The 16th East Asian Conference on Geometric Topology

January 25–28, 2021

This is an ONLINE conference organized by members in Tokyo.
https://park.itc.u-tokyo.ac.jp/MSF/topology/conference/EACGT16/

Talk Schedule

Time in the schedule is JST (UTC+9:00=CST+1:00=KST).

Time (JST)	25 January MONDAY		
	Room 1		
10:50–11:00	Opening Remarks		
11:00–12:00	JungHwan Park		
12:00–13:00	Lunch		
	Room 1	Room 2	Room 3
13:00–13:25	Seok beom Yoon	Yin Tian	Erika Kuno
13:30–13:55	Haimiao Chen	Nobuo Iida	Seung Yeop Yang
14:05–14:30	Qiang Zhang	Masaki Taniguchi	Jun Ueki
14:35–15:00	KyeongRo Kim	Guanheng Chen	Kokoro Tanaka
15:00–15:30	Tea Time		
15:30–15:55	Masaaki Suzuki	Zhiyun Cheng	Donggyun Seo
16:00–16:25	Fengling Li	Wonyong Jang	Hiroaki Karuo
16:35–17:00	Tsukasa Yashiro	Zhongzi Wang	Sang-hyun Kim

Time (JST)	26 January TUESDAY		
	Room 1		
9:40–10:40	Tetsuya Ito		
11:00–12:00	Ying Zhang		
12:00–13:00	Lunch		
	Room 1	Room 2	Room 3
13:00–13:25	Ran Tao	Dongsoo Lee	Motoko Kato
13:30–13:55	Shengkui Ye	Jumpei Yasuda	Xiaobing Sheng
14:05–14:30	Philippe Tranchida	Youlin Li	David Leturcq
14:35–15:00	Zhi Chen	Nobutaka Asano	Byeorhi Kim
15:00–15:30	Tea Time		
15:30–15:55	Ryotaro Ueda	Xuezhi Zhao	Dominik Wrazidlo
16:00–16:25	Fan Ding	Seonmi Choi	Akihiro Takano
16:35–17:00	Inhyeok Choi	Zixi Wang	Shin Satoh
17:05–17:30	Jiming Ma		Taehee Kim

Time (JST)	27 January WEDNESDAY		
	Room 1		
9:40–10:40	In Dae Jong and Hidetoshi Masai		
11:00–12:00	Gye-Seon Lee		
12:00–13:00	Lunch		
	Room 1	Room 2	Room 3
13:00–13:25	Kazuhiro Ichihara	Inkang Kim	Yi Liu
13:30–13:55	Jung Hoon Lee	Migiwa Sakurai	Jianchun Wu
14:05–14:30	Yi Xie	Hiroki Ito	Sangrok Oh
14:35–15:00	Changsub Kim	Naoko Kamada	Bin Yu
15:00–15:30	Tea Time		
15:30–15:55	Tomo Murao	Minkyoung Song	Fangting Zheng
16:00–16:25	Yanqing Zou	Yuta Taniguchi	Yuya Nishimura
16:35–17:00	Seiichi Kamada	Sungkyung Kang	Zhiqing Yang
17:05–17:30	Hyungryul Baik		Stavros Garoufalidis

Time (JST)	28 January THURSDAY
	Room 1
9:40–10:40	Yuta Nozaki
11:00–12:00	Wenyuan Yang
12:00–12:10	Closing Remarks

Program

Time in the program is JST (UTC+9:00=CST+1:00=KST).

25 January MONDAY

ROOM 1 (Plenary talks)
10:50–11:00 Opening remarks
11:00–12:00 JungHwan Park (KAIST)
Isotopy and equivalence of knots in 3-manifolds

ROOM 1
13:00–13:25 Seok beom Yoon (KIAS)
Adjoint Reidemeister torsion of hyperbolic 3-manifolds
13:30–13:55 Haimiao Chen (Beijing Technology and Business University)
On the $\mathrm{SL}(2,\mathbb{C})$-character varieties of Montesinos knots
14:05–14:30 Qiang Zhang (Xi'an Jiaotong University)
Fixed point indices and fixed words at infinity of selfmaps of graphs
14:35–15:00 KyeongRo Kim (KAIST)
Groups acting on the circle with a tight invariant lamination

15:30–15:55 Masaaki Suzuki (Meiji University)
Generating function on epimorphisms between 2-bridge knot groups
16:00–16:25 Fengling Li (Dalian University of Technology)
On Heegaard genus of cyclic coverings of two-bridge knots
16:35–17:00 Tsukasa Yashiro (Independent Mathematical Institute)
A topological model of splitting double strand DNA

ROOM 2
13:00–13:25 Yin Tian (Tsinghua University)
The Drinfeld center of monoidal 2-categories in $3+1$D Dijkgraaf-Witten Theory
13:30–13:55 Nobuo Iida (University of Tokyo)
Seiberg-Witten Floer homotopy contact invariant
14:05–14:30 Masaki Taniguchi (RIKEN)
Knotted 2-spheres in the 4-space and Yang-Mills gauge theory
14:35–15:00 Guanheng Chen (Southeast University)
Cobordism maps on periodic Floer homology and some computations

15:30–15:55 Zhiyun Cheng (Beijing Normal University)
A categorification of signed chromatic polynomial
16:00–16:25 Wonyong Jang (KAIST)
A sequence of algebraic integer relation numbers which converges to 4
16:35–17:00 Zhongzi Wang (Tsinghua University)
On embedding periodical maps of surfaces into those of n-sphere

ROOM 3
13:00–13:25 Erika Kuno (Osaka University)
Distortion of mapping class groups of nonorientable surfaces in the mapping class groups of orientable surfaces
13:30–13:55 Seung Yeop Yang (Kyungpook National University)
Set-theoretic Yang-Baxter homology groups of biquandles, and their Betti numbers
14:05–14:30 Jun Ueki (Tokyo Denki University)
Twisted Iwasawa invariants of knots
14:35–15:00 Kokoro Tanaka (Tokyo Gakugei University)
Knot coloring polynomial and the invariant using quandle colorings of 1-tangles

15:30–15:55 Donggyun Seo (KAIST)
The asymptotic translation length of a RAAG on the extension graph is rational
16:00–16:25 Hiroaki Karuo (RIMS, Kyoto University)
A degeneration of the skein algebra of a closed surface in a quantum torus
16:35–17:00 Sang-hyun Kim (KIAS)
Optimal regularity of mapping class group actions on the circle

26 January TUESDAY

ROOM 1 (Plenary talks)
09:40–10:40 Tetsuya Ito (Kyoto University)
A quantitative Birman-Menasco finiteness theorem and its application to crossing number problems
11:00–12:00 Ying Zhang (Soochow University)
Ordering of lengths of closed geodesics on most symmetric hyperbolic tori

ROOM 1

13:00–13:25 Ran Tao (Sichuan Normal University)
Cosmetic surgery conjecture for some satellite knots
13:30–13:55 Shengkui Ye (New York University-Shanghai)
Length functions on groups and Rigidity
14:05–14:30 Philippe Tranchida (KAIST)
The cohomological dimension of Torelli groups of partitioned surfaces
14:35–15:00 Zhi Chen (Hefei University of Technology)
A presentation of three manifold groups resembling the Wirtinger presentation

15:30–15:55 Ryotaro Ueda (Osaka University)
Quandle coloring quivers of virtual links
16:00–16:25 Fan Ding (Peking University)
Contact surgery along Legendrian knots and links
16:35–17:00 Inhyeok Choi (KAIST)
Rigidity of Length Identities of hyperbolic surfaces
17:05–17:30 Jiming Ma (Fudan University)
Three-manifolds at infinity of complex hyperbolic orbifolds

ROOM 2

13:00–13:25 Dongsoo Lee (Michigan State University)
On the kernel of the zero-surgery homomorphism from knot concordance
13:30–13:55 Jumpei Yasuda (Osaka University)
A plat form for surface links in S^4
14:05–14:30 Youlin Li (Shanghai Jiao-Tong University)
Symplectic fillings of lens spaces and Seifert fibered spaces
14:35–15:00 Nobutaka Asano (Tohoku University)
4-manifolds admitting simplified $(2, 0)$-trisections with prescribed vertical 3-manifolds

15:30–15:55 Xuezhi Zhao (Capital Normal University)
A knot invariant coming from generalized fixed point theory
16:00–16:25 Seonmi Choi (Kyungpook National University)
On a generalization of a Kauffman bracket magma and its invariant for surface-links
16:35–17:00 Zixi Wang (Fudan University)
Distinguishing 4-dimensional geometries via profinite completions

ROOM 3

13:00–13:25 Motoko Kato (Ehime University)
On acylindrical hyperbolicity of some Artin-Tits groups
13:30–13:55 Xiaobing Sheng (University of Tokyo)
The divergence properties of generalised Thompson's groups
14:05–14:30 David Leturcq (RIMS, Kyoto University)
Alexander polynomial(s) from diagram counts
14:35–15:00 Byeorhi Kim (POSTECH)
On relationship of quandle extensions to group extensions

15:30–15:55 Dominik Wrazidlo (Kyushu University)
Cusp cobordism of Morse functions
16:00–16:25 Akihiro Takano (University of Tokyo)
Extension of Tong-Yang-Ma representation
16:35–17:00 Shin Satoh (Kobe University)
The intersection polynomials of a virtual knot
17:05–17:30 Taehee Kim (Konkuk University)
Knot reversal and concordance

27 January WEDNESDAY

ROOM 1 (Plenary talks)

09:40–10:40 In Dae Jong (Kindai University) and **Hidetoshi Masai** (Tokyo Institute of Technology)
Complete exceptional surgeries on two-bridge links
11:00–12:00 Gye-Seon Lee (Sungkyunkwan University)
Geometric structures and Representation spaces

ROOM 1

13:00–13:25 Kazuhiro Ichihara (Nihon University)
A note on knots in lens spaces determined by their complements
13:30–13:55 Jung Hoon Lee (Jeonbuk National University)
Non-minimal bridge position of 2-cable links
14:05–14:30 Yi Xie (Peking University)
Several link detection results of Khovanov homology
14:35–15:00 Changsub Kim (KAIST)
On Translation Lengths of Anosov Maps on Curve Graph of Torus

15:30–15:55 Tomo Murao (Waseda University)
MCQ twisted Alexander invariants for handlebody-knots
16:00–16:25 Yanqing Zou (East China Normal University)
Mapping class groups of strongly irreducible Heegaard splittings
16:35–17:00 Seiichi Kamada (Osaka University)
Graphical description of surface foldings and braided surfaces
17:05–17:30 Hyungryul Baik (KAIST)
Minimal asymptotic translation for Torelli group of partitioned surfaces

ROOM 2

13:00–13:25 Inkang Kim (KIAS)
Signature, Toledo invariant, and surface group representation
13:30–13:55 Migiwa Sakurai (Shibaura Institute of Technology)
Infinitely many virtual knots which have the properties of Kishino's knot
14:05–14:30 Hiroki Ito (Osaka University)
A family of index polynomial invariants for vitrual links related to the writhe polynomials
14:35–15:00 Naoko Kamada (Nagoya City University)
Pseudo Goeritz matrices for virtual link diagrams

15:30–15:55 Minkyoung Song (IBS-CGP)
Slice-ribbon conjecture for pretzel knots
16:00–16:25 Yuta Taniguchi (Osaka City University)
f-twisted Alexander matrices and quandle cocycle invariants
16:35–17:00 Sungkyung Kang (IBS-CGP)
Linear independence of rationally slice knots

ROOM 3

13:00–13:25 Yi Liu (Peking University / Beijing International Center for Mathematical Sciences)
Finite-volume hyperbolic 3-manifolds are almost determined by their finite quotient groups

13:30–13:55 Jianchun Wu (Soochow University)
Limits of finite metacyclic p-groups of semidirect product type

14:05–14:30 Sangrok Oh (KAIST)
Quasi-isometry invariant of weakly special square complexes

14:35–15:00 Bin Yu (Tongji University)
Classifying expanding attractors on the figure-eight knot complement and non-transitive Anosov flows on Franks-Williams manifold

15:30–15:55 Fangting Zheng (Xi'an Jiaotong-Liverpool University)
Compact hyperbolic Coxeter 4-polytopes with 8-facets

16:00–16:25 Yuya Nishimura (Nihon University)
The computational complexity of classical link recognition (joint work with Kazuhiro Ichihara and Seiichi Tani)

16:35–17:00 Zhiqing Yang (Dalian University of Technology)
Algebraic approach to Knot polynomials

17:05–17:30 Stavros Garoufalidis (Southern University of Science and Technology)
Matrix-valued invariants of knots and holomorphic quantum modular forms

28 January THURSDAY

ROOM 1 (Plenary talks)

09:40–10:40 Yuta Nozaki (Hiroshima University)
Abelian quotients of the Y-filtration on the homology cylinders via the LMO functor

11:00–12:00 Wenyuan Yang (Peking University)
The Hausdorff dimension of the harmonic measure for relatively hyperbolic groups

Abstracts

Plenary talks

Tetsuya Ito (Kyoto University)

A quantitative Birman-Menasco finiteness theorem and its application to crossing number problems

Abstract: We give a quantitative version of Birman-Menasco finiteness theorem; an estimate of the crossing number in terms of genus and braid index. As applications, we provide estimates of the crossing numbers for composite and satellite (cable) knots. They give (though it is weak) theoretical supporting evidences for various conjectures on crossing numbers. In particular, when the braid index is not large, our estimates improve known estimates given by Lackenby.

In Dae Jong (Kindai University)
Hidetoshi Masai (Tokyo Institute of Technology)

Complete exceptional surgeries on two-bridge links

Abstract: Dehn surgeries on a component of a hyperbolic two-bridge link yielding non-hyperbolic manifolds were completely classified by Ichihara in 2012. A Dehn surgery on whole components of a hyperbolic link is said to be *complete exceptional* if the resultant is non-hyperbolic and all its proper sub-fillings (namely, those obtained by replacing at least one non-empty surgery slope with an empty one) are hyperbolic.

In this talk, we give a complete classification of complete exceptional surgeries on two-bridge links. Our key ingredients are study on essential branched surfaces in a link complement and computer-aided search of exceptional surgeries. This is a joint work with Kazuhiro Ichihara (Nihon University).

Gye-Seon Lee (Sungkyunkwan University)

Geometric structures and Representation spaces

Abstract: Let X be a homogeneous space for a Lie group G. A (G, X)-structure on a manifold M is an atlas of coordinate charts valued in X, such that the changes of coordinates locally lie in G. It is a fundamental question to ask how many ways one can put a (G, X)-structure on M, i.e. what is the space of (G, X)-structures on the manifold M? In this talk, I will explain the strong interaction between the space of (G, X)-structures on M and the space of representations of the fundamental group of M into G. In particular, I will describe the current understanding of these spaces, focusing on the case when X is real projective space and G is the group of projective automorphisms of X.

Yuta Nozaki (Hiroshima University)

Abelian quotients of the Y-filtration on the homology cylinders via the LMO functor

Abstract: We construct a series of homomorphisms from the Y-filtration on the monoid of homology cylinders to torsion modules via the mod $\mathbb{Z}$ reduction of the LMO functor. The restrictions of our homomorphisms to the lower central series of the Torelli group do not factor through Morita's refinement of the Johnson homomorphism. We use it to show that the abelianization of the Johnson kernel of a closed surface has torsion elements. This is joint work with Masatoshi Sato and Masaaki Suzuki.

JungHwan Park (KAIST)

Isotopy and equivalence

Abstract: It is a well-known and often used fact that the notions of (ambient) isotopy and equivalence coincide for knots in S^3, since any orientation-preserving homeomorphism of S^3 is isotopic to the identity.

We compare the notions of equivalence and isotopy for knots in more general 3-manifolds. We show that any orientation-preserving homeomorphism of a prime, oriented 3-manifold which preserves free homotopy classes is isotopic to the identity, except in the single case of the Gluck twist acting on $S^1 \times S^2$. We give infinitely many examples of knots in $S^1 \times S^2$ whose isotopy classes are changed by a Gluck twist. This is joint work with Paolo Aceto, Corey Bregman, Christopher Davis, and Arunima Ray.

Wenyuan Yang (Peking University)

The Hausdorff dimension of the harmonic measure for relatively hyperbolic groups

Abstract: In this talk, I will introduce the class of relatively hyperbolic groups and talk about the random walks on these groups driven by a probability measure with finite first moment. The hitting measure (called harmonic measure) of random walks on various topological boundaries of a relatively hyperbolic group gives the the model of Possion boundary. With respect to the Floyd metric and the shortcut metric, we prove that the Hausdorff dimension of the harmonic measure equals the ratio of the entropy and the drift of the random walk. This is joint work with Matthieu Dussaule.

Ying Zhang (Soochow University)

Ordering of lengths of closed geodesics on most symmetric hyperbolic tori

Abstract: The most symmetric once punctured hyperbolic tori are parametrized as $T(t)$ by a real parameter $t > 2$, which will be written as $t = 2 + x$. The trace of each closed geodesic on $T(t)$ is given by a polynomial in x. In joint work with Xiangfei Li, we investigate the properties of these polynomials and the ordering of the lengths of closed geodesics on $T(t)$. We make conjectures and prove some of them; in the case where $x = 1$, we obtain some conjectured properties of the Markoff numbers.

Parallel Session

Nobutaka Asano (Tohoku University)

4-manifolds admitting simplified $(2,0)$-trisections with prescribed vertical 3-manifolds

Abstract: A trisection of Gay-Kirby is a decomposition of a closed 4-manifold into three 4-dimesional 1-handlebodies. They proved the existence of a trisection for any closed 4-manifold by constructing a stable map from the 4-manifold to the real plane, called a trisection map. We focus on the 3-manifolds obtained as the preimages of arcs on the real plane for simplified $(2,0)$-trisection maps, called vertical 3-manifolds. Any vertical 3-manifold is given as a connected sum of finite copies of six basic vertical 3-manifolds and $S^2 \times S^1$. We show that a non-trivial 6-tuple of vertical 3-manifolds determines the source 4-manifold uniquely up to orientation reversing diffeomorphisms.

Hyungryul Baik (KAIST)

Minimal asymptotic translation for Torelli group of partitioned surfaces

Abstract: We reprot our recent results on the minimal asymptotic translation length for Torelli group of partitioned surfaces. We also briefly summarize the state of the art of the problem.

Guanheng Chen (Southeast University)

Cobordism maps on periodic Floer homology and some computations

Abstract: Periodic Floer homology (PFH) is a Gromov-Floer type invariant for surface symplecticmorphisms. It is a sister version of a well-known invariant called embedded contact homology (ECH). Like ECH, Lee and Taubes show that PFH is isomorphic to a version of Seiberg-Witten Floer homology. Given a symplectic cobordism between fibered 3-manifolds, it is expected that the cobordism induces a homomorphism between PFH of these fibered 3-manifolds. Such homomorphisms are called cobordism maps. Unfortunately, the cobordism maps for PFH are not at present directly defined due to certain technical difficulties. In the talk, I will present results about defining the cobordism maps for some cases, by using either the holomorphic curves method or Seiberg-Witten theory. Moreover, I will give explicit computations for some examples.

Haimiao Chen (Beijing Technology and Business University)

On the $\mathrm{SL}(2,\mathbb{C})$-character varieties of Montesinos knots

Abstract: For each Montesinos knot K, we can determine its (irreducible) $\mathrm{SL}(2,\mathbb{C})$-character variety, which is almost the same as the space of conjugacy classes of irreducible representations $\pi_1(S^3 - K) \to \mathrm{SL}(2,\mathbb{C})$. We also give a necessary condition for a polynomial $F(M^2, L)$ to be the A-polynomial of some Montesinos knot.

Zhi Chen (Hefei University of Technology)

A presentation of three manifold groups resembling the Wirtinger presentation

Abstract: In this talk we give a presentation for the fundamental groups of closed three manifolds resembling the well-known Wirtinger presentation of link groups. Suppose L is a link diagram. Then L gives a ribbon link L' canonically. Doing surgery along L' gives a closed three manifold M_L. We construct a group G_L with a special presentation, in which every overpassing arc of L and every component of L contribute a generator, and every crossing point of L contribute a relation. We will show the group G_L is isomorphic to a free product of $\pi_1(M_L)$ with a free group.

Zhiyun Cheng (Beijing Normal University)

A categorification of signed chromatic polynomial

Abstract: Chromatic polynomial, which encodes the number of distinct ways to color the vertices of a graph, was introduced by George David Birkhoff in 1912 in attempt to attack the four-color problem. Motivated by the seminal work of Khovanov, Helme-Guizon and Rong introduced a categorification for the chromatic polynomial. In this talk, I will give a brief introduction to this construction. If time permits, I will discuss how to define a categorification for the signed chromatic polynomial. This is a joint work with Ziyi Lei, Yitian Wang and Yanguo Zhang.

Inhyeok Choi (KAIST)

Rigidity of Length Identities of hyperbolic surfaces

Abstract: Due to Kac's question and Sunada's examples, the length spectra of domains and surfaces have been researched in depth. Meanwhile, it is still unclear whether the simple length spectrum can determine the isometry class of any hyperbolic surface. Nonetheless, one can instead ask the same question for 'generic' hyperbolic surface. In this talk, I will discuss the rigidity of length identities over the Teichmueller space, which reads off the subsurfaces of low complexitiy of generic hyperbolic surfaces. As an application, I will explain a variant of Wolpert's result, asserting that isometry classes of generic hyperbolic surfaces are determined by their simple length spectra. This is a joint work with H. Baik and D. M. Kim.

Seonmi Choi (Kyungpook National University)

On a generalization of a Kauffman bracket magma and its invariant for surface-links

Abstract: J.H. Przytycki and M. Niebrzydowski introduced an algebraic structure, called a Kauffman bracket magma. A Kauffman bracket magma is an entropic magma satisfying some conditions related to the regular Reidemeister moves. In this talk, we will introduce a generalization of a Kauffman bracket magma and construct an invariant valued in a Kauffman bracket magma via marked graph diagrams.

Fan Ding (Peking University)

Contact surgery along Legendrian knots and links

Abstract: Contact surgery is a useful tool in the study of contact 3-manifolds. In this talk, I will first introduce some basic concepts and results of contact surgery on contact 3-manifolds. Then I will review some recent results in this field. (This talk is based on joint work with Youlin Li and Zhongtao Wu.)

Stavros Garoufalidis (Southern University of Science and Technology)

Matrix-valued invariants of knots and holomorphic quantum modular forms

Abstract: The asymptotics of the Kashaev invariant leads to a (conjectural, but computable) matrix-valued invariant of knots at roots of unity parametrized by a pair of parabolic flat $\mathrm{SL}(2,\mathbb{C})$-connections that form a holomorphic quantum modular form. We will give an explicit definition of this 3×3 matrix-valued invariant for the simplest hyperbolic 4_1 knot, one row of which consists of elements of the Habiro ring. Joint work with Don Zagier.

Kazuhiro Ichihara (Nihon University)

A note on knots in lens spaces determined by their complements

Abstract: In this talk, I will talk about our recent study on the knot complement problem for knots in lens spaces. This is a joint work with Toshio Saito (Joetsu University of Education).

Nobuo Iida (University of Tokyo)

Seiberg-Witten Floer homotopy contact invariant

Abstract: This is a joint work with Masaki Taniguchi (Riken) arXiv:2010.02132. The contact invariants in monopole/Heegaard Floer homology theory have been used as effective tools to study 3 dimentional contact topology. Classifying symplectic fillings of contact 3-manifolds is a typical problem for which such techniques can be used. We constructed a "Floer homotopy " refinement of these invariants using Manolescu's idea of Seiberg–Witten Floer homotopy theory. We will explain its construction and some applications on symplectic fillings.

Hiroki Ito (Osaka University)

A family of index polynomial invariants for vitrual links related to the writhe polynomials

Abstract: In this talk, we introduce a family of polynomial invariants for ordered and oriented virtual links. It expands the writhe polynomial invariants introduced in a paper by Nakamura, Nakanishi and Satoh in 2020. If time permits, we will also discuss the case of virtual string links.

Wonyong Jang (KAIST)

A sequence of algebraic integer relation numbers which converges to 4

Abstract: For $\alpha \in \mathbb{R}$, let

$$A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}, B_\alpha = \begin{bmatrix} 1 & 0 \\ \alpha & 1 \end{bmatrix}.$$

Then the subgroup $G_\alpha = \langle A, B_\alpha \rangle \subset \mathrm{SL}(\mathbb{R})$ acts on the Poincare disc $\overline{\mathbb{D}}$ with the boundary. By using the action, we define the generalized Farey graph Γ_α. We prove that G_α is a free group of rank 2 if and only if the graph Γ_α is tree. By using this result and a symmetry of the generalized Farey graph Γ_α, we establish the orbit test for non-freeness of the group G_α. By applying the orbit test, we find a sequence of algebraic integer relation numbers which converges to 4. This is a joint work with KyeongRo Kim.

Naoko Kamada (Nagoya City University)

Pseudo Goeritz matrices for virtual link diagrams

Abstract: For a classical link diagram, a Goeritz matrix is defined by using a checkerboard coloring, and the invariant factors of the matrix is a link invariant. Not every virtual link diagram admits a checkerboard coloring. In this talk, we introduce two kinds of matrices, which we call pseudo Goeritz matrices, for virtual link diagrams. Invariant factors of these matrices are invariants of virtual links. One of them is also an invariant for a welded link. We show some applications of the invariants.

Seiichi Kamada (Osaka University)

Graphical description of surface foldings and braided surfaces

Abstract: A braided surface can be described by a braid chart, which is a graph in the base space whose edges are oriented and labeled by integers presenting standard generators of the braid group. Similarly, a surface folding (in dimension 3) can be described by a permutation chart, which is a graph in the base space whose edges are labeled by integers presenting standard generators of the symmetric group. This is an overview of such descriptions of surface foldings and braided surfaces. We introduce these descriptions and clarify a relationship among those topological objects.

Sungkyung Kang (IBS-CGP)

Linear independence of rationally slice knots

Abstract: We give an infinite family of rationally slice knots that are linearly independent in the smooth knot concordance group. In particular, our examples are all of infinite order. All previously known examples of rationally slice knots were order two. This is a joint work with J. Hom, J. Park, and M. Stoffregen.

Hiroaki Karuo (RIMS, Kyoto University)

A degeneration of the skein algebra of a closed surface in a quantum torus

Abstract: In the case when a surface has an ideal triangulation, Bonahon–Wong showed that the Kauffman bracket skein algebra of the surface can be embedded into a quantum torus. Since a closed surface does not have an ideal triangulation, there is no known similar embedding for a closed surface. In this talk, I will show that we can embed a "degeneration" of the skein algebra of a closed surface into a quantum torus. This is joint work with Thang T. Q. Le (Georgia Tech).

Motoko Kato (Ehime University)

On acylindrical hyperbolicity of some Artin-Tits groups

Abstract: It is conjectured that the central quotient of every irreducible Artin-Tits group is either virtually cyclic or acylindrically hyperbolic. We prove this conjecture for some Artin-Tits groups, including Artin-Tits groups associated to triangle-free graphs and Artin-Tits groups of large type associated to cones over square-free bipartite graphs. In the proof of the main result, we observe group actions on CAT(0) spaces, and detect group elements acting as rank one isometries. This talk is based on a joint paper arXiv:2004.03914 with Shin-ichi Oguni.

Byeorhi Kim (POSTECH)

On relationship of quandle extensions to group extensions

Abstract: In 1980s, Joyce and Matveev introduced a quandle which is an algebraic structure related to knot theory. In the papers, they also showed that for given a group G and an automorphism on G, there is a quandle structure on the underlying set of G, later called 'generalized Alexander quandle'. In particular, when the automorphism is an inner automorphism by a fixed element $\zeta \in G$, we denote this quandle structure by $(G, \triangleleft_\zeta)$. In this talk, we observe quandle structures given on a group obtained by extension. Also, we study a relationship between group extensions of a group and quandle extensions of a generalized Alexander quandle on the group.

Changsub Kim (KAIST)

On Translation Lengths of Anosov Maps on Curve Graph of Torus

Abstract: We show that an Anosov map has a geodesic axis on the curve graph of a torus. The direct corollary of our result is the stable translation length of an Anosov map on the curve graph is always a positive integer. As the proof is constructive, we also provide an algorithm to calculate the exact translation length for any given Anosov map. This is a joint work with Hyungryul Baik, Sanghoon Kwak, Hyunshik Shin.

Inkang Kim (KIAS)

Signature, Toledo invariant, and surface group representation

Abstract: Using Atiyah-Patodi-Singer index theorem, we obtain a formula for the signature of a flat symplectic vector bundle over a surface with boundary, which is related to the Toledo invariant and the eta invariant on the boundary. We also give a Milnor-Wood type inequality. This is a joint work with Pansu and Wan.

KyeongRo Kim (KAIST)

Groups acting on the circle with a tight invariant lamination

Abstract: According to H. Baik's result, a fuchsian group G can be characterized by a collection of three G-invariant laminations under some conditions. Recently, I focus on a tight pair that is a group with one invariant lamination and some extra conditions as a candidate which improves the above result. In this talk, I will briefly introduce some notions of laminations of a circle, and present a recent result about a tight pair. This work is joint with my advisor H. Baik.

Sang-hyun Kim (KIAS)

Optimal regularity of mapping class group actions on the circle

Abstract: We prove that the supremum of a positive real number $r > 0$ satisfying the following condition is 1: there exists a faithful C^r–action of the mapping class group on the circle. (Joint with Thomas Koberda and Cristóbal Rivas)

Taehee Kim (Konkuk University)

Knot reversal and concordance

Abstract: For an oriented knot, by reversing the string orientation we obtain the reverse of the knot. A knot and its reverse share many common properties, and it makes hard to distinguish them up to concordance. For instance, surgeries on a knot and its reverse are oriented diffeomorphic, and so are their branched cyclic covers. Also, their Heegaard Floer knot chain complexes are filtered chain homotopy equivalent. In this talk, despite these difficulties, we show that there exists a topologically slice knot that is not concordant to its reverse. We also discuss related topics such as mutation and relationships between the knot concordance group and the rational homology cobordism group of rational homology 3-spheres. This is joint work with Charles Livingston.

Erika Kuno (Osaka University)

Distortion of mapping class groups of nonorientable surfaces in the mapping class groups of orientable surfaces

Abstract: Subgroup distortion, defined by Gromov in 1993, is a tool to compare word metrics of subgroups and the ambient groups, and play an important role in geometric group theory. We prove that each mapping class group of a nonorientable surface is undistorted (linearly distorted) in the mapping class group of the double covering orientable surface by using semihyperbolicity of mapping class groups of orientable surfaces. This is a joint work with Takuya Katayama.

Dongsoo Lee (Michigan State University)

On the kernel of the zero-surgery homomorphism from knot concordance

Abstract: Kawauchi defined a groups structure on the set of homology $S^1 \times S^2$'s under an equivalence relation called $\widetilde{H}$-cobordism. This group reveives a homomorphism from the knot concordance group, given by the operation of zero-surgery. It is natural to ask whether the zero-surgery homomorphsm is injective. We show that this question has a negative answer in the smooth category. Indeed, the kernel of the zero-surgery homomorphism contains a $\mathbb{Z}^\infty$-subgroup.

Jung Hoon Lee (Jeonbuk National University)

Non-minimal bridge position of 2-cable links

Abstract: A knot (or link) in bridge position is said to be *perturbed* if it admits a cancelling pair of bridge disks, which can be used to give a lower index bridge position. Suppose that every non-minimal bridge position of a knot K is perturbed. We show that if L is a 2-cable link of K, then every non-minimal bridge position of L is also perturbed.

David Leturcq (RIMS, Kyoto University)

Alexander polynomial(s) from diagram counts

Abstract: We present the definition of Bott-Cattaneo-Rossi invariants (Z_k) of long knots $\mathbf{R}^n \hookrightarrow \mathbf{R}^{n+2}$. These invariants "count" some diagrams with $2k$ vertices, and we give some more flexible definition of Z_k using some special chains in configuration spaces, called propagators. This allows us to express the family of invariant (Z_k) as coefficients in a Taylor series of the Reidemeister torsion of the knot complement (which is the alternated product of the Alexander polynomials). When $n = 1$, this recovers a formula for the Alexander polynomial of Bar-Natan and Garoufalidis. This new method extends this result to long knots in homology 3-spheres.

Fengling Li (Dalian University of Technology)

On Heegaard genus of cyclic coverings of two-bridge knots

Abstract: In this talk, we discuss 3-manifolds which are cyclic coverings of 3-sphere branched over a special class of 2-bridge knots. An upper bound for Heegaard genus of these 3-manifolds is obtained. This is joint work with Miaowang Li, Fengchun Lei and Andrei Vesnin.

Youlin Li (Shanghai Jiao-Tong University)

Symplectic fillings of lens spaces and Seifert fibered spaces

Abstract: We apply Menke's JSJ decomposition for symplectic fillings to several families of contact 3-manifolds. Among other results, we complete the classification up to orientation-preserving diffeomorphism of strong symplectic fillings of lens spaces. For large families of contact structures on Seifert fibered spaces over S^2, we reduce the problem of classifying symplectic fillings to the same problem for universally tight or canonical contact structures. We show that fillings of contact manifolds obtained by surgery on certain Legendrian negative cables are the result of attaching a symplectic 2-handle to a filling of a lens space. This is joint work with Austin Christian.

Yi Liu (Peking University / Beijing International Center for Mathematical Sciences)

Finite-volume hyperbolic 3-manifolds are almost determined by their finite quotient groups

Abstract: In this talk, I will outline a proof, showing that the Thurston norm and fibered cone structures are determined by the profinite completions for fundamental groups of orientable finite-volume hyperbolic 3-manifold. Moreover, the profinite completion determines the hyperbolic 3-manifold up to finitely many possibilities.

Jiming Ma (Fudan University)

Three-manifolds at infinity of complex hyperbolic orbifolds

Abstract: We show the manifolds at infinity of the complex hyperbolic triangle groups $\Delta_{3,4,4;\infty}$ and $\Delta_{3,4,6;\infty}$, are one-cusped hyperbolic 3-manifolds $m038$ and $s090$ in the Snappy Census respectively. That is, these two manifolds admit spherical CR uniformizations.

Moreover, these two hyperbolic 3-manifolds above can be obtained by Dehn surgeries on the first cusp of the two-cusped hyperbolic 3-manifold $m295$ in the Snappy Census with slopes 2 and 4 respectively. In general, the main result in this paper allow us to conjecture that the manifold at infinity of the complex hyperbolic triangle group $\Delta_{3,4,n;\infty}$ is the one-cusped hyperbolic 3-manifold obtained by Dehn surgery on the first cusp of $m295$ with slope $n-2$. This is a joint work with Baohua Xie.

Tomo Murao (Waseda University)

MCQ twisted Alexander invariants for handlebody-knots

Abstract: A multiple conjugation quandle is an algebraic structure derived from handlebody-knot theory. In this talk, we introduce twisted derivatives for multiple conjugation quandles by using an MCQ Alexander pair, which is a pair of maps corresponding to a linear extension of a multiple conjugation quandle. By using this, we can construct MCQ twisted Alexander invariants for handlebody-knots.

Yuya Nishimura (Nihon University)

The computational complexity of classical link recognition (joint work with Kazuhiro Ichihara and Seiichi Tani)

Abstract: Given a diagram of a virtual link, a problem of determining whether the virtual link is classical is called classical link recognition. We show that the problem is in NP, and we give an exponential time algorithm to solve the problem. However, we only obtain a rough bound for the time complexity of the algorithm. Therefore, an experiment was carried out to estimate the time complexity of the algorithm.

Sangrok Oh (KAIST)

Quasi-isometry invariant of weakly special square complexes

Abstract: Given a compact weakly special square complex Y, we develop the notion of a (reduced) intersection complex for Y which is used to study the pattern of maximal subcomplexes with product structures. It turns out that if the universal covers of two compact weakly special square complexes are quasi-isometric, then their intersection complexes are isomorphic.

We then use this fact to study quasi-isometric classification of 2-dimensional RAAGs and graph 2-braid groups. Our results cover two well-known cases of 2-dimensional RAAGs: (1) those whose defining graphs are trees and (2) those whose outer automorphism groups are finite. Finally, we show that there are infinitely many graph 2-braid groups which are quasi-isometric to RAAGs and infinitely many which are not.

Migiwa Sakurai (Shibaura Institute of Technology)

Infinitely many virtual knots which have the properties of Kishino's knot

Abstract: Satoh and Taniguchi defined a virtual knot invariant J_n called the n-writhe for each non-zero integer n. The n-writhes give the coefficients of some polynomial invariants for virtual knots including the index polynomial, the odd writhe polynomial and the affine index polynomial. It is obvious that the virtualization of a real crossing is an unknotting operation for virtual knots. The unknotting number by the virtualization is called the virtual unknotting number. Kishino and Satoh found a virtual knot with special properties, which is called Kishino's Knot. Kishino's knot is a virtual knot whose values of the n-writhes vanish and it has the trivial Jones polynomial. Moreover the virtual unknotting number of it equals one.

In this talk, we construct infinitely many virtual knots which have the same properties of Kishino's knot. By using the Miyazawa polynomial, we showed that these virtual knots are non-classical, and their knot types are all different.

Shin Satoh (Kobe University)

The intersection polynomials of a virtual knot

Abstract: We define two kinds of invariants of a virtual knot called the first and second intersection polynomials. The definition is based on the intersection number of a pair of curves on a closed surface. We study several properties of the polynomials; By introducing invariants of long virtual knots, we give connected sum formulae of the intersection polynomials, and prove that there are infinitely many connected sums of any two virtual knots as an application. Furthermore, by studying the behavior under a crossing change, we show that the intersection polynomials are finite type invariants of order two, and find an invariant of a flat virtual knot derived from the the intersection polynomials.

Donggyun Seo (KAIST)

The asymptotic translation length of a RAAG on the extension graph is rational

Abstract: An extension graph was constructed due to the study of a right-angled Artin group (RAAG) by Kim–Koberda. Many properties for extension graphs are similar to those of the curve graph. In this talk, I would like to explain the asymptotic translation length for RAAGs on extension graphs is rational. This is obtained from the reformulation of Bowditch's finiteness property. As a corollary, the minimum of positive translation lengths is away from 0. This is joint work with Hyungryul Baik and Hyunsik Shin.

Xiaobing Sheng (University of Tokyo)

The divergence properties of generalised Thompson's groups

Abstract: Thompson's groups were first constructed in 60's from logic point of view, but later found to have many other interest properties. Nevertheless, the geometry of the groups are still mysterious. Golan and Sapir have proved that Thompson's groups have linear divergence which is one of the few geometric properties. I am going to look at this property in some generalisations of these groups.

Minkyoung Song (IBS-CGP)

Slice-ribbon conjecture for pretzel knots

Abstract: The slice-ribbon conjecture, posed by Fox in 1962, is an outstanding open problem which states that all slice knots are ribbon. Greene and Jabuka proved that it is true for 3-stranded pretzel knots $P(p, q, r)$ with odd parameters p, q, r. Lecuona established the sliceness of pretzel knots with one even parameter except for a set of parameter sets. As a corollary, the conjecture holds true for 3-stranded pretzel knots not in the exceptional family. We confirm the conjecture for knots in some subfamilies by proving that they are not slice. We use quadratic reciprocity to derive the result. (This is joint work with Min Hoon Kim and Changhee Lee.)

Masaaki Suzuki (Meiji University)

Generating function on epimorphisms between 2-bridge knot groups

Abstract: We have the generating function which determines the number of 2-bridge knot groups admitting epimorphisms onto the knot group of a given 2-bridge knot, in terms of crossing number. In this talk, we will refine this formula by taking account into genus as well as crossing number. Next, we determine the number of epimorphisms between fibered 2-bridge knot groups.

Akihiro Takano (University of Tokyo)

Extension of Tong-Yang-Ma representation

Abstract: The Tong-Yang-Ma representation (or standard representation) is an n dimensional irreducible representation of the braid group B_n discovered by D.M.Tong, S.D.Yang, and Z.Q.Ma in 1996. This has not been researched much so far compared to the Burau representation, although two representations are similar. In this talk, we introduce an extension of the Tong-Yang-Ma representation to the string link. This is joint work with Arthur Soulié (University of Glasgow).

Kokoro Tanaka (Tokyo Gakugei University)

Knot coloring polynomial and the invariant using quandle colorings of 1-tangles

Abstract: Given a pointed finite group, Eisermann defined an oriented knot invariant, called the knot coloring polynomial, using the knot group peripheral system. On the other hand, given a pointed finite quandle, Clark, Dunnig and Saito defined an oriented knot invariant using quandle colorings of corresponding 1-tangles. Both invariants are known to be generalizations of quandle cocycle invariants. In this talk, we discuss relationship between the two invariants.

Masaki Taniguchi (RIKEN)

Knotted 2-spheres in the 4-space and Yang-Mills gauge theory

Abstract: For a given smooth 2-knot in the 4-space, we give a relation between the existence of a smooth Seifert hypersurface of a certain class and the existence of irreducible SU(2)-representations of its knot group. For example, we see that any smooth 2-knot having the Poincare homology 3-sphere as a Seifert hypersurface has at least four irreducible SU(2)-representations of its knot group. This result cannot be proved for topological 2-knots. This leads to an understanding of the difference between smooth and topological 2-knots. The proof uses a quantitative formulation of instanton Floer homology.

Yuta Taniguchi (Osaka City University)

f-twisted Alexander matrices and quandle cocycle invariants

Abstract: A. Ishii and K. Oshiro introduced the notion of a φ-augmented f-twisted Alexander matrix which is defined by using an Alexander pair f and a generalized 2-cocycle φ. The twisted Alexander invariants are related to the quandle cocycle invariants by using a φ-augmented f-twisted Alexander matrix. In this talk, we observe a relation between the quandle cocycle invariant and the f-twisted Alexander matrix. As an application, we determine the deficiency of a knot quandle.

Ran Tao (Sichuan Normal University)

Cosmetic surgery conjecture for some satellite knots

Abstract: Two Dehn surgeries on a knot are called purely cosmetic if their surgered manifolds are homeomorphic as oriented manifolds. It is conjectured that nontrivial knots in S^3 do not admit purely cosmetic surgeries. In this talk, we describe how to solve this problem for cable knots and composite knots.

Yin Tian (Tsinghua University)

The Drinfeld center of monoidal 2-categories in $3+1$D Dijkgraaf-Witten Theory

Abstract: For a finite group G and a 4-cocycle $\omega \in Z^4(G, k^\times)$, we compute the center of the monoidal 2-category $2\mathrm{Vec}_G^\omega$ of ω-twisted G-graded 1-categories of finite dimensional k-vector spaces. We show that this center is a braided monoidal 2-category with a trivial sylleptic center. This center gives a precise mathematical description of the topological defects in the associated 3+1D Dijkgraaf-Witten TQFT. This is a joint work with Liang Kong and Shan Zhou.

Philippe Tranchida (KAIST)

The cohomological dimension of Torelli groups of partitioned surfaces

Abstract: The Torelli group of a closed surface S is the subgroup of the mapping class group of S acting trivially on the first homology of S and is a central object of study in geometric group theory. Putman extended the definition of Torelli groups to surfaces with boundary. Under his definition, a surface with boundary has multiple possible Torelli groups, one for each possible partition of its boundaries. Bestvina, Bux and Margalit proved that the Torelli group of a closed surface S has cohomological dimension $3g-5$. I will show how to use similar arguments to obtain a lower and an upper bound on the cohomological dimension of all Torelli groups of surfaces with boundary, using Putman's definition. This is a joint work with my advisor, Harry Hyungryul Baik.

Ryotaro Ueda (Osaka University)

Quandle coloring quivers of virtual links

Abstract: S.Nelson and K.Cho introduced the notion of a quandle coloring quiver, which is a quiver-valued classical link invariant. In this talk, we extend Nelson-Cho's invariant to virtual links using virtual quandle colorings. Properties similar to classical link's quandle coloring quiver studied by Yuta Taniguchi are discussed.

Jun Ueki (Tokyo Denki University)

Twisted Iwasawa invariants of knots

Abstract: We introduce the twisted Iwasawa invariants λ_p, μ_p, and ν_p for SL_2-representations of knot groups and a prime number p, describing the p-adic asymptotics of twisted homology groups in cyclic p-covers, to prove the followings.

1. The invariant λ_p of cyclic p-covers of some cyclic-cover determines the fiberedness and genera (Thurston norm) of knots.

2. We have $mu_p = 0$ for residually irreducible representations of twist knots.

These results would give another aspect of profinite rigidity developed by Michel Boileau, Stefan Friedl, and Yi Lu, with further interests in arithmetic topology. (Joint work with Ryoto Tange at Waseda.)

Zhongzi Wang (Tsinghua University)

On embedding periodical maps of surfaces into those of n-sphere

Abstract: We will study how the periodical maps of surfaces are smoothly embedded into those of n-sphere for some n, and what are the smallest n for such embeddings? This is a work jointly with Chao Wang and et al.

Zixi Wang (Fudan University)

Distinguishing 4-dimensional geometries via profinite completions

Abstract: It is well-known that there are 19 classes of geometries for 4-dimensional manifolds in the sense of Thurston. We could ask that to what extent the geometric information is revealed by the profinite completion of the fundamental group of a closed smooth geometric 4-manifold. In this paper, we show that the geometry of a closed orientable 4-manifold in the sense of Thurston could be detected by the profinite completion of its fundamental group except when the geometry is $\mathbb{H}^4$, $\mathbb{H}^2_{\mathbb{C}}$ or $\mathbb{H}^2\times\mathbb{H}^2$. Moreover, despite the fact that not every smooth 4-manifold could admit one geometry in the sense of Thurston, some 4-dimensional manifolds with Seifert fibred structures are indeed geometric. For a closed orientable Seifert fibred 4-manifold M, we show that whether M is geometric could be detected by the profinite completion of its fundamental group.

Dominik Wrazidlo (Kyushu University)

Cusp cobordism of Morse functions

Abstract: In the mid 1950s, Thom reduced the study of cobordism groups of embedded manifolds to the computation of homotopy groups of certain Thom complexes. Stable homotopy theory has been essential for the study of cobordism groups of smooth maps with prescribed singularities ever since. On the other hand, more explicit geometric methods of global singularity theory can be applied to study cobordism relations for Morse functions, as these are naturally based on certain smooth stable map germs into the plane. For example, Saeki and Yamamoto defined a notion of cusp cobordism for Morse functions on compact manifolds possibly with boundary, and used the combinatorics of Reeb graphs to compute the cusp cobordism group of Morse functions on surfaces. In this talk, we determine the cusp cobordism group of Morse functions on manifolds of arbitrary dimension by employing Levine's cusp elimination technique as well as the complementary process of creating pairs of cusps along fold lines. For Morse functions on surfaces our result yields an explicit description of Saeki-Yamamoto's cobordism invariant which they first constructed by means of the cohomology of the universal complex of singular fibers.

Jianchun Wu (Soochow University)

Limits of finite metacyclic p-groups of semidirect product type

Abstract: We make a complete classification of the convergence and divergence of sequences of finite metacyclic p-groups of semi-direct product type and get the limit groups of the convergent sequences.

Yi Xie (Peking University)

Several link detection results of Khovanov homology

Abstract: In this talk I will discuss a classification result on the links whose Khovanov homology has rank no greater than 8, where the coefficient ring is $\mathbb{Z}/2$. Moreover, I will show that Khovanov homology detects all links in the Thistlethwaite Link Table whose Khovanov homology has rank no greater than 12. This is joint work with Zhenkun Li and Boyu Zhang.

Seung Yeop Yang (Kyungpook National University)

Set-theoretic Yang-Baxter homology groups of biquandles, and their Betti numbers

Abstract: Biracks and biquandles, which are useful for studying the knot theory, are special families of solutions to the set-theoretic Yang-Baxter equation. A homology theory for the set-theoretic Yang-Baxter equation was developed by Carter, Elhamdadi and Saito in order to construct knot invariants. In this talk, we compute the Betti numbers for set-theoretic Yang-Baxter homology of cyclic biquandles.

Zhiqing Yang (Dalian University of Technology)

Algebraic approach to Knot polynomials

Abstract: Many knot polynomials can be defined using skein relations. Using skein relations one can define skein tree and skein height for a link. We call this height the geometric height. However, the geometric height is hard to compute. One can also define an algebraic height. On the other hand, if three link diagrams satisfy a skein relation, we call them geometrically skein related. This relation is also hard to determine. Among knot polynomials one can also say three polynomials are algebraically skein related.

In this talk, we show how this algebraic approach simplifies these problems.

Tsukasa Yashiro (Independent Mathematical Institute)

A topological model of splitting double strand DNA

Abstract: A DNA-link is a topological model of a segment of a double strand DNA (ds-DNA) whose ends are anchored at a sub-structure of the nucleus in a eukaryotic cell. Topologically, the segment of the double strand DNA (ds-DNA) is modeled by a special 2-component link (DNA-link). In the cell cycle, the DNA is replicated. The complicated replication process follows the semi-conservative scheme in which each backbone string is preserved in the replicated DNA. Therefore, this process is topologically interpreted as a splitting process of the DNA-link. Biologically, it is believed that the unknotting process is realized by enzymes topoisomerases Topo I and Topo II. However, it is not clear how the large number of linking number of the DNA-link can be eliminated. In this talk, we introduce a topological model for rewinding process of ds-DNA. This is a joint work with Abdul Adheem Mohamad.

Jumpei Yasuda (Osaka University)

A plat form for surface links in S^4

Abstract: A plat form is known for a presentation of classical links using geometric braid. In this talk, we introduce a plat form for surface links in S^4. Non-oritable surface links could be descripted by braided surface in the application.

Shengkui Ye (New York University-Shanghai)

Length functions on groups and Rigidity

Abstract: Let G be a group. A function $l : G \to [0, \infty)$ is called a length function if

(1) $l(g^n) = |n|l(g)$ for any $g \in G$ and $n \in \mathbb{Z}$;

(2) $l(hgh^{-1}) = l(g)$ for any $h, g \in G$; and

(3) $l(ab) \leq l(a) + l(b)$ for commuting elements a, b.

Such length functions exist in many branches of mathematics, mainly as stable word lengths, stable norms, translation lengths on CAT(0) spaces and Gromov δ-hyperbolic spaces, stable norms of quasi-cocycles, rotation numbers of circle homeomorphisms, dynamical degrees and so on. We study length functions on Lie groups, Gromov hyperbolic groups, arithmetic subgroups, matrix groups over rings and Cremona groups. As applications, we prove that every group homomorphism from an arithmetic subgroup of a simple algebraic $\mathbb{Q}$-group of $\mathbb{Q}$-rank at least 2, or a a finite-index subgroup of the elementary group $E_n(R)$ $(n \geq 3)$ over an associative ring, or the Cremona group $\mathrm{Cr}_2(\mathbb{C})$ to any group G having a purely positive length function must have finite image. Here G can be outer automorphism group $\mathrm{Aut}(F_n)$, mapping classes group $\mathrm{MCG}(\Sigma_g)$, CAT(0) groups or Gromov hyperbolic groups

Seok beom Yoon (KIAS)

Adjoint Reidemeister torsion of hyperbolic 3-manifolds

Abstract: For a hyperbolic 3-manifold, the adjoint Reidmeister torsion is defined as a function on the character variety. As an application of the so-called 3d-3d correspondence, it is recently conjectured that the adjoint Reidmeister torsion satisfies a certain type of vanishing identities. In this talk, we present some partial results of the conjecture including explicit computations on two-bridge knots.

Bin Yu (Tongji University)

Classifying expanding attractors on the figure-eight knot complement and non-transitive Anosov flows on Franks-Williams manifold

Abstract: An expanding attractor (for flow) on a 3-manifold is an essential lamination in the topological viewpoint. A fundamental example is the DA (derived from Anosov) expanding attractor on the figure-eight knot complement N_0. Using this attractor, Franks-Williams constructed the first example of non-transitive Anosov flow in history, with background manifold M_0 obtained by gluing two copies of N_0 through identity map along their boundaries, named by Franks-Williams manifold. In this talk, we will focus on classifying expanding attractors on N_0 and non-transitive Anosov flows on M_0. This is a joint work with Jiagang Yang.

Qiang Zhang (Xi'an Jiaotong University)

Fixed point indices and fixed words at infinity of selfmaps of graphs

Abstract: Indices of fixed point classes play a central role in Nielsen fixed point theory. Jiang-Wang-Zhang proved that for selfmaps of graphs and surfaces, the index of any fixed point class has an upper bound called its characteristic.

In this talk, we study the difference between the index and the characteristic for selfmaps of graphs. First, for free groups, we extend attracting fixed words at infinity of automorphisms into that of injective endomorphisms. Then, by using relative train track technique, we show that the difference mentioned above is quite likely to be the number of equivalence classes of attracting fixed words of the endomorphism induced on the fundamental group. Since both of attracting fixed words and the existed characteristic are totally determined by endomorphisms themselves, we give a new group-theorical approach to estimate indices of fixed point classes of graph selfmaps.

As consequence, we obtain an upper bound for attracting fixed words of injective endomorphisms of free groups, generalizing the one for automorphisms due to Gaboriau-Jaeger-Levitt-Lustig. Furthermore, we give a simple approach to roughly detecting whether fixed words exist or not. This is joint work with ZHAO Xuezhi.

Xuezhi Zhao (Capital Normal University)

A knot invariant coming from generalized fixed point theory

Abstract: Let $f : X \to Y$ be a map and B be a non-empty closed subset of Y. We consider the pre-image $f^{-1}(B)$ in usual way of fixed point theory, and find out some kinds of homomorphism indices. Their non-vanishing will guarantee the existence of pre-image of f at B. This is a natural generalization of root theory.

It is known that any knot can be regarded as a boundary of an immersed disc. We apply our relative homomorphism index to these immersed discs, and therefore define some new invariants for knots. Moreover, their additivity are proved.

(A joint work with Xing CHEN.)

Fangting Zheng (Xi'an Jiaotong-Liverpool University)

Compact hyperbolic Coxeter 4-polytopes with 8-facets

Abstract: Unlike the spherical and parabolic cases, complete classification regarding hyperbolic Coxeter polytopes of finite volume is far from being obtained. Poincaré and Andreev addressed the problems in dimensions 2 and 3, respectively. In dimensions larger than or equal to four, complete classifications of Coxeter polytopes are achieved scatteredly in the cases of simplexes, n-polytopes of finite volume with $n + 2$ facets and bounded n-polytope with $n + 3$ facets, etc. We obtain the complete classification for compact hyperbolic Coxeter 4-polytopes with 8 facets. This is a joint work with Jiming Ma.

Yanqing Zou (East China Normal University)

Mapping class groups of strongly irreducible Heegaard splittings

Abstract: A Heegaard splitting is strongly irreducible if for any pair of essential disks in both of these two handlebodies, their boundary curves intersect nontrivially. For any Heegaard splitting, its mapping class group is defined to be the isotopy class of automorphism which extends over both of these two handlebodies. In this talk, we will introduce some recent results about the mapping class group of a strongly irreducible Heegaard splitting.