GSTGC 2025 BIG BOOK OF ABSTRACTS

TACOS OF GSTGC '25

1. Plenary Talks

Applications of smoothing theory to 4-manifolds.
☙ *Mark Powell* *in*

Smoothing theory translates the question of how many smooth or PL structures a high-dimensional manifold admits into algebraic topology. While it does not apply verbatim in dimension four, the high dimensional theory makes partial predictions about smoothings of 4-manifolds. I will discuss when these predictions come true, and some of the resulting exotic phenomena. Based on joint work with Daher, Kasprowski, Orson, and Randal-Williams.

Want to compute C_2-equivariantly? Get real!
☙ *Bert Guillou* *in*

The homotopy theory of group actions, also known as equivariant homotopy theory, has seen a tremendous growth in interest in recent years. Even for the smallest nontrivial group, C_2, there is still plenty we don't know. I will discuss how harnessing motivic homotopy theory over the real numbers has led to recent advances in C_2-equivariant homotopy theory.

Special points in the Mandelbrot set.
☙ *Sarah Koch* *in*

The Mandelbrot set lives in the space of all quadratic polynomials. It has been extensively studied for decades. In this talk, we explore the Mandelbrot set and highlight some special algebraic points inside.

2. Early Career Talks

Unoriented 2-dimensional TQFTs and the category $\mathrm{Rep}(S_t)$. ☙ *Augustina Czenky* *in*

A classical result in quantum topology is that oriented 2-dimensional topological quantum field theories (2-TQFTs) are fully classified by commutative Frobenius algebras. Moreover, it is possible to recover from it the Deligne category $\mathrm{Rep}(S_t)$, which interpolates the category of finite-dimensional representations of the symmetric group S_n from n a positive integer to any parameter t in k. In 2006, Turaev and Turner introduced extended Frobenius algebras, which are commutative Frobenius algebras with additional structure, to classify unoriented 2-TQFTs. In this talk, we will explore the relation between (extended) Frobenius algebras and (unoriented) TQFTs, and show that in the unoriented case we can recover the generalized Deligne category $\mathrm{Rep}(S_t \wr \mathbb{Z}_2)$, which interpolates the category of finite-dimensional representations of the wreath product $S_t \wr \mathbb{Z}_2$.

Seifert surfaces in 4D. ☙ *Maggie Miller* *in*

A classical fact is that any two smooth disks with the same boundary in S^3 are isotopic rel. boundary. Many more complicated Seifert surfaces bounded by more interesting knots become isotopic once you push their interiors into the 4-ball. However, it turns out that not all such surfaces become isotopic in B^4. Surprisingly, any two genus-g Seifert surfaces bounded by an alternating knot become isotopic once you push their interiors into the 4-ball. It remains unknown which other knots have this property, or in general how one might count different Seifert surfaces up to isotopy in 4D. In this talk, we'll talk about classical constructions of Seifert surfaces, how to produce isotopies, and how to obstruct them.

Cut and paste invariants of manifolds and relations to cobordism. ↝ *Carmen Rovi* *in*

The classical problem of scissor's congruence asks whether two polytopes can be obtained from one another through a process of cutting and pasting. In the 1970s this question was posed instead for smooth manifolds: which manifolds M and N can be related to one another by cutting M into pieces and gluing them back together to get N? In recent work with Renee Hoekzema, Mona Merling, Laura Murray, and Julia Semikina, we upgraded the group of cut-and-paste invariants of manifolds with boundary to an algebraic K-theory spectrum and lifted the Euler characteristic to a map of spectra. I will discuss how cut-and-paste invariants relate to cobordism of manifolds and how the novel construction categorifies these invariants. I will also discuss new results on the categorification of cobordism cut-and-paste invariants: the group of invariants preserved by both cobordism and cut-and-paste equivalence.

Torus links and colored Heegaard Floer homology. ↝ *Beibei Lui* *in*

Link Floer homology is a filtered version of the Heegaard Floer homology defined for links in 3-manifolds. In this talk, we will introduce an algorithm to compute the link Floer homology of algebraic links from its Alexander polynomials. In particular, we give explicit descriptions of link Floer homology of torus link $T(n, mn)$. As an application, we compute the limit of the link Floer homology when m goes to infinity, using certain cobordism maps, which can be used to define colored link Floer homology. This talk includes joint work with Borodzik, Zemke, and with Alishahi, Gorsky.

Cohomology operations: classical foundations and modern applications. ↝ *Anibal M. Medina Mardones* *in*

Cohomology operations endow cohomology with additional algebraic structure, enabling the detection of topological features invisible to ordinary cohomology. In this talk, we will revisit classical results on Steenrod operations from an effective, computational perspective and develop their analogs in persistent cohomology. As we will see, this extension unlocks applications of these fundamental homotopy invariants in data science and metric geometry.

Curve graphs and variants: marrying topology and combinatorics using algebra. ↝ *Roberta Shapiro* *in*

Curve graphs of a surface are graphs that encode topological data about a surface and have been used to study many groups associated with surfaces. One such group is the mapping class group of a surface, which describes the symmetries of a surface. In this talk, we will establish connections between topology and combinatorics by studying Ivanov's famed theorem: the automorphism group of the curve graph is naturally isomorphic to the (extended) mapping class group. We will then state Ivanov's metaconjecture on automorphism groups of curve graphs and explore recent developments in that direction.

3. Student Talks

Below the student talks are listed Alphabetical by Title. If you would like to see the schedule with titles, see the talk-schedule

A family index theorem for end-periodic manifolds.
↝ *Alex Taylor (University of Illinois Urbana-Champaign)* *Sunday, 11:20 AM in Swain West 221*
The Atiyah-Patodi-Singer (APS) index theorem gives a topological formula for the Fredholm index of a Dirac operator on a compact manifold with boundary. In 2016 Mrowka-Ruberman-Saveliev (MRS) extended the theorem to end-periodic (asymptotically periodic) manifolds. On the other hand, there is a stronger version of the APS index theorem for families of Dirac operators associated to asymptotically cylindrical metrics which was carried out by Bismut-Cheeger and then further developed by Melrose-Piazza. This story leads to the question of strengthening the MRS index theorem using families of Dirac operators. I will address this question and present a new family index theorem for end-periodic manifolds.

An Equivariant Laudenbach-Poénaru Theorem.
☙ *Evan Scott (CUNY Graduate Center)* *Saturday, 11:30 AM in Swain West 219*

The classic Laudenbach-Poénaru Theorem regarding 4-dimensional 1-handlebodies, proved in 1972, is foundational for modern 4-dimensional smooth topology, driving well-known diagrammatic approaches like Kirby calculus and Trisection diagrams. This theorem has an oblique statement, whose most commonly known consequence is that the 3- and 4-handles in a handle decomposition of a closed 4-manifold are uniquely determined by the 0-, 1-, and 2-handles. Jeffrey Meier and I prove an equivariant version of this theorem, i.e. a version which accounts for finite group actions. This talk will recap the classical theorem, overview what adaptations need to be made for the equivariant case, and give a brief idea of the proof.

An Extension of the Kuperberg Invariant for Three-Manifolds from Involutory Hopf Algebras.
☙ *Nicolas Bridges (Purdue University)* *4:30 PM in Swain West 219*

We introduce an invariant of a pair (M, L) consisting of a closed connected oriented three-manifold and a framed oriented link embedded in M, which is a generalization of both the Kuperberg invariant and the Hennings-Kauffman-Radford (HKR) invariant. The invariant has as input the data of an involutory Hopf algebra and a collection of representations of the Drinfeld double. More precisely, we show that if L is the empty link, then the invariant is equivalent to the Kuperberg invariant for the manifold M, and if M is the 3-sphere and the representations are the left regular representations, then the invariant is equivalent to the HKR invariant. We also show that the invariant of (M, L) is equal to that of the 3-manifold obtained by surgery on L. This provides a new proof to a conjecture/theorem relating the Kuperberg invariant and the HKR invariant in the involutory case.

An Instanton Invariant for Knots in $\mathbb{R}P^3$.
☙ *Ivan So (Michigan State University)* *in*

In 2023, Manolescu-Willis showed there exists a Lee deformation for Khovanov homology for knots in $\mathbb{R}P^3$. The rank of the Lee deformation also behaves nicely as in the S^3 case. As a consequence, they were able to define a Rasmussen type s-invariant for knots over $\mathbb{R}P^3$. In this talk, we will present an analogous construction in the setting of instanton Floer homology, namely, we show that an $\mathbb{R}P^3$ knot invariant can be constructed in a way similar to that of $s^\#$ over S^3 by Kronheimer-Mrowka. We will also present some known properties of this invariant.

Bridge Number, Meridional Rank, and Fishnet Links.
☙ *Ella Pfaff (University of Notre Dame)* *in*

It has been conjectured that the bridge number of a link $L \subset S^3$ is equal to its meridional rank, i.e. the minimum number of link meridians needed to generate $\pi_1(S^3 \backslash L)$. Various infinite families of links are known to satisfy this equality. In this talk, I will define a new family for which the conjecture holds, called fishnet links. I will discuss their properties, and use fishnets to prove that adding an unknot to any link equates the bridge number and meridional rank of the resulting union. Joint with Blair and Kjuchukova.

Connected components of spaces of type-preserving representations.
☙ *Inyoung Ryu (Texas A&M University)* *in*

We investigate the spaces of representations of surface groups into $\mathrm{PSL}(2, \mathbb{R})$. For a closed surface, by the classic result of Goldman, the Euler class together with the Milnor-Wood inequality provide a complete classification of the connected components of the spaces of the representations. However, describing the connected components becomes more subtle when considering the space of type-preserving representations for punctured surfaces. In this talk, I will present a recent joint work with Tian Yang that addresses this problem.

Convex cocompactness of pseudo-Anosov subgroups of surface group extensions.

☙ *Junmo Ryang (Rice University)* *in*

When Farb and Mosher first defined convex cocompactness for subgroups of mapping class groups, they immediately noted that convex cocompact subgroups must be purely pseudo-Anosov. On the other hand, the converse statement proved to be a very difficult question: are all finitely generated, purely pseudo-Anosov subgroups convex cocompact? Although the question still remains open, there are a number of partial results which answer "yes" in some particular settings. In this talk, we explore a family of such results that answer this question for subgroups of certain surface group extensions built via the Birman exact sequence. We feature work of Kent-Leininger-Schleimer and Leininger-Russell, recent work extending their results, and potential directions of future work.

Covering moves for 3-manifolds.

☙ *Aru Mukherjea (University of Texas at Austin)* *in*

Every closed oriented 3-manifold is a 3-fold irregular branched cover of the 3-sphere, with branch locus a link. In the 1990s, Piergallini provided a set of moves relating any two links appearing as the branch locus of the same 3-manifold, later refining this set to two local tangle replacements. I will present this theorem, more recent extensions to higher degree branched coverings, and applications to 4-manifold topology.

Curvatures and macroscopic dimensions of symmetric products of Riemann surfaces.

☙ *Ekansh Jauhari (University of Florida)* *in*

Given a Riemann surface M_g of genus g, let $SP^n(M_g)$ denote its n-th symmetric product, which is the orbit space of the action of the symmetric group S_n on the product space $(M_g)^n$. We begin this talk by studying the existence (and non-existence) of metrics of non-negative Ricci curvature and positive scalar curvature on $SP^n(M_g)$ for various values of n and g. Then, by determining the spin of the manifolds $SP^n(M_g)$ and their universal coverings for all n and g, we estimate the macroscopic dimensions (in the sense of Gromov and Dranishnikov) of $SP^n(M_g)$ in several cases. Our computations produce infinitely many new counterexamples to Gromov's "rational inessentiality conjecture" in each dimension greater than 3. We also obtain infinitely many new examples in each dimension greater than 3 for which Gromov's and Dranishnikov's macroscopic dimensions do not agree. (Based on joint work with Luca Di Cerbo and Alexander Dranishnikov).

Equivariant Dyer-Lashof Operations.

☙ *Alex Waugh (University of Washington)* *in*

In 1956, Kudo and Araki developed operations analogous to Steenrod operations which act on the mod 2 homology of infinite loop spaces. They used these operations to give a complete description of the mod 2 homology of the qth loop space of the n-sphere whenever $q < n$. Browder, in his thesis, described the mod 2 homology of the free nth loop space of a connected space. Dyer and Lashof later constructed odd primary analogs of these operations and provided many analogous computations for iterated loop spaces. In this talk, we recall a geometric construction of these classical operations and provide an equivariant generalization for all finite groups and primes. We will then discuss how one can construct two infinite families of nonzero equivariant operations and, time permitting, discuss current progress for how one might use these to compute the Bredon cohomology of equivariant iterated loop spaces of G-connected spaces.

Equivariantly Knotted Spheres.

☙ *Malcolm Gabbard (Kansas State University)* *in*

When studying surfaces in 4-manifolds one form of equivalence you can study is equivalence up to smooth isotopy. When you have two non-isotopic surfaces you can ask how far away these surfaces are from being isotopic, and one measure of this distance you can use is stabilization distance. In this talk we will briefly review these notions and then define extensions of them to the symmetric setting. In this new setting we will show that there exist interesting symmetric 2-spheres in S^4 which are isotopic to the standard unknotted 2-sphere, however are distinct up to equivariant isotopy.

Failure of TQFTs to distinguish simply-connected 6-manifolds.

Katherine Novey (University of Notre Dame) *in*

Work by David Reutter and Chris Schommer-Pries has shown that ordinary Topological Quantum Field Theories (TQFTs) can distinguish stable diffeomorphism classes of closed, connected, even-dimensional manifolds subject to certain finiteness conditions. In particular, simply connected closed 6-manifolds with finite π_2 are diffeomorphic if and only if they cannot be distinguished by ordinary TQFTs, and it was conjectured that this result holds for all closed, simply connected 6-manifolds. We will present a pair of non-diffeomorphic closed, simply connected 6-manifolds with infinite π_2 that are indistinguishable by ordinary TQFTs, disproving the conjecture.

Frattini subgroups of hyperbolic-like groups.

Ekaterina Rybak (Vanderbilt University) *in*

The Frattini subgroup of a group G is the intersection of all maximal subgroups of G; if G has no maximal subgroups, its Frattini subgroup is G itself. Frattini subgroups of groups with "hyperbolic-like" geometry are often small in a suitable sense. Generalizing several known results, we prove that for any countable group G admitting a general type action on a hyperbolic space S, the induced action of the Frattini subgroup of G on S has bounded orbits. In contrast, we show that the Frattini subgroup of an infinite lacunary hyperbolic group can have finite index. As an application, we obtain the first examples of invariably generated, infinite, lacunary hyperbolic groups. The talk is based on a joint work with Gil Goffer and Denis Osin.

Geometric Crystallinity.

Kai Shaikh (University of Toronto) *in*

I will introduce the recent work of Hahn, Levy, and Senger demonstrating crystallinity phenomena exhibited by various invariants approximating algebraic K theory—in particular, I will sketch the stacky perspective on prismatic cohomology and related invariants as pioneered by Drinfeld and Bhatt-Lurie. I will then sketch what an analogue of their crystallinity results for higher height ring spectra might look like, and mention motivation from motivic cohomology.

Gromov Boundary of the Grand Arc Graph.

Arya Vadnere (University at Buffalo, SUNY) *in*

In 1999, E. Klarreich found a very intriguing correspondence between the Gromov boundary of the curve graph for closed surfaces (a very GGT object) with the space of ending laminations on the surface (a very geometric object). Since then, Hamendstadt, Schleimer and Pho-On have thought about various different proofs for this result, and generalizations to the arc graph / the arc-and-curve graph for finite-type surfaces. The grand arc graph is a type of arc graph associated with certain infinite-type surfaces, which is also an infinite-diameter hyperbolic graph. In this talk, we shall talk about ways to define laminations for infinite-type surfaces "that should correspond to points at infinity in the Grand arc graph"".

Heat Kernel Deformation of the 3D Seiberg-Witten Equation.

Claudia Yao (Harvard University) *in*

We introduce a 1-parameter family of equations that deforms the 3D Seiberg-Witten equation. The deformation is achieved through the heat kernel, with time serving as the deforming parameter. In the large-time limit, the equation reduces to the Seiberg-Witten equation, up to a small perturbation.The small-time behavior of the equation is quasilinear and involves the curvature of a $U(1)$ connection. We expect that the count of solutions remains invariant across all values of time, leading to a 1-dimensional cobordism between the Seiberg-Witten solutions and the solutions at time zero. However, the situation may be more complex. In this talk, we will present preliminary results on the moduli space of solutions to this 1-parameter family of equations. This work is ongoing.

Intro to Khovanov Homology.

☙ *Susan Rutter (CUNY Graduate Center)* *in*

Are you a graduate student considering learning about Khovanov homology? Come to this talk for a short introduction to the field. We will mostly cover the definitions and key theorems that make it a useful theory, but will touch on current research and directions, including the questions I am thinking about.

Khovanov homology's distinguished gift to contact geometry.

☙ *Ipsa Bezbarua (CUNY Graduate Center)* *in*

In 2006, Olga Plamenevskaya introduced a new invariant for transverse knots using Khovanov homology. In contrast to what most contemporary researchers were doing, she showed that picking a "distinguished" element from one of the Khovanov homology groups also yields a wealth of information about the knot under study. In this talk, we first undertake a crash course on the general contact structure on $\mathbb{R}^3$, transverse knots and their classical invariants. Then, we will define the distinguished element and look at some of its properties and its invariance. Time permitting, we will also see how it relates the self-linking number of a transverse knot to the Rasmussen s-invariant.

Kaplansky's Conjectures: Geometry and Topology.

☙ *Manisha Garg (University of Illinois Urbana-Champaign)* *in*

In 1956-1957 Kaplansky presented a list of several questions about group rings $F[G]$, where F is a field and G is a group. Two of those questions are concerned with whether there are nontrivial units and zero-divisors in a torsion-free group ring. In 2021, G. Gardam found the first example of nontrivial units in a group ring over a virtually abelian group and a field of order 2.

Khovanov and $\mathrm{sl}(3)$ **homology and equivariant knots.**

☙ *Max Throm (Michigan State University)* *in*

An equivariant knot (resp., equivariant link) is a knot that has a finite order group action preserving the knot (link). From this group action, one can define a compatible group action on the Khovanov homology of the knot. This gives rank inequalities on the odd and even Khovanov homologies for the knot [arXiv:1810.04769v2]. We hope to generalize this for the $\mathrm{sl}(3)$ link homology.

Knot Floer Homology and the Borromean Knot.

☙ *Rithwik Bushel Vidyarthi (Michigan State University)* *in*

Mapping class groups of surfaces are interesting objects to study. One way to study them is to form the mapping torus, which is a three-manifold. For surfaces with a single boundary, this naturally gives rise to a 3-manifold along with a knot inside it, and we can assign it the Knot Floer complex. A natural question to ask is when is this injective? When the monodromy is the Identity, it is in fact injective, and this corresponds to the Borromean knot. We will try to answer this question when the monodromy is a boundary Dehn twist.

Limits of almost homogeneous spaces and their fundamental groups.

☙ *Logan Richard (Oregon State University)* *in*

A sequence of proper geodesic spaces, X_n, is said to consist of "almost homogeneous spaces" if there is a sequence of discrete groups of isometries $G_n \leq \mathrm{Iso}(X_n)$ with the diameters of the quotients X_n/G_n approaching 0. I will present a theorem of my advisor, Sergio Zamora, stating that, if a sequence (X_n, p_n) of pointed almost homogeneous spaces converges in the pointed Gromov-Hausdorff sense to a space (X,p), then X is a nilpotent locally compact group equipped with an invariant geodesic metric. If time is permitting, I will discuss work toward proving a conjecture, which would state that a sequence of pointed, simply connected, almost homogeneous spaces converges to a simply connected space.

Link Floer Stable Homotopy Types.
☙ *Yan Tao (UCLA)* *in*

Manolescu and Sarkar constructed a stable homotopy type for the hat version of link Floer homology using the Cohen-Jones-Segal construction. We show a modified version of the Manolescu-Sarkar construction by the author which is friendlier for extending the construction to the minus version of link Floer homology as well as for computing certain invariants. We then show any such computations that turn out to be interesting knot invariants, including a Steenrod square.

Mac Lane Q-construction for exact $\infty-$categories.
☙ *Arash Karimi (Florida State University)* *in*

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Multiplicative spectral sequences in Homotopy Type Theory.
☙ *Arseniy Kryazhev (UCSD)* *in*

Homotopy Type Theory provides a natural framework for what can be called "synthetic homotopy theory". In synthetic homotopy theory, we do everything homotopy-invariantly; for example, we can define cohomology as maps into an Eilenberg–MacLane space, but not via singular cochains, because any singular simplex is, homotopically speaking, just a point. A natural quest is then to reproduce classic algebraic topology "synthetically". Indeed, doing so sheds new light on known constructions, generalizes them to an arbitrary infinity-topos, often simplifies them, and makes them formalizable in a computer proof assistant. Moreover, this could hypothetically allow for purely computational derivations of new results. The talk will present some developments in this endeavor: we can get at least as far as multiplicative Serre spectral sequence using exclusively homotopical tools!

On the K-theory of Tambara Fields.
☙ *Noah Wisdom (Northwestern University)* *in*

Tambara functors arise in equivariant homotopy theory as the homotopy groups of a G-$\mathbb{E}_\infty$ ring spectrum. Recently, many authors have taken the perspective that Tambara functors are robust equivariant analogues of commutative rings, and have begun a program of porting over results from commutative algebra to this so-called "equivariant algebra". We study the algebraic K-theory of Tambara functors, and strengthen a particular case of our computations by showing that every finitely generated projective module over a field-like C_{p^n}-Tambara functor is free. (Joint with David Chan)

Parametrizing Contact Diffeomorphisms.
☙ *George A Kevrekidis (Johns Hopkins University)* *in*

The study of contact geometry, the odd-dimensional analogue of symplectic geometry, is an important sub-field of Differential Geometry that has attracted significant interest from both theoretical and applied perspectives. It is central in our understanding of dissipative systems and lies at the heart of differential equivalence problems, but can be used as a theoretical framework in many other fields as well, such as optimization theory or thermodynamics; This is also suggested by the recent (over the past 5 years) surge of publications in the area. In this presentation, we consider the possibility of parametrizing contact flows, i.e. one-parameter families of contact diffeomorphisms, by composing exact contact maps with prolonged diffeomorphisms of the first jet space. This arises as a natural extension of pre-existing work for symplectic systems. This approach has advantages from an applied perspective (e.g. producing contact integrators amenable to back-propagation) but also has interesting theoretical aspects, in particular whether the approach could be universal. We further discuss with several computational examples (LA-UR-25-20222).

Persistent and combinatorial Laplacians for topological data analysis and their introduction to knot theory.
☙ *Benjamin Jones (Michigan State University)* *in*

Combinatorial Dirac and Laplacian operators, along with their persistent versions, have recently been used as a powerful tool in topological data analysis (TDA) for studying simplicial complexes. The key property of these operators is that the kernel is isomorphic to the corresponding homology theory, and the nontrivial part of the operator encodes more, usually geometric, information. I will introduce these operators and recent work on them, including advances in computation, applications to drug design with machine learning, and computational usage of knot theory via Khovanov homology.

Realization problems for groups of surface complements in 4-manifolds.
☙ *Remy Bohm (University of Texas at Ausin)* *in*

The question, "Which groups arise as the fundamental groups of n-sphere complements in the $(n+2)$-sphere?" has been answered, in varying ways, for all n. However, all characterizations for n=2 remain quite difficult to check, and simpler sufficient and necessary conditions remain elusive. In this talk, we aim to look at the various strategies for realizing large classes of groups as surface complement groups, aiming to either minimize the genus of the surface or the topology of the ambient manifold, and discussing when both are possible.

Singular Instantons & signs in Khovanov Homology.
☙ *Alex Epelde (Harvard University)* *in*

In the definition of the skein lasagna module of a 4-manifold X, it is essential that the starting TQFT be *fully functorial* for link cobordisms in S^3. I will discuss ongoing work to resolve existing sign ambiguities in Kronheimer and Mrowka's spectral sequence from Khovanov homology to singular instanton link homology. The goal is to obtain a theory that is fully functorial for link cobordisms in S^3, where the E_2 page carries a canonical isomorphism to Khovanov-Rozansky $\mathfrak{gl}_2$ link homology. Possible applications include non-vanishing theorems for 4-manifold Khovanov skein lasagna modules à la Ren-Willis.

Symplectic annular Khovanov homology for symmetric knots.
☙ *Sriram Raghunath (Rutgers University New Brunswick)* *in*

When a knot diagram is symmetric, it induces an action on the Khovanov chain complex of the knot. We can analyze the equivariant cohomology of the chain complex with this action to understand relationships between the Khovanov homology of the original knot and the Khovanov homology of the quotient knot. Stoffregen and Zhang have studied the extension of this action to the Khovanov homotopy type and applied Smith theory to prove results about periodic knots, while Lipshitz and Sarkar have used the same techniques to understand the Khovanov homology of strongly invertible knots.

Seidel and Smith have defined a symplectic reformulation of combinatorial Khovanov homology, and they have used localization techniques in Floer theory to study the symplectic Khovanov homology of 2-periodic knots. In our work, we define an annular version of symplectic Khovanov homology and apply this theory to understand the symplectic Khovanov homology of 2-periodic and strongly invertible knots. This is joint work with Kristen Hendricks and Cheuk Yu Mak.

The Coefficients of Klein-4 Equivariant HA.
☙ *Jesse Keyes (University of Kentucky)* *in*

In G-equivariant homotopy theory, it is known that the equivariant Eilenberg-MacLane spectra representing ordinary equivariant cohomology have nontrivial $RO(G)$-graded homotopy. In this talk, we will see a computation of the universal case of this ordinary equivariant cohomology. In particular, we will see the $RO(G)$-graded homotopy of HA for A the Burnside Mackey functor, in the case that G is the Klein-4 group.

Transverse invariant as Khovanov skein spectrum at its Extreme Alexander grading.
☙ *Nilangshu Bhattacharyya (Louisiana State University)* *in*

Olga Plamenevskaya described a transverse link invariant as an element of Khovanov homology. Lawrence Roberts gave a link surgery spectral sequence whose E^2 page is the reduced Khovanov skein homology (with $\mathbb{Z}_2$ coefficient) of a closed braid L with odd number of strands and E^∞ page is the knot Floer homology of the lift of the braid axis in the double branch cover, and the spectral sequence splits with respect to the Alexander grading. The transverse invariant does not vanish in the Khovanov skein homology, and under the above spectral sequence and upon mapping the knot Floer homology to the Heegard Floer homology, the transverse invariant corresponds to the contact invariant. Lipshitz-Sarkar gave a stable homotopy type invariant of links in S^3. Subsequently, Lipshitz-Ng-Sarkar found a cohomotopy element in the Khovanov spectrum associated to the Plamenevskaya invariant. We can think of this element as a map from Khovanov spectra at its extreme quantum grading to the sphere spectrum. We constructed a stable homotopy type for Khovanov skein homology and showed that we can think of the cohomotopy transverse element as a map from the Khovanov spectra at its extreme quantum grading to the Khovanov skein spectra at its extreme Alexander grading. This is a joint work with Adithyan Pandikkadan, which will be presented in this talk.

Twisted bicategorical shadows and traces.
Zhonghui Sun (Michigan State University) *in*

Bicategorical shadows, defined by Ponto, provide a framework that generalizes (topological) Hochschild homology. Bicategorical shadows have important properties, such as Morita invariance, and allow one to generalize the symmetric monoidal trace to a bicategorical trace. Topological Hochschild homology (THH), which is an essential component of the trace methods approach for algebraic K-theory, is a key example of a bicategorical shadow.

In recent years, equivariant versions of topological Hochschild homology have emerged. In particular, for a C_n-ring spectrum, there is a theory of C_n-twisted THH, constructed via equivariant norms. However, twisted THH fails to be a bicategorical shadow. In this talk, we will explain a new framework of equivariant bicategorical shadows and explain why twisted THH is a g-twisted shadow. We also explore g-twisted bicategorical traces.

Unstable Stems via EHP and the unstable Adams spectral sequence.
Francis Baer (Wayne State University) *in*

In 1958 Adams first defined the Adams spectral sequence which was soon after used it to compute stable homotopy groups of spheres in a range. In 1962, Toda computed unstable homotopy groups in a small (yet shocking for the time) range using the EHP sequence, Toda brackets, and various other composition methods. A decade later the unstable Adams spectral sequence was defined and was used by Mahowald and Curtis to compute unstable homotopy groups of S^3 through the 52-stem. In this talk we discuss how to combine the EHP sequence, composition methods, and the unstable Adams spectral sequence with the help of computer automation to compute unstable homotopy groups of spheres.

What is Möbius inversion?
Jamin Kochman (University of Kentucky) *in*

Möbius inversion is a well established idea in combinatorics, but it exhibits patterns which may be familiar to those who study categorical traces. The purpose of this talk is to investigate the connection between these two ideas. I will present some background for both Möbius functions and traces. In the context of profunctors, I will demonstrate how the former can be realized as an example of the latter. If time allows, I will discuss the meaning of Möbius inversion in this new context.

4. Posters

	Saturday				
Time	Room 1	Room 2	Room 3	Room 4	Room 5
10:20 AM	The Coefficients of Klein-4 Equivariant HA	Kaplansky's Conjectures: Geometry and Topology	Link Floer Stable Homotopy Types	Intro to Khovanov Homology	What is Möbius inversion?
10:50 AM	Unstable Stems via EHP and the unstable Adams spectral sequence	Gromov Boundary of the Grand Arc Graph	Knot Floer Homology and the Borromean Knot	Covering moves for 3-manifolds	Heat Kernel Deformation of the 3D Seiberg-Witten Equation
11:30 AM	Geometric Crystallinity	Frattini subgroups of hyperbolic-like groups	Khovanov and sl(3) homology and equivariant knots	An Equivariant Laudenbach-Poénaru Theorem	Parametrizing Contact Diffeomorphisms
4:00 PM	Multiplicative spectral sequences in Homotopy Type Theory	Connected components of spaces of type-preserving representations	An Instanton Invariant for Knots in $\mathbb{R}P^3$	Realization problems for groups of surface complements in 4-manifolds	
4:30 PM	Equivariant Dyer-Lashof Operations	Convex cocompactness of pseudo-Anosov subgroups of surface group extensions	An Extension of the Kuperberg Invariant for Three-Manifolds from Involutory Hopf Algebras	Bridge Number, Meridional Rank, and Fishnet Links	Curvatures and macroscopic dimensions of symmetric products of Riemann surfaces
	Sunday				
10:20 AM	On the K-theory of Tambara Fields	Limits of almost homogeneous spaces and their fundamental groups	Transverse invariant as Khovanov skein spectrum at its Extreme Alexander grading	Equivariantly Knotted Spheres	Persistent and combinatorial Laplacians for topological data analysis and their introduction to knot theory
10:50 AM	Mac Lane Q-construction for exact $\infty-$categories		Symplectic annular Khovanov homology for symmetric knots	Singular Instantons & signs in Khovanov Homology	
11:20 AM	Twisted bicategorical shadows and traces		Failure of TQFTs to distinguish simply-connected 6-manifolds	Khovanov homology's distinguished gift to contact geometry	A family index theorem for end-periodic manifolds