet soup of concordance invariants derived from Heegaard Floer homology. As an application of these tools, I will discuss my recent work (joint with Jen Hom and Tye Lidman) concerning non-locally-flat PL concordance of knots in homology spheres.

Pizza Break
12:40 pm -1:00 pm

Graduate Session #6
Sunday 1:00 pm -1:30 pm

Torsion in Khovanov homology (Room B-122)
Sujoy Mukherjee (The George Washington University)
Khovanov homology, an invariant of knots (or links), is a generalization of the Jones polynomial. $\mathbb{Z}_2$ torsion in the Khovanov homology of links is very common. A finite number of examples of knots with non-$\mathbb{Z}_2$ torsion were also known earlier. In this presentation, I will discuss some infinite families of knots and links with non-$\mathbb{Z}_2$ torsion. In particular, I will also discuss counter-examples to parts of the PS braid conjecture.

Type: Research

Constructions of Complex Surfaces on the Bogomolov-Miyaoka-Yau Line (Room B-117)
Sumeyra Sakalli (University of Minnesota)
We will construct complex ball quotients by using the line arrangements in the complex projective plane, CP^2, and Galois coverings. If time permits we will also provide exotic simply connected, irreducible, symplectic 4-manifolds with nonnegative signatures by using these complex surfaces. This is a joint work with Anar Akhmedov.

Type: Research

Non-orientable surfaces bounded by knots (Room B-119)
Samantha Allen (Indiana University Bloomington)
In this talk, I will present some of the current methods for bounding the non-orientable genus of a knot involving the Euler number and an interplay between classical knot invariants and the recently defined Upsilon invariant arising from Heegaard Floer theory. The presentation will include definitions and basic examples. To conclude, I will explain how another Heegaard Floer invariant, the d-invariant, can provide finer details about the set of non-orientable surfaces which can be bounded by a given knot.

Type: Research

Log-Canonical Poisson Brackets (Room B-115)
Nick Ovenhouse (Michigan State University)
The theorems of Darboux and Weinstein give so-called "canonical" local coordinates on a symplectic or Poisson manifold in which the Poisson brackets of all coordinate functions are constants. In joint work with John Machacek, we study Poisson varieties (the algebraic geometry analog), and whether an analogous statement is true in this other category. In particular, we study affine space with a so-called "log-canonical" Poisson structure, where the brackets of two coordinate functions are given by simple homogeneous quadratic expressions. We prove that for such brackets, there is no change of coordinates (allowing only rational functions) in which the Poisson brackets become constant or linear expressions in the new coordinates. Thus log-canonical coordinates are in some sense the "simplest" coordinates to work in, in this case.

Type: Research

Short Break
1:30 pm -1:40 pm

Graduate Session #7
Sunday 1:40 pm - 2:10 pm

Hierarchies of non-positively curved cube complexes (Room B-122)

Teddy Einstein (Cornell University)

Wise's malnormal special quotient theorem (MSQT) is a key ingredient in Agol's proof of the Virtual Haken Conjecture. The most important step in proving the MSQT is the construction of a hierarchy for hyperbolic compact special non-positively curved cube complexes. In this talk, I will explain what a hierarchy of a compact special non-positively curved cube complex is and discuss how to generalize Agol, Manning and Groves' proof of the MSQT to the relatively hyperbolic setting.

Type: Research

Solving Nahm's equations by method of spectral curve (Room B-117)

Jason Quinones (University of Arizona)

The Nahm equations are a system of nonlinear differential equations whose solutions are of interest to physicists as they give rise to $SU(2)$ monopoles. Nahm's equations turn out to be equivalent to a Lax pair and this gives us an associated spectral curve. I discuss the familiar method of using sections of line bundles over this spectral curve to yield solutions to Nahm's equations and present some current challenges with this method.

Type: Expository

Immersed Lagrangian fillings of Legendrian knots (Room B-119)

Samantha Pezzimenti (Bryn Mawr College)

The Poincaré polynomial associated to certain Legendrian knots with generating families provides an obstruction to the existence of embedded Lagrangian fillings. As a consequence of the Seidel isomorphism, if the polynomial is not of the form $t + 2g$, the Legendrian cannot have an embedded Lagrangian filling. However, the existence of an immersed Lagrangian filling is not obstructed. We will investigate how this polynomial gives us information about the minimal number of double points and genus of an immersed filling.

Type: Research

Manifolds of higher rank (Room B-115)

Samuel Lin (Michigan State University)

Fixing $K = -1, 0$, or 1, a complete Riemannian manifold is said to have higher hyperbolic, Euclidean, or spherical rank if every geodesic admits a parallel field making curvature K with the geodesic. Locally symmetric spaces provide examples. Rank rigidity theorems aim to show that these are the only examples of manifolds of higher rank. After giving an overview of historic results, I will specialize in manifolds of higher hyperbolic rank, and give constructions of infinite volume, non-homogeneous manifolds of higher rank. These examples show the necessity of finite volume assumption in hyperbolic rank rigidity results.

Type: Research

Thanks for coming!