

求真国际数学会议

2026 QIUZHEN INTERNATIONAL
MATHEMATICS CONFERENCE

PANDA
ANALYTIC
NUMBER THEORY
PROBABILITY
AND STATISTICS



会议手册 Conference Guide

2026.8.3-7

Beijing·Tsinghua University



清华大学 求真书院
Qiu Zhen College, Tsinghua University

中国科学院晨兴数学中心
MORNINGSIDE CENTER OF MATHEMATICS
CHINESE ACADEMY OF SCIENCES



清华大学 丘成桐数学科学中心
Yau Mathematical Sciences Center, Tsinghua University



北京应用数学
与统计研究中心
Beijing Institute of
Mathematical Sciences and
Statistics



求真国际数学会议

2026

QIUZHEN INTERNATIONAL
MATHEMATICS CONFERENCE

主办单位 Host

清华大学求真书院
Qiuzhen College, Tsinghua University

协办单位 Co-hosts

清华大学丘成桐数学科学中心
Yau Mathematical Sciences Center, Tsinghua University (YMSC)

中国科学院晨兴数学中心
Morningside Center of Mathematics, Chinese Academy of Sciences (MCM)

北京雁栖湖应用数学研究院
Beijing Institute of Mathematical Sciences and Applications (BIMSA)

此次会议得到清华学堂人才培养计划（数学班）的支持。
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Tsinghua Xuetaang Talents Program

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主办方介绍

About Qiuzhen College

2021年初,清华大学创新本科人才培养布局,设立求真书院,聘请丘成桐先生担任书院院长。4月20日,求真书院成立仪式在清华大学主楼接待厅隆重举行。

求真书院全面落实丘成桐先生提出的数学领军人才培养理念与育人构想,深耕数理人才早期选拔培育,依托校内外顶尖资源,搭建本土贯通式成长通道,目标在中国本土培育一批顶尖基础学科研究者,引领并推动中国乃至全球数学、理论物理等基础学科的长期发展。

书院现已搭建层次完备的人才培养体系,覆盖本科、硕士、博士完整学段,开设多项特色培养项目:八年制本博贯通的丘成桐数学科学领军人才培养计划,四年制本科丘成桐数学英才班、数学与人工智能实验班,数学与人工智能硕士项目及数学与应用数学博士项目。

同时,求真书院联合清华大学经济管理学院、自动化系、生命科学学院、智能产业研究院、电子工程系,设立交叉学科联合博士培养项目,鼓励学生在以数学为基础的交叉前沿领域产出重大原创性科研成果。

In early 2021, Tsinghua University founded Qiuzhen College to advance innovation in undergraduate talent cultivation and appointed Professor Shing-Tung Yau as its Dean. The College's inauguration ceremony was grandly held on April 20 at the Reception Hall of Tsinghua University's Main Building.

Qiuzhen College fully implements Professor Yau's educational philosophy and vision for nurturing leaders in the mathematical sciences. It deepens its efforts in the early identification, selection, and cultivation of talents in fundamental mathematics and physics. Leveraging top-tier resources both within and outside the university, the College has built an integrated, contiguous pathway for talent development rooted in China. Its goal is to nurture a cohort of top-tier basic-science researchers domestically, thereby leading and advancing the long-term development of mathematics, theoretical physics, and other fundamental disciplines in China and across the globe.

The College has established a comprehensive, multi-tiered training system that covers the full academic spectrum from bachelor's through master's to doctoral programs. It offers a range of specialized programs, including: the eight-year continuous B.S.-Ph.D. track under the YAU Mathematical Sciences Leaders Program, the four-year undergraduate YAU Mathematical Sciences Talents Program, the Mathematics and Artificial Intelligence Experimental Class, the Master's Program in Mathematics and Artificial Intelligence, and the Doctoral Program in Mathematics and Applied Mathematics.

In addition, Qiuzhen College collaborates with Tsinghua University's School of Economics and Management, Department of Automation, School of Life Sciences, Institute for AI Industry Research (AIR), and Department of Electronic Engineering to establish interdisciplinary joint doctoral programs. These programs encourage students to produce major, groundbreaking original research outcomes in interdisciplinary frontier fields grounded in mathematics.

关于大会

About the conference

组织者 Organizers

丘成桐 Shing-Tung Yau

Foreign Member of Chinese Academy of Sciences

中国科学院外籍院士

Member of National Academy of Sciences, U.S.A.

美国国家科学院院士

Member of American Academy of Arts and Sciences

美国艺术与科学院院士

Chair Professor of Tsinghua University

清华大学讲席教授

Dean of Qiuzhen College, Tsinghua University

清华大学求真书院院长

Director of Yau Mathematical Sciences Center, Tsinghua University

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田野 Ye Tian

Member of Chinese Academy of Sciences

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徐文强 Max Wenqiang Xu

Associate Professor of Yau Mathematical Sciences Center,
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清华大学丘成桐数学科学中心副教授



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报告人/Speakers



Benjamin Bedert

University of Cambridge
剑桥大学



Paul Bourgade

NYU Courant
纽约大学柯朗数学科学研究所



Emmanuel Breuillard

University of Oxford
牛津大学



Yu Deng 邓煜

University of Chicago
芝加哥大学



Jian Ding 丁剑

Peking University
北京大学



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Weikun He 何伟鲲

Chinese Academy of Sciences
中国科学院



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Péter Pál Pach

HUN-REN Alfréd Rényi
Institute of Mathematics
阿尔弗雷德·雷尼数学研究所



Zeev Rudnick

Tel Aviv University
特拉维夫大学



Peter Sarnak

Princeton University 普林斯顿大学
Institute for Advanced Study
普林斯顿高等研究院



Damaris Schindler

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Fernando Xuancheng Shao
邵烜程

University of Kentucky
肯塔基大学



Weijie Su 苏炜杰

University of Pennsylvania
宾夕法尼亚大学



Xin Sun 孙鑫

Peking University
北京大学



Ruodu Wang 王若度

University of Waterloo
滑铁卢大学



Victor Wang 汪洋

Academia Sinica

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报告人/Speakers



Mo Dick Wong

The University of Hong Kong
香港大学



Ping Xi 郝平

Xi'an Jiaotong University
西安交通大学



Lei Yang 杨磊

National University of
Singapore
新加坡国立大学



Xiangdong Ye 叶向东

University of Science and
Technology of China
中国科学技术大学



Lingfu Zhang 张灵夫

California Institute of
Technology, Caltech
加州理工学院

会议日程

Agenda

总体日程 Schedule

会议时间 Time

2026年8月2日-8月7日, Aug 2-7, 2026

All times are Beijing Time (China Standard Time, UTC+8).

会议地点 Location

清华大学求真书院（北京市海淀区水磨聚智园1号楼）

Qiuzhen College, Tsinghua University (Building 1, Shuimo Juzhi Yuan, Haidian District, Beijing)

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 **2026.8.2** | 星期日
Sun.

Time	Event	Venue
14:30-17:00	On-site Registration	Wenjin Hotel, Building 5, No.1 Courtyard, Zhongguancun East Road, Haidian District, Beijing

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 **2026.8.3** | 星期一
Mon.



上午 / Morning Session

清华大学求真书院沐曦厅

MetaX Lecture Hall, Building 1, Shuimo Juzhi Yuan, Tsinghua University

Time	Plenary Session	Chair
8:15-8:30	On-site Registration(continued)	
8:30-9:00	Opening Ceremony	
9:00-9:45	Peter Sarnak	Shing-Tung Yau 丘成桐
9:45-10:15	Break	
10:15-11:00	Yu Deng 邓煜	Shing-Tung Yau 丘成桐
11:00-11:30	Group Photo/Break	
11:30-12:15	Zeev Rudnick	Max Wenqiang Xu 徐文强



下午 / Afternoon Session

清华大学求真书院沐曦厅

MetaX Lecture Hall, Building 1, Shuimo Juzhi Yuan, Tsinghua University

Time	Plenary Session	Chair
14:30-15:15	Xiangdong Ye 叶向东	Ye Tian 田野
15:15-15:45	Break	
15:45-16:30	Wen Huang 黄文	Max Wenqiang Xu 徐文强
16:30-18:00	Free Discussion	

 **2026.8.4** | 星期二
Tue.



上午 / Morning Session

清华大学求真书院沐曦厅

MetaX Lecture Hall, Building 1, Shuimo Juzhi Yuan, Tsinghua University

Time	Plenary Session	Chair
9:00-9:45	Martin Hairer	Max Wenqiang Xu 徐文强
9:45-10:15	Break	
10:15-11:00	Xue-Mei Li 李雪梅	Hao Wu 吴昊
11:00-11:30	Break	
11:30-12:15	Xin Sun 孙鑫	Jianping Jiang 姜建平



下午 / Afternoon Session

清华大学求真书院沐曦厅

MetaX Lecture Hall, Building 1, Shuimo Juzhi Yuan, Tsinghua University

Time	Plenary Session	Chair
14:30-15:15	Fernando Xuancheng Shao 邵烜程	Yuk-Kam Lau
15:15-15:45	Break	
15:45-16:30	Alexandra Florea	Yueke Hu 胡悦科
16:30-17:00	Break	
17:00-17:45	Victor Wang 汪洋	Huajie Li 李华杰

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 **2026.8.5** | 星期三
Wed.



上午 / Morning Session

清华大学求真书院沐曦厅

MetaX Lecture Hall, Building 1, Shuimo Juzhi Yuan, Tsinghua University

Time	Plenary Session	Chair
9:00-9:45	Jian Ding 丁剑	Shing-Tung Yau 丘成桐
9:45-10:15	Break	
10:15-11:00	Weijie Su 苏炜杰	Xinyi Li 李欣意
11:00-11:30	Break	
11:30-12:15	Ruodu Wang 王若度	Rongling Wu 邬荣领



下午 / Afternoon Session

Time	Plenary Session
14:30-18:00	Free Afternoon

 **2026.8.6** | 星期四
Thu.

 **上午 / Morning Session**
清华大学求真书院沐曦厅

MetaX Lecture Hall, Building 1, Shuimo Juzhi Yuan, Tsinghua University

Time	Plenary Session	Chair
9:00-9:45	Emmanuel Breuillard	Max Wenqiang Xu 徐文强
9:45-10:15	Break	
10:15-11:00	Lei Yang 杨磊	Yitwah Cheung 张翼华
11:00-11:30	Break	
11:30-12:15	Weikun He 何伟鲲	Ping Xi 郗平

 **下午 / Afternoon Session**
清华大学求真书院沐曦厅

MetaX Lecture Hall, Building 1, Shuimo Juzhi Yuan, Tsinghua University

Time	Plenary Session	Chair
14:30-15:15	Ping Xi 郗平	Bin Xu 徐斌
15:15-15:45	Break	
15:45-16:30	Philippe Michel	Zeev Rudnick
16:30-17:00	Break	
17:00-17:45	Mo Dick Wong	Wenbo Li 李文博

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 **2026.8.7** | 星期五
Fri.



上午 / Morning Session

清华大学求真书院沐曦厅

MetaX Lecture Hall, Building 1, Shuimo Juzhi Yuan, Tsinghua University

Time	Plenary Session	Chair
9:00-9:45	Damaris Schindler	Xin Zhang 张欣
9:45-10:15	Break	
10:15-11:00	Péter Pál Pach	Fernando Xuancheng Shao 邵烜程
11:00-11:30	Break	
11:30-12:15	Benjamin Bedert	Shengwen Gan 甘盛文



下午 / Afternoon Session

清华大学求真书院沐曦厅

MetaX Lecture Hall, Building 1, Shuimo Juzhi Yuan, Tsinghua University

Time	Plenary Session	Chair
14:30-15:15	Lingfu Zhang 张灵夫	Chenlin Gu 顾陈琳
15:15-15:45	Break	
15:45-16:30	Paul Bourgade	Fan Yang 杨帆
16:30-16:45	Closing Ceremony	

题目摘要

Title and Abstract

Titles and abstracts are listed in chronological order.

On indefinite ternary quadratic forms

Peter Sarnak

Abstract

We describe the solution to two problems concerning indefinite integral ternary quadratic forms. The first about anisotropic forms was popularized by Margulis following his solution of the Oppenheim Conjecture. The second about the density of isotropic forms was raised by Serre. Joint work with A.Gamburd, A.Ghosh and J.Whang.

The 4 dimensional Anderson model

Yu Deng 邓煜

Abstract

We establish Gaussian scaling limit, for the (elliptic) Anderson model in 4 dimensions, with small coupling constant. This is a simplest example of a critical model in SPDEs, a theme which has been a major challenge of the field. Our theorem provides the first example where infinitely many renormalization constants are present and controlled. This is joint work with Hao Shen.

Prime numbers, closed geodesics, and random hyperbolic surfaces

Zeev Rudnick

Abstract

There is a close analogy between the theory of closed geodesics on a hyperbolic surface and prime number theory. This has been known since the 1950s. After surveying the two theories, I will discuss a recent perspective, when we consider the surface as being random in the moduli space of hyperbolic surfaces of large genus.

Recurrence and its applications

Xiangdong Ye 叶向东

Abstract

Recurrence is one of the most important notions in dynamical systems. It turns out that recurrence also has many profound applications in combinatorial number theory. In this talk I will review some well known results concerning recurrence and the applications. In the process I will also explain the main tools used and under development, and state some recent results and some open questions.

Typical periodic optimization for dynamical systems: Symbolic dynamics

Wen Huang 黄文

Abstract

This talk mainly reviews and introduces recent progress on the typical optimization of dynamical systems: the symbolic systems case. The contents include: the theory of maximizing sets in dynamical systems, for the study of ergodic optimization in systems with weak hyperbolicity, but where the Mañé cohomology lemma does not hold. The theory yields a structural theorem that isolates the part of the system responsible for any robust non-periodic optimization. The structural theorem is developed further in the setting of symbolic dynamics: given any shift space, for typical Lipschitz functions, the maximizing measure is shown to be either periodic or supported on the Markov boundary of the shift space. It follows that Contreras' Typical Periodic Optimization theorem for shifts of finite type can be extended to a wide class of shift spaces, including every sofic shift. This is joint work with Oliver Jenkinson, Leiye Xu, and Yiwei Zhang.

Stochastic Quantisation of Gauge Theories

Martin Hairer

Abstract

We will review Parisi and Wu's original motivation for introducing the 'stochastic quantisation' procedure for QFT's. 40 years after their insight, this approach is finally bearing fruit in a way that they predicted at the time.

Coarse Curvature in Riemannian and Lorentzian Geometry

Xue-Mei Li 李雪梅

Abstract

Einstein's field equations relate the curvature of spacetime to the distribution of matter and energy. Since Ollivier's influential work on Ricci curvature for Markov chains on metric spaces, there has been renewed interest in synthetic and coarse notions of curvature. In this talk, I shall discuss constructions of coarse curvature in both Riemannian and Lorentzian geometry. In the Riemannian setting, I shall describe coarse analogues of intrinsic Ricci curvature and of extrinsic curvature for embedded submanifolds. I shall then turn to the Lorentzian setting and discuss coarse notions of Ricci curvature associated with timelike directions.

Liouville Quantum Gravity: from Random Planar Maps to Conformal Field Theory

Xin Sun 孙鑫

Abstract

Originating in theoretical physics, Liouville quantum gravity (LQG) has been an important topic in probability theory and mathematical physics in the past two decades. In this talk, we review two aspects of this topic. The first is that LQG describes the random conformal geometry of the scaling limit of random planar maps. We highlight the convergence of random planar maps under discrete conformal embedding, where couplings between LQG and the Schramm-Loewner evolution (SLE) play a key role. The second aspect is the connection to conformal field theory (CFT). Here we highlight the interplay between Liouville CFT and the SLE/LQG coupling, the CFT description of 2D quantum gravity coupled with conformal matter, and applications to SLE and 2D statistical physics. This talk is based on the 2026 ICM proceeding joint with Nina Holden.

On character sum estimates over generalized arithmetic progressions

Fernando Xuancheng Shao 邵烜程

Abstract

I will discuss extending classical estimates for character sums over intervals to character sums over general additively structured sets. These problems turn out to be naturally connected to the sum-product phenomenon in additive combinatorics. In particular, I will describe a Burgess-type estimate for character sums over generalized arithmetic progressions (GAPs) of rank 2. A crucial ingredient in the proof is a sharp upper bound for the multiplicative energy of such GAPs. This is joint work with Ali Alsetri.

Simultaneous non-vanishing for L-functions

Alexandra Florea

Abstract

In this talk, I will discuss recent results on the behavior of Dirichlet L-functions in families, focusing on simultaneous non-vanishing and value distribution questions. For simultaneous non-vanishing, I will consider two settings: families of twists of Dirichlet L-functions of prime moduli, and families arising from Galois orbits of Dirichlet characters. The main question I will focus on is whether one can find many members of these families whose L-functions are simultaneously nonzero at the central point. I will also discuss the simultaneous fluctuations of these L-functions, proving weighted central limit theorems that let us quantify how large or small several Dirichlet L-functions can be at the same time. This talk is based on joint works with Hung Bui and Micah Milinovich, and Hung Bui and Hieu Ngo.

Nonabelian equidistribution via sum-product phenomena

Victor Wang 汪洋

Abstract

A central challenge in number theory is to establish nontrivial cancellation in natural arithmetic sums, such as those arising from L-functions or the circle method. I will discuss joint work with N. Arala, J. R. Getz, J. Hou, C.-H. Hsu, and H. Li, concerning a new, nonabelian circle method and its applications to counting problems of a classical flavor. We rewrite key nonabelian Weyl sums using Poisson summation, and estimate the resulting dual sums by combining quadratic Gauss sum bounds with novel vanishing phenomena and repulsion-based lattice bounds.

Recent progress on critical percolation for level-sets of metric graph Gaussian free fields

Jian Ding 丁剑

Abstract

In this talk, I will review some recent progress on the critical percolation for the level-set of the Gaussian free field on the metric graph of $\mathbb{Z}^d$ for $d \geq 3$ (thanks to Lupu's isomorphism theorem, this is equivalent to the critical percolation for the metric graph loop soup model). In this talk, I will present some recent results on one-arm probabilities, incipient infinite clusters, two-arm probabilities, pivotal edges, as well as some comparison between the metric graph loop soup and the Brownian loop soup in three dimensions. This is based on a series of joint works with Zhenhao Cai.

Toward a Mathematical Theory of Deep Learning: Lessons from Personal Research

Weijie Su 苏炜杰

Abstract

A century ago, breakthroughs like relativity and quantum mechanics emerged from or developed alongside rigorous mathematical theories. Today's AI revolution presents a stark contrast: progress remains predominantly empirical while mathematical theory lags significantly behind. In this talk, I will share perspectives on current efforts to establish theoretical foundations for deep learning, drawing from my personal research experiences. We will examine the strengths and limitations of various approaches—including toy models, phenomenological models, and conditional-theory approaches—and explore why certain methods succeed in capturing specific behaviors while failing to provide comprehensive understanding. The talk concludes by highlighting opportunities for the mathematics community to contribute to advancing the theoretical foundations of deep learning.

Processing risk and ambiguity in decision making

Ruodu Wang 王若度

Abstract

Risk and ambiguity are two main sources of uncertainty that broadly exist in a wide range of contexts in economics, decision making, and risk management. We give a brief introduction to decision theory under risk and ambiguity. Then we present some new results on modeling decision rules that handle general risk attitudes and ambiguity. Without going into deep technical details, we discuss a new Bayesian approach for risk and ambiguity and a new framework that processes ambiguity before risk (in contrast, traditional framework processes risk before ambiguity), as well as their applications.

Expander Cayley graphs and non-abelian Littlewood-Offord.

Emmanuel Breuillard

Abstract

I will discuss a new non-abelian version of the Littlewood-Offord theorem regarding products of independent matrix valued random variables and their concentration on algebraic sets. We obtain uniform exponential bounds that lead to uniform spectral gaps for actions of linear groups as well as sharp estimates for the "escape from subvarieties phenomenon". Although our bounds hold for matrices over the complex numbers, their proof requires an adelic input and the consideration of diophantine heights (height gap). We will then show how these new bounds can be used to prove that finite simple groups of Lie type of bounded rank have uniform expansion, except possibly for a small exceptional subfamily, improving on earlier work of Green, Guralnick, Tao and myself. This is joint work with Oren Becker.

Effective Ratner for products of SL_2

Lei Yang 杨磊

Abstract

In this talk, I will talk about recent developments on effective versions of Ratner's equidistribution theorem. After a brief introduction and survey, I will explain a recent result joint with Elon Lindenstrauss and Amir Mohammadi on effective Ratner for unipotent subgroups in products of SL_2 . Main novelties of the proof include: (1) a Bourgain type projection theorem that allows us to analyze local obstructions of a bootstrapping step; (2) a new dynamical framework that allows us to combine the local obstructions and get a global obstruction coming from an intermediate subgroup.

Quantitative equidistribution of random walks on homogeneous spaces

Weikun He 何伟鲲

Abstract

Homogeneous spaces often carry number theoretic information. Using dynamics such as unipotent flows on such spaces have lead to solutions of difficult problems in Diophantine approximation. Random walks can be considered as non-continuous analogue of flows. The qualitative theory of the dynamics of such random walks has been established by Benoist-Quint while a full quantitative theory remains a challenge. I will present some progress on quantitative equidistributions including an application to Diophantine approximation on fractal sets. Based on joint works with Timothée B nard and Han Zhang.

The Brun--Titchmarsh Theorem

Ping Xi 郝平

Abstract

The classical Brun--Titchmarsh theorem gives an upper bound, which is of correct order of magnitude, for the number of primes in an individual arithmetic progression. We will discuss our recent works on sharpening this theorem with better constants by combining Dirichlet polynomials, character/exponential sums, ℓ -adic cohomology and spectral theory of automorphic forms. If time permits, we also mention its connection with the Landau--Siegel zero. This is based on joint works with Junren Zheng.

Applied ℓ -adic cohomology: an introduction

Philippe Michel

Abstract

Several important problems in analytic number theory reduce to evaluating sums of "algebraic exponential sums" relative to some growing modulus q against specific arithmetic functions (such as the characteristic function of an interval, the von Mangoldt or the Moebius function or the characteristic function of the primes). When the modulus is a prime, the algebraic exponential sums are "trace functions" of ℓ -adic sheaves along the affine line over the finite field $\mathbb{F}_q$. In this case methods from ℓ -adic cohomology (coming from the works of Deligne, Katz, Laumon and many other) can be applied. By "Applied ℓ -adic cohomology" we mean the set of techniques that allow to bridge the gap between these two areas. This talk (based on series joint works with E. Fouvry, E. Kowalski and W. Sawin) will present several uses of "applied ℓ -adic cohomology" from the most basic to the most sophisticated ones.

On the Limiting Distribution of Partial Sums of Random Multiplicative Functions

Mo Dick Wong

Abstract

In this talk, I shall discuss the asymptotic behaviour of a random walk associated with a Steinhaus multiplicative function. This model is motivated by Helson's conjecture on Hankel forms in harmonic analysis and also provides insight into fundamental arithmetic objects such as Dirichlet characters. Building on Harper's seminal work on the striking phenomenon of better-than-square-root cancellation, I shall present a central limit theorem (joint work with Ofir Gorodetsky) under a non-standard scaling, featuring a random variance closely related to the statistics of the Riemann zeta function on the critical line. Time permitting, I shall also discuss other recent advances in the area, as well as closely connected questions in random matrix theory.

Density of rational points near manifolds

Damaris Schindler

Abstract

Given a bounded submanifold M in $\mathbb{R}^n$, how many rational points with common bounded denominator are there in a small thickening of M ? How does this counting function behave if we let the size of the denominator go to infinity? The study of the density of rational points near manifolds has seen significant progress in the last couple of years. In this talk I will explain why we might be interested in this question, focusing on applications in Diophantine approximation and the (quantitative) arithmetic of projective varieties.

The Alon-Jaeger-Tarsi conjecture via group ring identities

Péter Pál Pach

Abstract

The Alon-Jaeger-Tarsi conjecture states that for any finite field $\mathbb{F}$ of size at least 4 and any nonsingular matrix A over $\mathbb{F}$ there exists a vector x such that neither x nor Ax has a 0 component. In this talk we discuss the proof of this result for $|\mathbb{F}| > 79$ and further applications of our method about coset covers and additive bases. Joint work with János Nagy and István Tomon.

One-sided estimates for trigonometric sums

Benjamin Bedert

Abstract

Several problems in additive combinatorics and Diophantine approximation can be reduced to the task of obtaining one-sided estimates for trigonometric sums. Such estimates are generally significantly harder to establish than their two-sided counterparts, and are deeply connected to the additive structure of the spectrum. I will discuss recently developed Fourier-analytic and combinatorial methods for obtaining them, and illustrate their applicability in resolving a longstanding question of Erdős on large sum-free subsets of sets of integers, obtaining polynomial bounds for Chowla's cosine problem, and improving the best bound towards the Lonely Runner Conjecture.

The Airy_ β Line Ensemble: A New Universal Stochastic Process

Lingfu Zhang 张灵夫

Abstract

The Gaussian distribution is the basic universal law for fluctuations in weakly dependent systems, while extreme fluctuations in many strongly correlated systems are governed by the Tracy–Widom_ β distributions, indexed by a positive parameter β . We construct their process-level extension, the Airy_ β line ensemble, much as Brownian motion extends the Gaussian distribution. This new object unifies scaling limits of a wide range of random systems: random matrices, log-gas dynamics, square ice models, random growth, and interacting particle systems, originated in statistics, physics, and biology. At special values of β , it has explicit integrable structures, but they become increasingly hidden for general, especially irrational, β . Our works uncovers this structure using Dunkl operators, and also poles of a random meromorphic function. This talk is based on joint works with Vadim Gorin, Jiaoyang Huang, and Jiaming Xu.

Loop equations characterize random matrix statistics

Paul Bourgade

Abstract

After reviewing results and methods for random matrix universality I will explain a recent work with Jiaoyang Huang, characterizing the local point processes of random matrix theory by loop equations, or equivalently the equilibrium BBGKY hierarchy.

会务信息

Conference Service Information

现场注册 On-site Registration

时间 Date & Time

8月2日下午 14:30-17:00 Aug 2, 14:30-17:00 p.m.

8月3日上午 8:15-8:30 Aug 3, 8:15-8:30 a.m.

地点 Location

清华大学求真书院（北京市海淀区水磨聚智园1号楼）

Qiuzhen College, Tsinghua University (Building 1, Shuimo Juzhi Yuan, Haidian District, Beijing)

会议酒店信息

甲所宾馆：清华大学校内甲所宾馆, 010-62783166

文津国际酒店：中关村东路一号院5号楼（清华大学南门外）, 010-62525566

1. 酒店房费说明

公付房费的报告人，住宿日期超过预订住宿时间，需自付超出部分房费。

在酒店所产生的房杂费，洗衣费、房间食品、餐费等额外费用，需自付。

2. 酒店入住及退房政策

甲所：退房时间为退房当日12:00，超过12:00 加收半天房费。

文津国际酒店：退房时间可延迟到退房当日 14:00, 14:00-18:00 退房加收半天房费，超过18:00退房加收一天房费。

求真国际数学会议

2026

QIUZHEN INTERNATIONAL
MATHEMATICS CONFERENCE

Hotel Information

Jiasuo Hotel: Inside Tsinghua University campus. Phone: 010-62783166

Wenjin Hotel Address: Building 5, No.1 Courtyard, Zhongguancun East Road,
Haidian District, Beijing

Phone: 010-62525566

Room rates

For the speakers whose accommodation is covered by the organizer, the organizer will only cover charges within the reserved accommodation period (extended-stay fees are not included). The expenses for meals and laundry as well as the incidental expenses and extra consumption in the hotels shall be paid by the participants themselves.

Check-in/out policies

Jiasuo: The check-out time is 12:00 (noon) on the check-out day, and half-day room rate will be charged for checking-out after 12:00.

Wenjin Hotel: The check-out time can be postponed to 14:00 on the check-out day, and half-day room rate will be charged for checking-out at 14:00-18:00 and 1-day room rate for checking-out after 18:00.

餐饮安排：（8月3日-7日）

餐饮	时间	用餐人员	用餐地点
午餐	12:30-14:00	报告人和注册参会人	求真书院1号楼
欢迎晚宴	8月3日 18:30	报告人及邀请嘉宾	清华大学熙春园餐厅

Catering (Aug 3-7)

Catering	Time	Dining arrangements	Venue
Lunch	12:30-14:00	Speakers and Registered participants	Shuimo Juzhi Yuan
Welcome Banquet	Aug 3 18:30	Only for speakers and invited guests	Xi'chun'yuan Canteen of Tsinghua University

求真国际数学会 2026

QIUZHEN INTERNATIONAL
MATHEMATICS CONFERENCE

交通安排

主办方根据会议日程安排车辆接送，具体信息如下：

发车时间	发车地点→到达地点
2026年8月3日	
8:00	文津国际酒店→清华大学求真书院
18:30 欢迎晚宴	清华大学求真书院→清华大学熙春园餐厅→文津国际酒店
2026年8月4日-7日	
8:30	文津国际酒店→清华大学求真书院
18:00	清华大学求真书院→文津国际酒店

Transportation

Time	Departure→Arrival
Aug 3, 2026	
8:00	Wenjin Hotel→Qiuzhen College of Tsinghua University
18:30 Welcome Banquet	Qiuzhen College of Tsinghua University→Wenjin Hotel Qiuzhen College of Tsinghua University→Xi'chun'yuan Canteen of Tsinghua University→Wenjin Hotel
Aug 4-7, 2026	
8:30	Wenjin Hotel→Qiuzhen College of Tsinghua University
18:00	Qiuzhen College of Tsinghua University→Wenjin Hotel

联络信息

Contact Information

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清华大学地图 / Map



