

The 11th Sino-Russian Conference on Knot Theory and Related Topics

June 30 - July 4, 2025



Xi'an Jiaotong-Liverpool University

No.111 Ren'ai Road, Suzhou Dushu Lake Higher Education Town,
Suzhou Industrial Park, Suzhou, P.R. of China

Program Committee	4
Local Organizing Committee	4
Hosting University	4
Supporting	4
Contact	4

About 5

The 11th Sino-Russian Conference on Knot Theory and Related Topics	5
Xi'an Jiaotong-Liverpool University (XJTLU)	5
School of Mathematics and Physics	6
Department of Pure Mathematics	6

Schedule 7

Title and Abstract..... 8

✓ 6.30 Monday	8
The Vol-Det conjecture for highly twisted links	8
Intersections of loops on surfaces.....	8
Invariants for knots in $\Sigma_g \times I$ and knots in $\Sigma_g \times S^1$	9
Shape of Thurston's filling systole subset in surface moduli space	9
A standard form of incompressible surfaces in handlebodies	9
Local certificates in knot space geometry	9
A categorification for the partial-dual genus polynomial	9
✓ 7.1 Tuesday	10
Negative amphicheiral knots and the half-Alexander polynomial.....	10
On the genericity of hyperbolic knots.....	10
Ordering curves on surfaces.....	10
Equivariant differential geometry and generalized rotational hypersurfaces	11
Braids in dynamics on the disc	11
Moduli spaces of curves and Kontsevich's graph complexes.....	11
Manifold homeomorphisms that are the identity on a subset	12
✓ 7.2 Wednesday	12
Orbifold Lagrangian Floer theory and Hecke algebras.....	12
Some properties of graphs related to knots	12
Reverse Lagrangian surgery.....	12
✓ 7.3 Thursday	13
Kauffman bracket skein module of the (3,3,3,3)-pretzel link exterior.....	13
Hyperbolic and Euclidean structures on cone-manifolds over trefoil knot with a bridge	13
Winding parity and classification of knots in $S_g \times S^1$	13
The photography method. Solving equations and constructing invariants	14
Non-abelian tensor product and orderability of groups	14
The L^2 Alexander torsion for links and its leading coefficient.....	14
Kauffman bracket skein modules of small Seifert manifolds	14
✓ 7.4 Friday	15
New estimates for the number of prime knots.....	15
Comparing -genera, Bridge-1 genera and Heegaard genera of knots.....	15
Multi-virtual braid groups	15

On crossoid structure on knots 16
Right-angled hyperbolic polyhedron of minimum volume 16
Manturov-Nikonov map: non-faithfulness from braids to virtual braids..... 16
The symmetry of Heegaard splittings..... 16

Participants 17

Miscellaneous Information..... 19

How to get to the hotel 19
Lecture rooms..... 19
Conference Registration..... 19
Walking Guidance During the Conference 20
Lunch, Dinner, Banquet..... 20
Wireless Network in the Lecture Hall..... 20
Conference Volunteers and Contact Information 21
Medical Center 22
Suzhou Summer Travel Guide 22

Program Committee

Zhiyun Cheng (Beijing Normal University)
Andrey Malyutin (St. Petersburg Department of
Steklov Mathematical Institute of RAS)
Vassily Manturov (Moscow Institute of Physics and Technology)
Andrei Vesnin (Sobolev Institute of Mathematics of SB RAS &
Tomsk State University)
Jiajun Wang (Peking University)
Zhiqing Yang (Dalian University of Technology)
Ying Zhang (Soochow University)

Local Organizing Committee

Jintai Ding (Xi'an Jiaotong-Liverpool University)
Thijs Kouwenhoven (Xi'an Jiaotong-Liverpool University)
Yi Liu (Peking University)
Jiming Ma (Fudan University)
Jiajun Wang (Peking University)
Ying Zhang (Soochow University)
Fangting Zheng (Xi'an Jiaotong-Liverpool University)

Hosting University

Xi'an Jiaotong-Liverpool University (Host)
Peking University (Co-host)
Sino-Russian Mathematical Center (Co-host)

Supporting

Xi'an Jiaotong-Liverpool University
Peking University
Sino-Russian Mathematical Center
NSFC No.12471067

Contact

Fangting Zheng
Email: fangting.zheng@xjtlu.edu.cn

About

The 11th Sino-Russian Conference on Knot Theory and Related Topics

Knot theory is an actively developing branch of geometry and topology. Modern knot theory includes the study of knots in thickened surfaces and other three-dimensional manifolds, knotoids, and knotted graphs, etc. It is characterized by a combination of methods of three-dimensional topology, algebraic topology, group theory, representation theory, and non-Euclidean geometry. The purpose of the conference is to present new results and discuss open problems related to current trends in knot theory. This conference aims to present cutting-edge results and address open problems in current research, with a focus on classical and virtual knot invariants, geometric structures in low-dimensional topology, braid groups, quandles, Yang-Baxter equations, and applications of knot theory. As the 11th edition of the China-Russia conference series alternately hosted in both countries, it furthers the tradition of bilateral collaboration in this field.

Xi'an Jiaotong-Liverpool University (XJTLU)

Xi'an Jiaotong-Liverpool University (XJTLU) is an international joint-venture university founded by Xi'an Jiaotong University in China and the University of Liverpool in the UK. As a Sino-foreign cooperative university, it captures the essence of both parent universities and is the largest of its kind approved by China's Ministry of Education.

The University offers more than 100-degree programmes in the fields of science, engineering, business, finance, architecture, urban planning, language, and culture. All programmes are taught in English. Upon successful completion of the programme, undergraduate students will earn two degrees—an XJTLU degree from China's Ministry of Education, and a globally recognized degree from the University of Liverpool. Postgraduate students will receive a degree from the University of Liverpool, which is recognized by China's Ministry of Education. All departments at XJTLU offer PhD programmes, which fulfils XJTLU's vision to be a research-led international university in China and a Chinese university recognized internationally for its unique features.

Since its establishment in May 2006, XJTLU has contributed to the development of higher education in China by implementing the "Five-Star Model". XJTLU continuously upgrades its student development system, management and operation mechanisms in response to demands. Over time, XJTLU has won wide recognition for its highly internationalized environment, advanced educational concepts and high-quality talent development. XJTLU bases its values on diversity, discipline, innovation, liberty and trust. It's famous for its resilient management structure and innovative educational model. XJTLU also integrates the cultural and educational essence of the East and the West and cultivates world citizens with international perspectives and competitiveness. It is exploring new models for higher education that will influence educational development both in China and the world.

School of Mathematics and Physics

The School of Mathematics and Physics (SMP) is the home of more than 120 staff members, over 2,500 Undergraduate students, more than 200 Master's students and more than 70 Ph.D. students by 2024. The school also undertakes the service teaching to all the year 15,000+ students for Calculus, Linear Algebra, Statistics modules and other related programme students cross the universities. The school and its precursors have equipped students with strong academic backgrounds as well as analytical skills, communication skills, programming skills, teamwork spirits and practical problem-solving skills. The academic staff are involved in cutting-edge research in different aspects of mathematics and physics, publish hundreds of research articles annually, have received governmental or collaboration projects, and train excellent research students.

In 2024, a total of 625 SMP undergraduates from the domestic unified enrollment program graduated. Among them, 576 students (92.16%) chose to pursue further studies either domestically or abroad, while 18 students (2.88%) start their career life.

According to global university rankings, in the statistical result of the 2024 cohort graduates, 62.28% students in Financial Mathematics, 52.2% students in Applied Mathematics, and 36.47% students in Actuarial Science had been admitted to top 10 universities worldwide, demonstrating outstanding academic outcomes. At the same time, the graduates also performed well in employment, showing strong potential for future career development.

Department of Pure Mathematics

The Department of Pure Mathematics is committed to excellence in research and teaching at XJTLU. We have recently grown and established ourselves as an important academic group within the University. We mainly teach modules for the Applied Mathematics programme that are of a more abstract nature. We are proud of the high quality of our teaching and, as a diverse international team, work hard to give the best learning experience to our students.

Our staff are internationally recognized for their high-quality research output in a number of pure mathematical disciplines such as algebra, combinatorics, dynamical systems, geometry, number theory and topology.

We have a small number of PhD and postdoctoral students, and welcome enquires from prospective candidates.

Schedule

Venue	IAG08	MA405	FBG09				
Time	6.30 Monday	7.1 Tuesday	7.2 Wednesday	7.3 Thursday	7.4 Friday		
8:40-9:00	Opening / Photo						
Chair	Jiajun Wang	Andrey Vesnin	Ying Zhang	Ruifeng Qiu	Jiming Ma		
9:00-9:50	Andrey Vesnin	Wenzhao Chen	Tianyu Yuan	Haimiao Chen	Andrei Malyutin		
Tea break							
10:10-11:00	Xuezhi Zhao	Yury Belousov	Elena Konstantinova	Nikolay Abrosimov	Yanqing Zou		
11:10-12:00	Zhiyun Cheng	Binbin Xu	Yu Pan	Seongjeong Kim	Tatyana Kozlovskaya		
Lunch							
Chair	Nikolay Abrosimov	Zhiqing Yang	Free afternoon	Chair	Fangting Zheng	Chair	Andrei Malyutin
14:30-15:20	Yue Gao	Yuhang Liu		14:30-15:20	Vasily Manturov*	14:30-15:20	Igor Nikonov*
15:30-16:20	Wei Lin	Xiang Liu		15:30-15:55	Maxim Ivanov*	15:30-15:55	Andrei Egorov*
Tea break				Tea break			
16:40-17:05	Ilya Alekseev	Lizi Guo		16:15-17:05	Jianru Duan	16:15-16:40	Yangzhou Liu
17:15-17:40	Ziyi Lei	Daria Aksenova		17:15-17:40	Shangjun Shi	16:50-17:15	Hao Chen
		Banquet					
Asterisk (*) indicates the speaker has chosen to present online. No mark indicates the speaker will present on-site. All times listed are Beijing Time (UTC+8).							

Title and Abstract

✓ 6.30 Monday

The Vol-Det conjecture for highly twisted links

Andrei Vesnin (Sobolev Institute of Mathematics of SB RAS & Tomsk State University)

For a hyperbolic link $K \subset S^3$ we denote the volume of the 3-manifold $S^3 \setminus K$ by $\text{vol}(K)$ and the determinant of K by $\det(K)$. Champanerkar, Kofman and Purcell formulated the following Vol-Det conjecture in 2016.

Conjecture. Let K be an alternating hyperbolic link. Then

$$\text{vol}(K) < 2\pi \cdot \log \det(K).$$

It is known that the constant 2π in the conjecture is accurate. The conjecture holds for all knots with at most 16 crossings, 2-bridge links and closures of 3-strand braids. Let us denote $v_{\text{tet}} = 3\Lambda(\pi/3)$, where

$$\Lambda(\theta) = - \int_0^\theta \ln|2 \sin(t)| dt$$

is the Lobachevsky function, and $\xi = \exp\left(\frac{5v_{\text{tet}}}{\pi}\right)$. Let γ be a number such that $1/\gamma$ is the positive real root of the equation $x^3(x+1)^2 = 1$.

Theorem 1. [1] Let K be an alternating hyperbolic link and let its reduced alternating diagram D with $t(D) > 8$ twists and $c(D)$ crossings. If

$$c(D) \geq t(D) + \xi^{t(D)-1.4} - 2\gamma^{t(D)-1}$$

then the Vol-Det conjecture is true for K .

Theorem 2. [1] Let K be a nontrivial nonsplit alternating link and let D be its reduced alternating diagram with $t(D) > 8$ twists. Then the following inequality holds

$$\text{vol}(K) \leq \frac{10 v_{\text{tet}}}{\log \gamma} \cdot \log \det(K) - \left(\frac{10 v_{\text{tet}} \log 2}{\log \gamma} + 4v_{\text{tet}} \right).$$

[1] A. Egorov, A. Vesnin, The Vol-Det Conjecture for highly twisted alternating links. Preprint available at arXiv:2411.11711v2, 10pp.

Intersections of loops on surfaces

Xuezhi Zhao (Capital Normal University)

We shall explain our methods and algorithms to compute the geometric intersection of loops on surfaces. The position of loops having the minimal intersection are also addressed. Thus, we can determine the complement of loops having the minimal intersection. Some applications will be given. This talk includes some joint works with Ying Gu and Shengwen Xie.

Invariants for knots in $\Sigma_g \times I$ and knots in $\Sigma_g \times S^1$

Zhiyun Cheng (Beijing Normal University)

In this talk, I will discuss how to use index and quandle to define knot invariants for knots in 3-manifolds mentioned in the title. This talk is based on joint work with Hongzhu Gao.

Shape of Thurston's filling systole subset in surface moduli space

Yue Gao (Anhui Normal University)

In this talk, I am going to talk about the sparseness of Thurston's subset. Sparseness is a geometric concept on Thurston's subset first raised by Anderson-Parlier-Pettet in 2016. We have proved the sparseness of Thurston's subset in the sense of Teichmüller distance and Weil-Petersson distance. More precisely, most surfaces in genus g surface moduli space have Teichmüller distance $\frac{1}{5} \log(\log g)$ and Weil-Petersson distance $0.6521(\sqrt{\log g} - \sqrt{7 \log(\log g)})$ to the Thurston's subset.

A standard form of incompressible surfaces in handlebodies

Wei Lin (Fujian Normal University)

We give a standard form for a class of surfaces which includes all the properly embedded incompressible surfaces in 3-dimensional handlebodies. We also give a necessary and sufficient condition to determine the incompressibility of such surfaces placed in our standard form. Our algorithm is practical.

Local certificates in knot space geometry

Ilya Alekseev (Saint Petersburg State University)

We employ geometric methods to analyze the structure of knot space through two perspectives: Gordian graphs (metric viewpoint) and satellite operations (fractal viewpoint). In particular, we present new geometric local certificates—via specific tangle-patterns—that detect knot non-triviality, link non-splittability, and incompressible tori in knot complements. Emphasizing their finite-type nature, we situate these certificates within the Goussarov–Vassiliev–Habiro filtration.

A categorification for the partial-dual genus polynomial

Ziyi Lei (Beijing Normal University)

The partial-dual genus polynomial $\partial_{\varepsilon_G}(z)$ of a ribbon graph G is the generating function that enumerates all partial duals of G . We give a categorification for this

polynomial. The key ingredient of the construction is an extended Frobenius algebra related to unoriented topological quantum field theory.

✓ 7.1 Tuesday

Negative amphicheiral knots and the half-Alexander polynomial

Whenzhao Chen (ShanghaiTech University)

In this talk, we will study strongly negative amphicheiral knots - a class of knots with symmetry. These knots provide torsion elements in the knot concordance group, which are less understood than infinite-order elements. We will introduce the half-Alexander polynomial, an equivariant version of the Alexander polynomial for strongly negative amphicheiral knots, focusing on its applications to knot concordance. In particular, I will show how it facilitated the construction of the first examples of non-slice amphichiral knots of determinant 1. This talk is based on joint work with Keegan Boyle.

On the genericity of hyperbolic knots

Yury Belousov (St. Petersburg Department of Steklov Mathematical Institute of RAS)

In 1978, Thurston proved a celebrated theorem classifying knots into three categories: torus, satellite, and hyperbolic. For decades, it was widely conjectured that almost all prime knots are hyperbolic. Specifically, in Adams' *The Knot Book*, one can find the following conjecture: the proportion of hyperbolic knots among prime knots with at most n crossings approaches 1 as n approaches infinity. Surprisingly, recent developments overturned this longstanding conjecture. In 2017, A. Malyutin showed that Adams' conjecture clashes with several other plausible conjectures in knot theory. Finally, Adams' conjecture was disproved in 2019 through joint work with A. Malyutin. This talk will highlight the core ideas and methods underlying this result.

Ordering curves on surfaces

Binbin Xu (Nankai University)

Let S be an oriented topological surface of finite type. Given a hyperbolic metric on S , there is an order among all homotopy classes of curves on S induced by comparing the lengths of their geodesic representatives. We call it the length order of curves induced by the given hyperbolic metric. In a collaboration with Hugo Parlier and Hanh Vo, we show that given any pair of distinct points in the Teichmüller space $\mathcal{T}(S)$ of S , there exist two homotopy classes of curves on S , such that the two given points of $\mathcal{T}(S)$ induce different length order on them. Hence the length orders of curves on S can determine points in $\mathcal{T}(S)$. This result is a generalization of a result of

Greg McShane and Hugo Parlier. We also study the homotopy classes of curves whose length order never changes as the hyperbolic metric varies, and introduce a way to construct such examples.

Equivariant differential geometry and generalized rotational hypersurfaces

Yuhang Liu (Xi'an Jiaotong-Liverpool University)

In this talk, we first discuss basic concepts on smooth group actions on smooth manifolds, including orbit types, orbit space, cohomogeneity, etc. We will introduce smooth slice theorem to study local structures of orbits. Then we will move on to a special type of invariant submanifolds--rotational hypersurfaces. We will discuss constant curvature problem on such hypersurfaces, including my recent work on rotational hypersurfaces with constant Gauss-Kronecker curvature, joint with my previous student Yunchu Dai. We will also talk about some open problems to be studied in the future, including hypersurfaces with more general types of group actions.

Braids in dynamics on the disc

Xiang Liu (Hebei Normal University)

Braids arise naturally in dynamics of disc maps. Periodic orbits induce braids, and the forcing among periodic orbits is characterized by their braid types. For the linking of orbits, based on a trace formula for the forcing relation given by Jiang and Zheng in 2008, we present a method for finding periodic orbits which are linked with a given one. We also discuss the relation between the theory of braid types and the theory of braid Conley indices for symplectomorphisms of the disc, which is developed by Czechowski and Vandervorst in 2017.

Moduli Spaces of Curves and Kontsevich's Graph Complexes

Lizi Guo (University of Cambridge)

The study of the moduli spaces M_g of compact Riemann surfaces of genus g is an old and important problem in geometry and topology, first introduced by Riemann in 1850s. In general, the space M_g is not compact. A classic compactification was given by Deligne and Mumford in 1969 by considering nodal Riemann surfaces. The combinatorial type of a nodal Riemann surface can be encoded into a stable graph. Metrizing these stable graphs gives some degenerated algebraic curves called tropical curves, whose moduli spaces Δ_g will help us understand the original M_g . In this report, we will introduce some recent computation results of the (co)homology of these moduli spaces using Kontsevich's Graph Complexes.

Manifold homeomorphisms that are the identity on a subset

Daria Aksenova (St. Petersburg Department of Steklov Mathematical Institute of RAS)

This talk presents a generalization of J. Alexander's theorem (see [1]), celebrated for its concise proof known as the Alexander trick. The classical result states that any homeomorphism of a closed n -ball fixes the boundary is isotopic to the identity relative to the boundary. In 1981, D. B. A. Epstein established a 2-dimensional generalization (see [2]): Let K be a nonempty compact subset of a connected compact 2-manifold M such that every component of $M - K$ is an open disk. If a self-homeomorphism $h: M \rightarrow M$ is the identity on K and preserves the orientation on M , then h is isotopic to the identity by an isotopy which is fixed on K . We present a counterexample demonstrating that Epstein's theorem fails for 3-manifolds and a generalized theorem (with an additional condition) unifying Alexander's and Epstein's results for n -manifolds.

[1] Alexander J. W. On the deformation of an n -cell. Proceedings of the National Academy of Sciences of the United States of America, 1923, 406-407.

[2] Epstein D. B. A. Pointwise periodic homeomorphisms. Proceedings of the London Mathematical Society, 1981, T. 3, No. 3, 415-460.

✓ 7.2 Wednesday

Orbifold Lagrangian Floer theory and Hecke algebras

Tianyu Yuan (Eastern Institute of Technology)

Let G be a finite group acting on X . We show that the wrapped Fukaya algebra of a generic fiber of $T^*(X/G)$ is isomorphic to the Hecke algebra associated to X/G . The key ingredient in defining such orbifold Floer theory is the global Kuranishi chart developed by Abouzaid-Mclean-Smith and Bai-Xu. This is joint work in progress with Ko Honda, Roman Krutowski, and Yin Tian.

Some properties of graphs related to knots

Elena Konstantinova (China Three Gorges University)

In this talk we discuss spectral and structural properties of regular graphs related to knots.

Reverse Lagrangian surgery

Yu Pan (Tianjin University)

A major theme in symplectic and contact topology is the study of Legendrian knots and exact Lagrangian surfaces. In the talk, we will talk about some flexibility results of immersed Lagrangian surfaces using augmentation, a Floer type invariant of Legendrian knots. In particular, for an immersed filling of a topological knot, one can do surgery to resolve a double point with the price of increasing the surface genus by 1. In the Lagrangian analog, one can do Lagrangian surgery on immersed Lagrangian fillings to treat a double point by a genus. In this talk, we will explore the possibility of reversing the Lagrangian surgery, i.e., compressing a genus into a double point. It turns out that not all Lagrangian surgery is reversible.

✓ 7.3 Thursday

Kauffman bracket skein module of the (3,3,3,3)-pretzel link exterior

Haimiao Chen (Beijing Technology and Business University)

We show that the Kauffman bracket skein module of the (3,3,3,3)-pretzel link exterior over $\mathbb{Q}(q^{\frac{1}{2}})$ is not finitely generated as a module over $\mathbb{Q}(q^{\frac{1}{2}})[t_1, t_2]$ where t_1, t_2 are the meridians of two components. This disproves a finiteness conjecture of Detcherry proposed in 2021.

Hyperbolic and Euclidean structures on cone-manifolds over trefoil knot with a bridge

Nikolay Abrosimov (Sobolev Institute of Mathematics of SB RAS & Tomsk State University)

We study cone-manifolds whose singular set is the trefoil knot with a bridge and whose underlying space is the 3-dimensional sphere. We establish necessary and sufficient conditions for the existence of such manifolds in both Euclidean and hyperbolic geometries, and derive explicit volume formulas in each case.

Winding parity and classification of knots in $S_g \times S^1$

Seongjeong Kim (Jilin University)

In knot theory not only classical knots, which are embedded circles in S^3 up to isotopy but also knots in other 3-manifolds are interesting for mathematicians. In particular, virtual knots, which are knots in thickened surface $S_g \times [0,1]$ with an orientable surface S_g of genus g , are studied and they provide interesting properties. One of famous tool to study virtual knots is *parity* defined by V.O. Manturov, by using which many invariants for classical knots can be non-trivially extended to invariants for virtual knots. In this paper we are interested in knots in

$S_g \times S^1$. Isotopy classes of knots in $S_g \times S^1$ can be presented by using diagrams on plane and local moves, but one can expect that we lose over/under information. But we have information how many times a half of the crossing of the knot in $S_g \times S^1$ rotates along S^1 , and we define it **labels** of crossings. We extend labels to the notion of **winding parity** and properties of it are studied. In the end of paper, we study classifications of knots in $S_g \times S^1$ with small number of crossings by using a winding parity.

The photography method. Solving equations and constructing invariants

Vasily Manturov (Moscow Institute of Physics and Technology)

TBA

Non-abelian tensor product and orderability of groups

Maxim Ivanov (Sobolev Institute of Mathematics of SB RAS & Tomsk State University)

In 1987 R. Brown and J.-L. Loday defined non-abelian tensor product of groups. The construction arises in applications of a generalized Van Kampen theorem. In particular, third homotopy group of the suspension of an Eilenberg–MacLane space $K(G, 1)$ is isomorphic to a kernel of a natural map $G \otimes G \rightarrow G$. We will discuss properties, such as orderability of tensor products, and their relation to those of the initial groups.

The L^2 Alexander torsion for links and its leading coefficient

Jianru Duan (Peking University)

The L^2 -Alexander torsion is an invariant associated to a 3-manifold and a 1-cohomology class. For an oriented link, this invariant is a real function with many properties similar to the classical Alexander polynomial. In this talk, I will first review the basics of L^2 -theory of 3-manifolds (e.g. L^2 -beti numbers, L^2 -torsions), then discuss the "leading coefficient" of the L^2 -Alexander torsion and show its connection with Gabai's sutured manifold theory and the guts theory recently developed by Agol-Zhang.

Kauffman bracket skein modules of small Seifert manifolds

Shangjun Shi (East China Normal University)

We compute the Kauffman bracket skein modules (KBSM) of small Seifert manifolds by providing presentations of them. From the presentations of small Seifert manifolds, we show that the KBSM of $D^2(k_1, k_2)$, $k_i \geq 1$ are infinitely generated free modules. This is joint work with Xiao Wang and Minyi Liang.

✓ 7.4 Friday

New estimates for the number of prime knots

Andrei Malyutin (St. Petersburg Department of Steklov Mathematical Institute of RAS)

We study the structure and statistical characteristics of the set of classical knots. A particular point of this study is the growth rate of the number of knots with respect to various complexity measures on the set of knots. In this talk, new estimates for the growth rate of the number of prime knots with respect to the crossing number will be presented.

Comparing—genera, Bridge-1 genera and Heegaard genera of knots

Yanqing Zou (East China Normal University)

Let $h(K)$, $g_H(K)$, $g_1(K)$, $t(K)$ be the h-genus, Heegaard genus, bridge-1 genus, and tunnel number of a knot K in the 3-sphere S^3 , respectively. It is known that $g_H(K) - 1 = t(K) \leq g_1(K) \leq h(K) \leq g_H(K)$. A natural question arises: when do these invariants become equal? We provide the necessary and sufficient conditions for equality and use these to show that for each integer $n \geq 1$, the following three families of knots are infinite: $A_n = \{K \mid t(K) = n < g_1(K)\}$, $B_n = \{K \mid g_1(K) = n < h(K)\}$, $C_n = \{K \mid h(K) = n < g_H(K)\}$. This result resolves a conjecture in a conjecture of Morimoto, confirming that each of these families is infinite. This is a joint work with Ruifeng Qiu and Chao Wang.

Multi-virtual braid groups

Tatiana Kozlovskaja (Tomsk State University)

L. Kauffman introduced multi-virtual and symmetric multi-virtual braid groups, which are a generalization of the virtual braid group. We introduce multi-virtual pure and multi-virtual semi-pure braid groups. We give a set of generators and defining relations, we show that multi-virtual braid group is a semi-direct product of its subgroups.

On crossoid structure on knots

Igor Nikonov (Lomonosov Moscow State University)

We define a structure called crossoid for description of colorings of the crossings in knots diagrams. Crossoids generalize parities in knot theory introduced by V.O. Manturov. On the other hand, any biquandle induces a crossoid structure. We give a topological description of the fundamental crossoid of a knot, and define a crossoid cocycle invariant of knots valued in crossoid cohomology.

Right-angled hyperbolic polyhedron of minimum volume

Andrei Egorov (Sobolev Institute of Mathematics of SB RAS & Tomsk State University)

We establish that among all right-angled hyperbolic polyhedra, the one with the smallest volume is a polyhedron having three ideal and two finite vertices. The volume of this polyhedron is equal to Catalan's constant, $G \approx 0.915965$.

Manturov-Nikonov map: non-faithfulness from braids to virtual braids

Yangzhou Liu (Moscow Institute of Physics and Technology)

The representation theory of braids is more advanced than that of classical knots, with established representations such as the Burau representation (unfaithful for B_n when $n \geq 5$) the Temperley–Lieb representation (related to the Jones polynomial), and the Lawrence–Krammer–Bigelow representation (faithful for $n \geq 1$). In 2022, Prof. Manturov and Prof. Nikonov introduced a mapping from braids to virtual braids to study classical knot theory using virtual knot theory. This talk will demonstrate that this mapping is unfaithful, partly.

The symmetry of Heegaard splittings

Hao Chen (East China Normal University)

The mapping class group of a Heegaard splitting for a 3-manifold is the group of isotopy classes of orientation-preserving diffeomorphisms of the manifold that preserve the splitting. As a subgroup of surface mapping class group, Minsky asked whether it is finite, finitely generated, or finitely presented. In this talk, I will review some known results for this problem and introduce a new method to tackle this problem. This talk is based on a joint work with Yanqing Zou.

Participants

	Name	University	Email
1	Nikolay Abrosimov	Sobolev Institute of Mathematics	abrosimov@math.nsc.ru
2	Daria Aksenova	St. Petersburg Dept. of Steklov Mathematical Institute of RAS	daria.aksenova12@gmail.com
3	Ilya Alekseev	Saint Petersburg State University	ilyaalekseev@yahoo.com
4	Jiacheng An	Dalian University of Technology	anan0312@163.com
5	Yury Belousov	St. Petersburg Dept. of Steklov Mathematical Institute of RAS	bus99@yandex.ru
6	Li Cai	Xi'an Jiaotong-Liverpool University	Li.Cai@xjtlu.edu.cn
7	Xinwen Cao	East China Normal University	1224949307@qq.com
8	Haimiao Chen	Beijing Technology and Business University	chenhaimiao@btbu.edu.cn
9	Hao Chen	East China Normal University	hchen@stu.ecnu.edu.cn
10	Haocong Chen	Dalian University of Technology	chc1728@mail.dlut.edu.cn
11	Wenzhao Chen	ShanghaiTech University	chenwzh@shanghaitech.edu.cn
12	Zhiyun Cheng	Beijing Normal University	czy@bnu.edu.cn
13	Siqi Ding	Dalian University of Technology	sqding@yeah.net
14	Jianru Duan	Peking University	duanjr@stu.pku.edu.cn
15	Andrei Egorov	Sobolev Institute of Mathematics	a.egorov2@g.nsu.ru
16	Bing Fang	Henan Normal University & BIMSA	B_Fang@yeah.net
17	Jie Fei	Xi'an Jiaotong-Liverpool University	jie.feixjtlu.edu.cn
18	Yan Fu	Nankai University	1120230012@mail.nankai.edu.cn
19	Hongzhu Gao	Beijing Normal University	hzgao@bnu.edu.cn
20	Yue Gao	Anhui Normal University	yuegao@ahnu.edu.cn
21	Lizi Guo	University of Cambridge	lg759@cam.ac.uk
22	Zhiyi He	Beijing Normal University	202321130080@mail.bnu.edu.cn
23	Maxim Ivanov	Sobolev Institute of Mathematics	m.ivanov2@g.nsu.ru
24	Chengzheng Jin	Jilin University	kimseongjeong@jlu.edu.cn
25	Elena Konstantinova	China Three Gorges University	e_konsta@ctgu.edu.cn
26	Tatiana Kozlovskaja	Tomsk State University	Konus_magadan@mail.ru
27	Ziyi Lei	Beijing Normal University	202431130003@mail.bnu.edu.cn
28	Fengling Li	Dalian University of Technology	fenglingli@dlut.edu.cn
29	Yanlin Li	Hangzhou Normal University	liyl@hznu.edu.cn
30	Youlin Li	Shanghai Jiao Tong University	liyulin@sjtu.edu.cn
31	Junjie Liao	Capital Normal University	2230501006@cnu.edu.cn
32	Wei Lin	Fujian Normal University	linwei201208@gmail.com
33	Xinyu Lin	Beijing Normal University	202321130081@mail.bnu.edu.cn
34	Lang Liu	Beijing Normal University	202421130082@mail.bnu.edu.cn
35	Qing Liu	Nankai University	Qingliu@nankai.edu.cn
36	Wenbiao Liu	Beijing Normal University	202321130082@mail.bnu.edu.cn
37	Xiang Liu	Hebei Normal University	nz_liu1989@163.com
38	Yang Liu	East China Normal University	51265500009@stu.ecnu.edu.cn
39	Yangzhou Liu	Moscow Institute of Physics and Technology	yangzhouliu@uic.edu.cn

40	Ye Liu	Xi'an Jiaotong-Liverpool University	ye.liu@xjtlu.edu.cn
41	Yuhang Liu	Xi'an Jiaotong-Liverpool University	Yuhang.liu02@xjtlu.edu.cn
42	Ziyi Liu	Hebei Normal University	2483953038@qq.com
43	Simon Lloyd	Xi'an Jiaotong-Liverpool University	Simon.Lloyd@xjtlu.edu.cn
44	Jiming Ma	Fudan University	majiming@fudan.edu.cn
45	Liyuan Ma	Dalian University of Technology	liyuan_ma@126.com
46	Andrei Malyutin	St. Petersburg Dept. of Steklov Mathematical Institute of RAS	andreymalyutin@gmail.com
47	Vasily Manturov	Moscow Institute of Physics and Technology	vomanturov@yandex.ru
48	Xuejiao Mao	Dalian University of Technology	xjmao@mail.dlut.edu.cn
49	Yunpeng Meng	Capital Normal University	2230501005@cnu.edu.cn
50	Stephen Moore	Xi'an Jiaotong-Liverpool University	Stephen.Moore@xjtlu.edu.cn
51	Igor Nikonov	Lomonosov Moscow State University	nikonov@mech.math.msu.su
52	Yu Pan	Tianjin University	ypan@tju.edu.cn
53	Anirudha Poria	Xi'an Jiaotong-Liverpool University	Anirudha.Poria@xjtlu.edu.cn
54	Ruifeng Qiu	East China Normal University	rfqiu@math.ecnu.edu.cn
55	Shangjun Shi	East China Normal University	51255500022@stu.ecnu.edu.cn
56	Dongqi Sun	Harbin Engineering University	sundq1029@hrbeu.edu.cn
57	Adam-Christiaan van Roosmalen	Xi'an Jiaotong-Liverpool University	ac.vanroosmalen@xjtlu.edu.cn
58	Andrey Vesnin	Sobolev Institute of Mathematics	vesnin@math.nsc.ru
59	Sihan Wan	Xi'an Jiaotong-Liverpool University	SihanwanSihanwan@outlook.com
60	Chao Wang	East China Normal University	wangchao@math.ecnu.edu.cn
61	Gefei Wang	Peking University	wanggefei@math.pku.edu.cn
62	Jiajun Wang	Peking University	wjiajun@pku.edu.cn
63	Junhua Wang	Jiangsu University of Technology	jhwang@jsut.edu.cn
64	Saijun Wang	East China Normal University	52285500010@stu.ecnu.edu.cn
65	Zixi Wang	Zhejiang Normal University	zxwang22@zjnu.edu.cn
66	Jianchun Wu	Soochow University	wujianchun@suda.edu.cn
67	Baohua Xie	Hunan University	xiexbh@hnu.edu.cn
68	Binbin Xu	Nankai University	binbin.xu@nankai.edu.cn
69	Xiaomeng Xu	BIMSA	xiaomeng.x.xu@gmail.com
70	Shasha Yang	Hebei Normal University	3101118398@qq.com
71	Zhiqing Yang	Dalian University of Technology	yangzhiqing@dlut.edu.cn
72	Tianyu Yuan	Eastern Institute of Technology	tyyuan@eitech.edu.cn
73	Qiang Zhang	Xi'an Jiaotong University	zhangq.math@xjtu.edu.cn
74	Yaomingyuan Zhang	Soochow University	zhangymy96.sina.com
75	Ying Zhang	Soochow University	yzhang@suda.edu.cn
76	Xuezhi Zhao	Capital Normal University	4019@cnu.edu.cn
77	Fangting Zheng	Xi'an Jiaotong-Liverpool University	fangting.zheng@xjtlu.edu.cn
78	Linan Zhong	Yanbian University	lnzhong@ybu.edu.cn
79	Yanqing Zou	East China Normal University	yqzou@math.ecnu.edu.cn
80	Ze Zhou	Shenzhen University	zhouze@szu.edu.cn

Miscellaneous Information

How to Get to the Hotel

Participants will be accommodated at Xi'an Jiaotong-Liverpool International Conference Center (No.99 Ren'ai Road, Suzhou Industrial Park, Suzhou. Tel: +86-512-86665555 / +86 15151457598). It is recommended to take a taxi from the train station or airport to the hotel.

Train Station	Bus	Subway	Taxi
Suzhou Railway Station	Expr. #143 70min + walk 5min	#2 40min + walk 25min	20-30 mins recommended
Suzhou North Railway Station	Not recommended	#2 65min + walk 25min	30-40 mins recommended
Suzhou Industrial Park Railway Station	Expr. #115 50min + walk 10min	#8 14min	15-25 mins recommended

Airport	Public Transportation	Taxi
Sunan Shuofang International Airport	Airport bus Suzhou South line 67 mins + Metro #4 5mins + Metro #2 20 mins	60-70 mins recommended
Shanghai Hongqiao International Airport	Shanghai Metro # 2 6 mins + train from Shanghai Hongqiao Railway Station to Suzhou Station/Suzhou Industrial Park Station 30 mins Afterward, please refer to the table above for transportation from the train station to the hotel.	1h5mins-1h15mins recommended
Shanghai Pudong International Airport	Not recommended	1h50mins-2h20mins recommended

Lecture Rooms

Monday (June 30th): **IAG08** (South Campus, IA Building, ground floor)

Tuesday (July 1st): **MA405** (North Campus, Math Building, 4th floor)

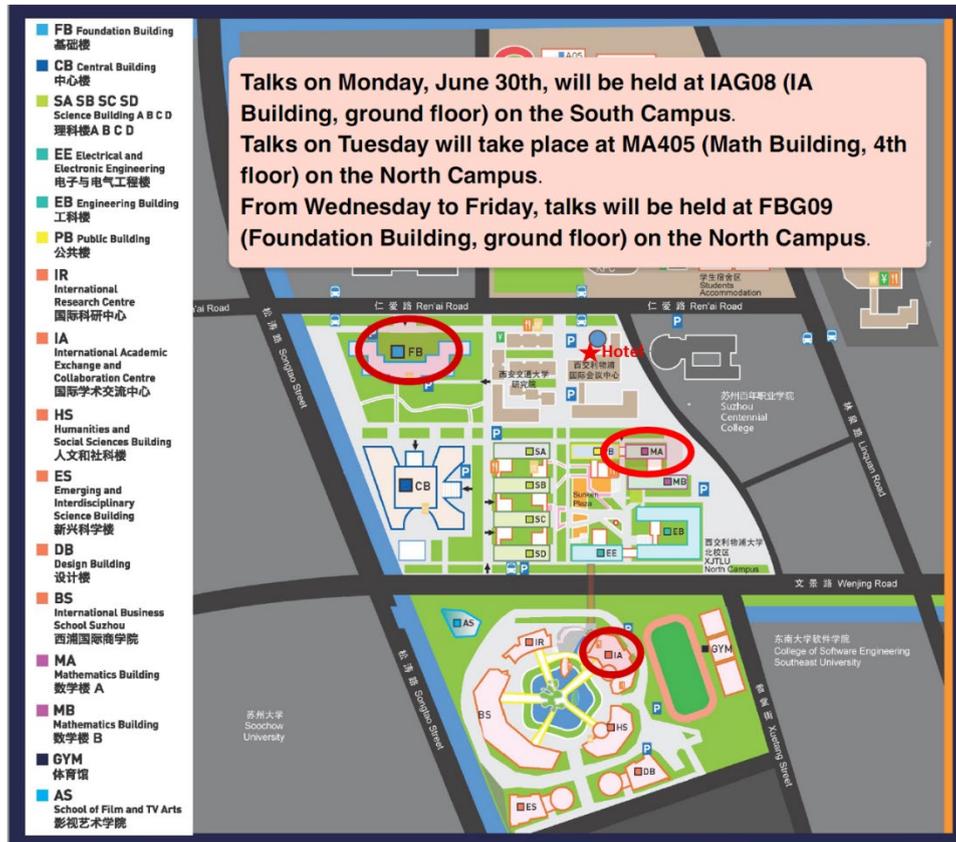
Wednesday–Friday (July 2nd–July 4th): **FBG09** (North Campus, Foundation Building, ground floor)

Conference Registration

Participants can choose to register and collect conference materials at the hotel lobby from 13:00-21:00 on June 29th or register on-site at the conference venue.

Walking Guidance During the Conference

On the mornings of **June 30th at 8:15, June 1st at 8:40, and June 2nd at 8:40**, student volunteers will depart from the lobby of the conference center to guide participants to the lecture hall. You may also follow the map below to reach the venue on your own—the locations are circled for reference.



Lunch, Dinner, Banquet

Boxed meals will be provided for lunch daily from June 30 to July 4. Dinner venues, except on free and banquet days, will be announced after the final session each day. The Banquet will take place at Songhe Lou—Guanqian Street Branch (松鹤楼, 观前店) on Tuesday, July 1st, at 18:00.

Wireless Network in the Lecture Hall

There are two ways to access wireless internet during the event at XJTLU:

Via eduroam

XJTLU supports eduroam, a secure worldwide Wi-Fi roaming service developed for the international research and education community.

If you are from another university that also supports eduroam, you can connect to the eduroam network directly using your home university email credentials (e.g. username@university.edu.cn).

Via XJTLU local network

- Connect to the wireless network named 'XJTLU'.
- When prompted by the login page (or after opening <https://netauth.xjtlu.edu.cn/>), enter the following temporary credentials:
- Username: wifi63 • Password: Wifi632025



Use MacAuth I agree to Campus network's [Terms of Use](#)
Please do not check this option on public computers shared by other users (Classroom, Printing Rooms etc.) 请不要在共享给其他用户使用的公共电脑上勾选此项(教室, 自助打印室等)

Login to your XJTLU account

Login

Visitor Registration



Conference Volunteers and Contact Information

Team Coordinator: Zihan Wang

Vice Team Coordinator: Ziyong Wu, Zihan Xu

Zihan Wang: +86 13852921898

Ziyong Wu: +86 18978880266

Zihan Xu: +86 17388876270

Sihan Wan: +86 17705597986

Keyu Mao: +86 15287117847

Bowei Tang: +86 13914382097

Yuchi Peng: +86 18905156307

Juan Chen: +86 17798598728

Ruiqi Song: +86 18645997508

Peiyuan Ren: +86 18596256602

Jia Chen: +86 13913144926

Qizhi Wang: +86 17311197918

Yinquan Hou: +86 18916165436

Zeyuan Yu: +86 13587309166

Date	6.30	7.1	7.2	7.3	7,4
Morning Volunteers	Zihan Wang Qizhi Wang	Zihan Wang Yinquan Hou Qizhi Wang	Ziyong Wu Bowei Tang Ruiqi Song	Zihan Xu Peiyuan Ren	Bowei Tang Yinquan Hou
Afternoon Volunteers	Ziyong Wu Jia Chen	Zihan Xu Juan Chen Yuchi Peng		Peiyuan Ren Ruiqi Song Jia Chen	Yuchi Peng Juan Chen

Medical Center

There is a Health Service Center located on the North Campus (see the map below). If you have health problems, please get in touch with the volunteers to go to the Health Service Center.



Health Service Center, North Campus, the Ground floor of Fundamental Building at FBG59 Tel: 0512-81884630

Another option is to seek volunteers for help to get to the nearby hospital: The Fourth Affiliated Hospital of Soochow University (Suzhou Dushu Lake Hospital).

Suzhou Summer Travel Guide

The average daytime temperature in Suzhou in July is around 31°C, while the average nighttime temperature is around 28°C. Please add or remove clothing accordingly. Suzhou can be very hot and humid during this season, so please take precautions against heat and sun exposure. We also recommend bringing sun protection (such as hats, sunglasses, and sunscreen) and an umbrella or raincoat in case of sudden showers.

You can scan the QR code on the right side below to get the Suzhou Travel Pocket Book (English Version).

