

2026 Teichmüller Theory and Related Topics

Conference Manual



2026 April 4th to 10th
Hefei (合肥) Anhui (安徽)





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I Conference Information

Time: April 4th to 10th, 2026

Venue: Fillmore Grand Binhu Hefei (合肥滨湖富茂大饭店),
No.1001 Luzhou Road, Binhu District, Hefei, Anhui 230601, China.

Organizers (listed alphabetically by last name):

Shinpei Baba (University of Osaka)

Gye-Seon Lee (Seoul National University)

Qiongling Li (Nankai University)

Zhe Sun (University of Science and Technology of China, USTC)

Shucheng Yu (University of Science and Technology of China,
USTC)

Tengren Zhang (National University of Singapore)

Contact:

Ms. Linmin Guo, guolinmin@ustc.edu.cn



II Transportation

1. Xinqiao Airport: Taxi takes around 45 mins and the price is around 60-200rmb. Public transport from airport to Hefei Nan station is Airport Bus Line 3. Then from Hefei Nan station to Wanda city take metro line 1 then walk for 6 mins. By public transportation, it takes around 1 hours and 40 mins and the price is 28 rmb.

2. Hefei Nan Station: Public transport from Hefei Nan station to WandaCheng Station by metro line 1 (out from Port D), then walk for 6 mins, takes around 30 mins and the price is 3 rmb. Taxi takes around 20 mins and the price is around 20-50 rmb.

3. Hefei Station: Public transport from Hefei station to Wanda city is metro line 1. Then walk for 6 mins. It takes around 50 mins and the price is 6 rmb. Taxi takes around 30 mins and the price is around 30-80 rmb.

III Travel Guide

Payment and Taxi in China:

Alipay  & Wechat  & Cash

In China, almost everyone uses wechat/alipay for payment, we strongly recommend you to use wechat/alipay for payment. It should work after you link your credit card to wechat/alipay.

You can use DiDi (滴滴出行)  to book a taxi without a Chinese phone number--- Didi accepts payment with Alipay or WeChat.

Using Gaode/Baidu map app for booking taxi would be very cheap. But you have to link your chinese phone number to do so.

You can unlink all of them when you leave.

Map Applications:

- [Baidu](#)



- [Gaode](#)





IV Speakers

(listed alphabetically by last name)

1. Daniel Douglas, Virginia Polytechnic Institute and State University
2. Honghao Gao, Tsinghua University
3. Stavros Garoufalidis, Southern University of Science and Technology
4. Siqi He, Academy of Mathematics and Systems Science
5. Pengfei Huang, Nanjing University
6. Shunsuke Kano, Tohoku University
7. Hyun Kyu Kim, Korea Institute for Advanced Study
8. Minju Lee, Korea Advanced Institute of Science and Technology
9. Yi Liu, Peking University
10. Greg McShane, Université Grenoble Alpes
11. Hideki Miyachi, Kanazawa university
12. Takuro Mochizuki, Kyoto University
13. Linhui Shen, Michigan State University
14. Nicolas Tholozan, École Normale Supérieure
15. Daping Weng, The University of North Carolina at Chapel Hill
16. Yunhui Wu, Tsinghua University
17. Wenyan Yang, Peking University
18. Tao Yu, Southern University of Science and Technology
19. Feng Zhu, University of Wisconsin-Madison



V Conference Schedule

Date: Saturday, April 4th, 2026

Venue: Milan Ting

Time	Speaker	Title	Chair
08:30-08:40	Welcome Message from the Dean		Zhe Sun
08:40-09:40	Takuro Mochizuki	Specialized Simpson's main estimates for cyclic harmonic G-bundles	
09:40-10:30	Coffee Break		
10:30-11:30	Stavros Garoufalidis	A lift of the colored Jones polynomial	
11:30-12:30	Lunch		
14:40-15:40	Yi Liu	Entropy versus volume via Heegaard diagrams	Ying Zhang
15:40-16:30	Coffee Break		
16:30-17:30	HyunKyu Kim	A quantization of moduli spaces of 3-dimensional gravity	
17:30-19:30	Dinner		



V Conference Schedule

Date: Sunday, April 5th, 2026

Venue: Milan Ting

Time	Speaker	Title	Chair
08:40-09:40	Yunhui Wu	Nearly optimal spectral gaps for random hyperbolic surfaces	Gye-Seon Lee
09:40-10:30	Coffee Break		
10:30-11:30	Minju Lee	Counting totally geodesic submanifolds in infinite volume rank one spaces	
11:30-12:30	Lunch		
14:40-15:40	Hideki Miyachi	Function theory, Dynamics, and Ergodic theory in Teichmuller theory	Tsukasa Ishibashi
15:40-16:30	Coffee Break		
16:30-17:30	Pengfei Huang	Symmetric spaces for groups over involutive algebras and applications	
17:30-19:30	Dinner		



V Conference Schedule

Date: Wednesday, April 8th, 2026

Venue: Milan Ting

Time	Speaker	Title	Chair
08:40-09:40	Honghao Gao	Legendrian knots and quantum groups	Tengren Zhang
09:40-10:30	Coffee Break		
10:30-11:30	Wenyuan Yang	Dimensions of escaping and recurrent geodesics	
11:30-12:30	Lunch		
14:40-15:40	Siqi He	Recent progress on the compactification of the Hitchin moduli space near singular fibers	Ze Zhou
15:40-16:30	Coffee Break		
16:30-17:30	Tao Yu	Relation between Bonahon-Liu-Wong-Yang and Baseilhac-Benedetti invariants	
17:30-19:30	Dinner		



V Conference Schedule

Date: Thursday, April 9th, 2026

Venue: Milan Ting

Time	Speaker	Title	Chair
08:40-09:40	Greg McShane	Hyperbolic Geometry and Diophantine Approximation	Qiongling Li
09:40-10:30	Coffee Break		
10:30-11:30	Daniel Douglas	A quantum N-dimer model	
11:30-12:30	Lunch		
14:40-15:40	Nicolas Tholozan	Positive representations over non-archimedean fields	Youngjun Kim
15:40-16:30	Coffee Break		
16:30-17:30	Shunsuke Kano	Fenchel--Nielsen twist for cluster algebras	
17:30-19:30	Dinner		



V Conference Schedule

Date: Friday, April 10th, 2026

Venue: Milan Ting

Time	Speaker	Title	Chair
08:40-09:40	Linhui Shen	Skein algebras on punctured surfaces and quantizations of higher decorated Teichmüller spaces	Shinpei Baba
09:40-10:30	Coffee Break		
10:30-11:30	Daping Weng	Weaves from T-shifting plabic graphs	
11:30-12:30	Lunch		
14:40-15:40	Feng Zhu	Patterson--Sullivan theory for transverse groups and beyond	Sungwoon Kim



VI Title and Abstract

Specialized Simpson's main estimates for cyclic harmonic G-bundles

Takuro Mochizuki, Kyoto University

There are some useful estimates for harmonic metrics of cyclic Higgs bundles and symmetric Higgs bundles satisfying the regularity conditions. In this talk, we shall discuss a unified generalizations of the estimates to the context of G-Higgs bundles. As applications, we shall discuss the existence and the classification of some type of harmonic G-Higgs bundles.

A lift of the colored Jones polynomial

Stavros Garoufalidis, SUSTech

We will discuss a lift of the colored Jones polynomial of a knot to a Habiro ring associated to its Alexander polynomial. The lift has functorial properties with respect to Dehn filling, extends to the skein module of the knot complement and describes the contribution of the abelian part of the $SL(2, \mathbb{C})$ -character variety of the knot complement under Chern-Simons perturbation theory. Joint work with Campbell Wheeler.



VI Title and Abstract

Entropy versus volume via Heegaard diagrams

Yi Liu, Peking University

In this talk, I'll discuss an inequality due to Kojima comparing the entropy of a pseudo-Anosov mapping class with the hyperbolic volume of the mapping torus. I will explain how to use Heegaard Floer homology to improve the direction of bounding entropy by volume from above.

A quantization of moduli spaces of 3-dimensional gravity

HyunKyu Kim, Korea Institute for Advanced Study

For a punctured oriented surface S , I will present a quantization of the moduli space of maximal globally hyperbolic Cauchy-complete constant curvature Lorentzian metrics on S times the real line, with parabolic holonomy around punctures. I will first review the cluster-variety type quantization of Teichmüller spaces by Chekhov-Fock-Goncharov, and explain how to apply it to our case by generalized complexification. This also yields a new quantization of the cotangent bundle of the Teichmüller space, inspired by 3d gravity. Based on the joint work with C. Scarinci.



VI Title and Abstract

Nearly optimal spectral gaps for random hyperbolic surfaces

Yunhui Wu, Tsinghua University

In this talk, we will introduce some recent remarkable developments on nearly optimal spectral gaps for random hyperbolic surfaces. For example, joint with Yang Shen, we show that a random hyperbolic surface in the Brooks-Makover model has nearly optimal spectral gap.

Counting totally geodesic submanifolds in infinite volume rank one spaces

Minju Lee,

Korea Advanced Institute of Science and Technology

In this talk, we focus on totally geodesic submanifolds (TGS) in geometrically finite rank one locally symmetric spaces of infinite volume. We first show that there are at most finitely many maximal TGS of finite volume of the given manifold. We then provide explicit upper bounds for the number of TGS with volume less than T . These bounds are polynomial in T , and are obtained by quantitative result accounting for the isolation of TGS. Our results extend previous work of Mohammadi-Oh on real hyperbolic 3-manifolds to the general rank-one locally symmetric spaces. This is ongoing joint work with Hee Oh.



VI Title and Abstract

Function theory, Dynamics, and Ergodic theory in Teichmüller theory

Hideki Miyachi, Kanazawa university

This talk presents recent progress in my research on function theory in Teichmüller theory. First, I discuss a Poisson integral formula for pluriharmonic functions on Teichmüller space. Then, I explain its applications to the dynamics of the mapping class group.

Symmetric spaces for groups over involutive algebras and applications

Pengfei Huang, Nanjing University

Symplectic groups and (indefinite) orthogonal groups over noncommutative involutive algebras provide a new way of realizing classical Lie groups. When in particular, the involutive algebra is Hermitian or the complexification of a Hermitian algebra, one can identify the corresponding maximal compact subgroups. This new perspective allows for the realization of various geometric models for the symmetric space of these groups. In this talk, we will illustrate these ideas and describe the tangent spaces for each of the models, as well as the application to the interpretation of Higgs bundles. If time permits, we will also talk about a factorization of the Hitchin morphism in terms of these models, which provides a concrete geometric interpretation of the Hitchin base. This is joint work with G. Kydonakis, E. Rogozinnikov and A. Wienhard.



VI Title and Abstract

Legendrian knots and quantum groups

Honghao Gao, Tsinghua University

For a class of Legendrian links including -1 closures of positive braids, we define an ideal of q -commutation relations among the Reeb chords and show that the quotient of the Chekanov-Eliashberg dga by this ideal gives rise to a quantization of the augmentation variety. As our main application, we study a link constructed from two half-twists, and show how the quantum group $U_q(\mathfrak{gl}_n)$ arises from our construction. In addition, the algebraic structures of the Hopf algebra are shown to have geometric origins. The braid group action on the quantum group, for example, arises from the action of particular Legendrian loops. Based on a joint work with R. Casals, L. Ng, L. Shen, D. Weng and E. Zaslow.

Dimensions of escaping and recurrent geodesics

Wenyuan Yang, Peking University

In this talk, we investigate the asymptotic behavior of geodesics—such as escaping and recurrent trajectories—on Riemannian manifolds. Recurrent geodesics are characterized by their endpoints in the visual boundary, which correspond to conical limit points for the fundamental group. The Hausdorff dimension of (uniformly) conical points has been extensively studied, beginning with Patterson's work (1975) on Fuchsian groups, followed by Sullivan (1979) for geometrically finite Kleinian groups, and later Bishop-Jones (1996) for general Kleinian groups. In this talk, we extend these classical results by computing the Hausdorff dimensions of two other key subsets of the limit set: The Myrberg limit set (a distinguished subclass of non-uniformly conical points) and the non-conical limit set. This is based on joint work with Mahan Mj (TIFR).



VI Title and Abstract

Recent progress on the compactification of the Hitchin moduli space near singular fibers

Siqi He

Academy of Mathematics and Systems Science

The Hitchin moduli space has rich geometric structures and is equipped with the Hitchin fibration, which includes singular fibers. While the compactification and asymptotic geometry near smooth fibers are by now relatively well understood, much less is known near singular fibers. In this talk, we will discuss recent progress toward understanding the compactification of the Hitchin moduli space in a neighborhood of singular fibers. This talk is based on joint work with Nianzi Li and Johannes Horn.

Relation between Bonahon-Liu-Wong-Yang and Baseilhac-Benedetti invariants

Tao Yu, Southern University of Science and Technology

Given a mapping class of a surface and a generic invariant $SL(2, \mathbb{C})$ -character, Bonahon-Liu (later reformulated by Bonahon-Wong-Yang) and Baseilhac-Benedetti defined invariants from these data using representations of the Chekhov-Fock algebra. Although they are clearly related, the exact relation is not immediate from the definition since the dimensions of the representations are very different. We will discuss the exact relation between the two invariants and see that the naive guess based on multiplicities is false most of the time. Instead, an extension of the $U(1)$ -invariant by Gocho and Murakami-Ohtsuki-Okada enters the equation.



VI Title and Abstract

Hyperbolic Geometry and Diophantine Approximation

Greg McShane, University of Grenoble Alps

In this talk, I will explore the trajectory of the "McShane Identity"—originally established in my thesis at the relationship with Diophantine approximation. The identity, which expresses the geometry of a punctured hyperbolic torus through a summation of the lengths of its simple closed geodesics, did not merely find later utility in number theory; rather, it arose from considerations of Diophantine approximation and the classical study of the Markoff spectrum.

The connection centers on the fact that the lengths of geodesics on a punctured torus are determined by the traces of elements in $\mathrm{PSL}(2, \mathbb{Z})$, which are intrinsically linked to the approximation of irrationals by rationals. I will discuss how these geometric insights provided the framework for my recent work, "Convexity and Aigner's Conjectures" (arXiv:2101.03316).

Central to this discussion is the problem of **uniqueness**, which I will address in terms of **Penner's lambda lengths**. By viewing the Markov numbers as coordinates in the context of decorated Teichmüller space, we gain a new perspective on their ordering. Furthermore, I will relate these results to a theorem of **Bugeaud, Reutenauer, and Sisek** regarding the properties of Fibonacci and Pell numbers.



VI Title and Abstract

A quantum N-dimer model

Daniel Douglas, Virginia Tech

We discuss a quantum version of the N-dimer model from statistical mechanics, based on the Reshetikhin-Turaev formalism for the quantum group $U_q(\mathfrak{sl}_N)$. This is joint work with Richard Kenyon, Nicholas Ovenhouse, Samuel Panitch, and Sri Tata.

Positive representations over non-archimedean fields

Nicolas Tholozan, École Normale Supérieure

Guichard, Labourie and Wienhard have introduced the notion of « positive representation » of a surface group, which encompass most (probably all) the « higher Teichmüller components » of representation varieties into real algebraic groups. Motivated by the deformation theory of these representations, we will study the generalization of this notion to surfaces with boundary, and representations into algebraic groups over non-archimedean ordered fields. We will emphasize the subtle differences that arise in this new context. This is joint work with Xenia Flamm, Tengren Zhang and Tianqi Wang.



VI Title and Abstract

Fenchel--Nielsen twist for cluster algebras

Shunsuke Kano, Tohoku University

As a continuous version of the Dehn twist, there is a deformation of hyperbolic structures known as the Fenchel--Nielsen twist. Wolpert shows that this corresponds to a Hamiltonian flow with respect to the length function on the Teichmüller space. In this talk, we define a continuous version for a class of cluster algebra automorphisms satisfying certain linear recurrence relations, which we call linearizable mutation loops. In particular, for the generalized Dehn twist (cluster Dehn twist) introduced by Ishibashi, we show that this corresponds to a Hamiltonian flow on cluster varieties. This talk is based on joint work with Tsukasa Ishibashi (Tohoku University).

Skein algebras on punctured surfaces and quantizations of higher decorated Teichmüller spaces

Linhui Shen, Michigan State University

The decorated Teichmüller spaces of punctured surfaces, introduced by Penner, carry a natural extension of the Weil-Petersson Poisson structure, due to Mondello. Roger and Yang later defined skein algebras for punctured surfaces, providing a natural quantization of Mondello's Poisson structure. In this talk, we extend this Poisson structure to the Fock--Goncharov higher decorated Teichmüller spaces associated with an arbitrary split semisimple algebraic group G with trivial center. For $G = \mathrm{SL}_3$ and SL_4 , we further construct a quantization of these Poisson structures, yielding a natural generalization of Roger-Yang skein algebras. This is joint work in progress with Zhe Sun and Daping Weng.



VI Title and Abstract

Weaves from T-shifting plabic graphs

Daping Weng, UNC Chapel Hill

Legendrian weaves were introduced by Casals and Zaslow as a graphical calculus to depict Legendrian surfaces in the standard contact $\mathbb{R}^5$, and they have been adapted as a combinatorial tool to describe cluster structures on various flag moduli spaces. Casals and Li presented a construction that can deform the conjugate surface of a plabic graph to an exact Lagrangian surface represented by a weave. Motivated by their construction, we introduced a construction called T-shift on reduced plabic graphs in my joint work with Casals, Le, and Sherman-Bennett, and used it to prove the conjecture that the Muller-Speyer twist maps on positroids are Donaldson-Thomas transformations. If time allows, I will also discuss my joint work in progress with Casals and Kim that extends the T-shift construction to 3D plabic graphs, which relates the two approaches of braid varieties of Dynkin type A symplectically.



VI Title and Abstract

Patterson--Sullivan theory for transverse groups and beyond

Feng Zhu, University of Wisconsin-Madison

In this talk I will discuss a general theory of Patterson-Sullivan (PS) measures associated to coarse cocycles of convergence groups. Under some natural geometric assumptions on the coarse cocycle/s, we prove existence, uniqueness, ergodicity, and counting results. This framework includes, among other examples, PS measures on the Gromov boundary of a hyperbolic metric space, hitting measures of random walks on hyperbolic groups, as well as PS measures on flag manifolds associated to Anosov (or more generally transverse) subgroups of semisimple Lie groups. This is joint work with Pierre-Louis Blayac, Richard Canary, Tengren Zhang, and Andrew Zimmer