華東師範大學
EAST CHINA NORMAL UNIVERSITY

Last Updated: May 13, 2026

Preliminary Version

Spring Operator Algebras Program

May 18–22, 2026

Research Center for Operator Algebras

Shanghai, China

Supported by

School of Mathematical Sciences

East China Normal University

2026 年春 · 上海

Contents

Conference Venue & General Schedule

Venue: Room 502, Wenfu Building, East China Normal University(Putuo Campus), Shanghai, China.

Dates: May 18–22, 2026

<table>
<tr><th></th><th>Mon. (5.18)</th><th>Tue. (5.19)</th><th>Wed. (5.20)</th><th>Thu. (5.21)</th><th>Fri. (5.22)</th></tr>
<tr><td>09:30–10:30
Chair</td><td>Nigel Higson
Hang Wang</td><td>Nigel Higson
Hang Wang</td><td>Nigel Higson
Hang Wang</td><td>Nigel Higson
Hang Wang</td><td>Axel Gastaldi
Baiying Ren</td></tr>
<tr><td>Tea Break</td><td colspan="5"></td></tr>
<tr><td>11:00–12:00
Chair</td><td>Zelin Yi
Hang Wang</td><td>Jiawen Zhang
Hang Wang</td><td>Yi-Jun Yao
Hang Wang</td><td>Zijing Wang
Hang Wang</td><td>Andrej Żuk
Baiying Ren</td></tr>
<tr><td>Lunch Break</td><td colspan="5"></td></tr>
<tr><td>14:00–15:00
Chair</td><td>Jintao Deng
Sayan Das</td><td rowspan="3">Free Discussion</td><td>Jianchao Wu
Huaxin Lin</td><td rowspan="3">Free Discussion</td><td>Bin Gui
Sayan Das</td></tr>
<tr><td>Tea Break</td><td></td><td></td><td></td></tr>
<tr><td>15:30–16:30
Chair</td><td>Haoyuan Gao
Sayan Das</td><td>Liang Guo
Huaxin Lin</td><td>Bin Gui
Sayan Das</td></tr>
<tr><td>Evening</td><td colspan="5"></td></tr>
</table>

- **Tea Breaks:** Served at **Room 501**,adjacent to the lecture room.
- **Lunches:**
  - **Mon, Wed: Yifu Building** (逸夫楼)
  - **Tue, Thu, Fri: Hexi Canteen** (河西食堂)
- **Banquet:** A banquet for all participants will be held at **Hexi Canteen** (3rd Floor) on **Monday evening**.

List of Participants

Speakers

Andrej Żuk	Institut de Mathématiques Université Paris 7
Nigel Higson	Pennsylvania State University
Bin Gui	Yau Mathematical Sciences Center Tsinghua University
Zelin Yi	TongJi University
Jintao Deng	Shanghai University of Finance and Economics
Haoyuan Gao	East China Normal University
Yi-Jun Yao	Fudan University
Jianchao Wu	Shanghai Center for Mathematical Sciences
Liang Guo	Shanghai Institute for Mathematics and Interdisciplinary Sciences
Zijing Wang	Shanghai Institute for Mathematics and Interdisciplinary Sciences
Axel Gastaldi	Institut de Mathématiques de Marseille with Université d'Aix-Marseille
Jiawen Zhang	Fudan University

Schedule of Talks

Monday, May 18	
Chair: Hang Wang	
09:30 – 10:30	Nigel Higson: *Noncommutative geometry of the Satake compactification*
10:30 – 11:00	Tea Break
11:00 – 12:00	Zelin Yi: *Tangent groupoid and the index theory*
12:00 – 14:00	Lunch Break
Chair: Sayan Das	
14:00 – 15:00	Jintao Deng: *The quantitative coarse Baum-Connes conjecture for free product*
15:00 – 15:30	Tea Break
15:30 – 16:30	Haoyuan Gao: *Quantization of symplectic actions and deformation of Hopf algebras*
17:00 –	Dinner

Tuesday, May 19	
Chair: Hang Wang	
09:30 – 10:30	Nigel Higson: *Noncommutative geometry of the Satake compactification*
10:30 – 11:00	Tea Break
11:00 – 12:00	Jiawen Zhang: *Asymptotic expansion for groupoids and Roe type algebras*
12:00 – 14:00	Lunch Break
14:00 –	Free Discussion

Wednesday, May 20	
Chair: Hang Wang	
09:30 – 10:30	Nigel Higson: *Noncommutative geometry of the Satake compactification*
10:30 – 11:00	Tea Break
11:00 – 12:00	Yi-Jun Yao: *TBA*
12:00 – 14:00	Lunch Break
Chair: Huaxin Lin	
14:00 – 15:00	Jianchao Wu: *New Proper Actions from Coarse Embeddings*
15:00 – 15:30	Tea Break
15:30 – 16:30	Liang Guo: *A Groupoid Approach to the Equivariant Coarse Baum-Connes Conjecture*
17:00 –	Free Evening

Thursday, May 21	
Chair: Hang Wang	
09:30 – 10:30	Nigel Higson: *Noncommutative geometry of the Satake compactification*
10:30 – 11:00	Tea Break
11:00 – 12:00	Zijing Wang: *Index theory and Riemann-Roch formula*
12:00 – 14:00	Lunch Break
14:00 –	Free Discussion

Friday, May 22	
Chair: Baiying Ren	
09:30 – 10:30	Axel Gastaldi: *Periodic cyclic homology of smooth crossed product algebras*
10:30 – 11:00	Tea Break
11:00 – 12:00	Andrej Żuk: *TBA*
12:00 – 14:00	Lunch Break
Chair: Sayan Das	
14:00 – 15:00	Bin Gui: *The Bisognano-Wichmann theorem in algebraic quantum field theory (Part I)*
15:00 – 15:30	Tea Break
15:30 – 16:30	Bin Gui: *The Bisognano-Wichmann theorem in algebraic quantum field theory (Part II)*
16:30 –	Closing

Abstracts

Nigel Higson *Pennsylvania State University*

Title: Noncommutative geometry of the Satake compactification

Abstract: My lectures will be about the construction of a new groupoid in Lie theory, about the noncommutative geometric aspects of this groupoid, and about applications, real and potential, to representation theory. This is joint work with Jacob Bradd and Robert Yuncken. The (maximal) Satake compactification associated to a real reductive group G is the closure of the symmetric space of all maximal compact subgroups within the compact space of all closed subgroups of G. I shall present different views of a groupoid that may be associated to the Satake compactification. The general idea behind this Satake groupoid is due to Omar Mohsen. But I shall give a Lie-theoretic account of Mohsen's construction, and I shall also identify the groupoid with a purely geometric construction arising from Richard Melrose's b-calculus. Turning to applications, I shall give a geometric account, using the groupoid, of Harish-Chandra's principle that a tempered irreducible representation of a real reductive group is either discrete series, modulo center, or embeddable in a representation that is parabolically induced from such a representation. Time permitting, I shall speculate on potential applications to non-Riemannian symmetric spaces and to Plancherel formulas.

Andrej Żuk *Institut de Mathématiques Université Paris 7*

Title: TBA

Abstract: TBA

Bin Gui *Yau Mathematical Sciences Center Tsinghua University*

Title: The Bisognano-Wichmann theorem in algebraic quantum field theory.

Abstract: Algebraic quantum field theory (AQFT) is a mathematically rigorous formulation of quantum field theory based on operator algebras. The Bisognano-Wichmann theorem, discovered in the 1970s, relates Tomita-Takesaki theory to symmetries in AQFT. The purpose of this talk is to provide a survey of this important theorem. I will first present the necessary background in AQFT, and then give a heuristic explanation of why the Bisognano- Wichmann theorem holds.

Zelin Yi *TongJi University*

Title: Tangent groupoid and the index theory

Abstract: The geometric construction of the tangent groupoid provides a smooth deformation from (pseudo)differential operators to their symbols. It was introduced by Connes to streamline the

proof of the Atiyah–Singer index theorem. In this talk, we shall explain the relationship between the tangent groupoid and local index theory. If time permits, we will discuss possible generalizations to the noncompact setting. This is joint work with Xiaoman Chen, Yi-Jun Yao, and Jiawen Zhang.

Jintao Deng *Shanghai University of Finance and Economics*

Title: The quantitative coarse Baum-Connes conjecture for free product

Abstract: The coarse Baum-Connes conjecture has been verified for many spaces, including those coarsely embedding into Hilbert space and certain relative expanders, with important applications to geometry and topology. Quantitative K-theory, introduced by G. Yu, provides a refined framework for studying this conjecture. The quantitative coarse Baum-Connes conjecture asserts the quantitative vanishing of the K-theory of the obstruction group. In this talk, based on joint work with Ryo Toyota, I will focus on free products of groups. Our main result is: If two finitely generated groups satisfy the quantitative coarse Baum-Connes conjecture, then so does their free product. I will outline the proof, which uses decompositions arising from the Bass-Serre tree and avoids the issue that the conjecture does not pass to subspaces.

Haoyuan Gao *East China Normal University*

Title: Quantization of symplectic actions and deformation of Hopf algebras

Abstract: In this talk, I will first introduce the notion of universal deformation formula (UDF) for Hopf algebra actions by Drinfeld' s pioneer work for classical r-matrices, and Esposito-Schnitzer-Waldmann' s alternative proof of Drinfeld' s result using deformation quantization of symplectic manifolds. Then I will introduce deformation quantization of actions of symplectic automorphisms and symplectic vector fields, and applications in searching for UDFs for certain types of Hopf algebras. A typical example is the Connes-Moscovici Hopf algebra of codimension 1 foliations and its bicrossproduct description introduced by Hadfield and Majid. This talk is partially based on the ongoing joint work with Yi-Jun Yao (Fudan University).

Yi-Jun Yao *Fudan University*

Title: TBA

Abstract: TBA

Jianchao Wu *Shanghai Center for Mathematical Sciences, Fudan University*

Title: New Proper Actions from Coarse Embeddings

Abstract: A major highlight of noncommutative geometry is the verification of the Novikov conjecture for groups satisfying suitable geometric conditions, particularly coarse geometric conditions

such as coarse embeddability into a Hilbert space. To prove such a result, one crucial step, which remained challenging to generalize, involves obtaining, from a given coarse embedding, a proper action of the group (on a continuous field of metric spaces and, eventually, on a suitable C∗-algebra). In recent joint work with Geng Tian, we found, for a countable group with a coarse embedding into a Banach space, a simple construction of a proper affine isometric action on an associated function space. This avoids the technical machinery of continuous fields and conditionally negative type functions, and allows us to advance our knowledge on the (strong) Novikov conjecture in a few directions.

Liang Guo *Shanghai Institute for Mathematics and Interdisciplinary Sciences*

Title: A Groupoid Approach to the Equivariant Coarse Baum-Connes Conjecture

Abstract: In this talk, we introduce a groupoid approach to the equivariant coarse Baum-Connes conjecture. For a proper metric space X equipped with an isometric action of a countable discrete group Γ, we construct the equivariant coarse groupoid $G(X,\Gamma)$ and prove that the equivariant coarse Baum-Connes conjecture for $G(X,\Gamma)$ is equivalent to the groupoid Baum-Connes conjecture for $G(X,\Gamma)$ (with certain coefficient). To establish this geometric-to-analytic translation, we introduce an equivariant localization algebra for etale groupoids G that realizes the KKG-theory. As an application of this groupoid machinery, we prove that the equivariant coarse Novikov conjecture holds for (X,Γ) if X coarsely embeds into a Hilbert space (which is not required to be Γ-equivariant).

Zijing Wang *Shanghai Institute for Mathematics and Interdisciplinary Sciences*

Title: Index theory and Riemann-Roch formula

Abstract: In this talk, we will briefly outline the Atiyah-Singer Index Theorem, Chern character defect ,and its cohomology formula. Then we will introduce equivariant cohomology , equivariant Chern character and the equivariant Riemann-Roch formula to present the cohomology formula of the equivariant index theory. This talk is based on the joint work with Professor Hang Wang.

Axel Gastaldi *Institut de Mathématiques de Marseille with Université d'Aix-Marseille*

Title: Periodic cyclic homology of smooth crossed product algebras

Abstract: Let G be a real reductive group and K a maximal compact subgroup. The Kasparov theorem states that the Kasparov product of the Dirac and dual Dirac elements over G/K is trivial in both direction. Due to the Cuntz description of the bivariant K-theory, these Dirac and dual Dirac elements induce a pair of C^*-morphisms that K-equivariantly inverses to each other at level of K-groups. Our idea is to descend these C^*-morphisms to Frechet algebras morphisms to obtain them as K-equivariant inverses modulo homotopy at the level of periodic cyclic homology. By a Cuntz-Quillen-Morita equivalence and a theorem of Nistor we obtain, modulo a stability algebra, an isomorphism in periodic cyclic homology which is the Banach counterpart of the Baum-Connes

conjecture with coefficients for Lie groups.

Jiawen Zhang *Fudan University*

Title: Asymptotic expansion for groupoids and Roe type algebras

Abstract: In this talk, we introduce a notion of expansion for groupoids, which recovers the classical notion of expander graphs by a family of pair groupoids and expanding actions in measure by transformation groupoids. We also consider an asymptotic version for expansion and establish structural theorems, showing that asymptotic expansion can be approximated by domains of expansions. On the other hand, we introduce dynamical propagation and quasi-locality for operators on groupoids and the associated Roe type algebras. Our main results characterize when these algebras possess block-rank-one projections by means of asymptotic expansion, which generalises the crucial ingredients in previous works to provide counterexamples to the coarse Baum-Connes conjecture. This is a joint work with Xulong Lu and Qin Wang.

Practical Information

Transportation to ECNU Putuo Campus

- **From Pudong International Airport (PVG)**
  - **By Taxi:** Take a taxi from the official taxi rank. It takes about **60–90 minutes** (approx. **200–250 RMB**). Please show the driver this address: **华东师范大学普陀校区（中山北路 3663 号）**.
  - **By Metro:** Take **Line 2** to **Zhongshan Park Station**, transfer to **Line 3 or 4**, and get off at **Jinshajiang Road Station** (**Exit 5**). Total time: **90–120 minutes**.
- **From Hongqiao Airport (SHA) / Hongqiao Railway Station**
  - **By Metro (Fastest):** Take **Line 13** directly to **Jinshajiang Road Station**. It takes only about **25 minutes** from the Railway Station. From the airport (Terminal 2), you can also take **Line 10** and transfer to **Line 13**.
  - **By Taxi:** About **30–45 minutes** (approx. **60–80 RMB**).

Accommodation

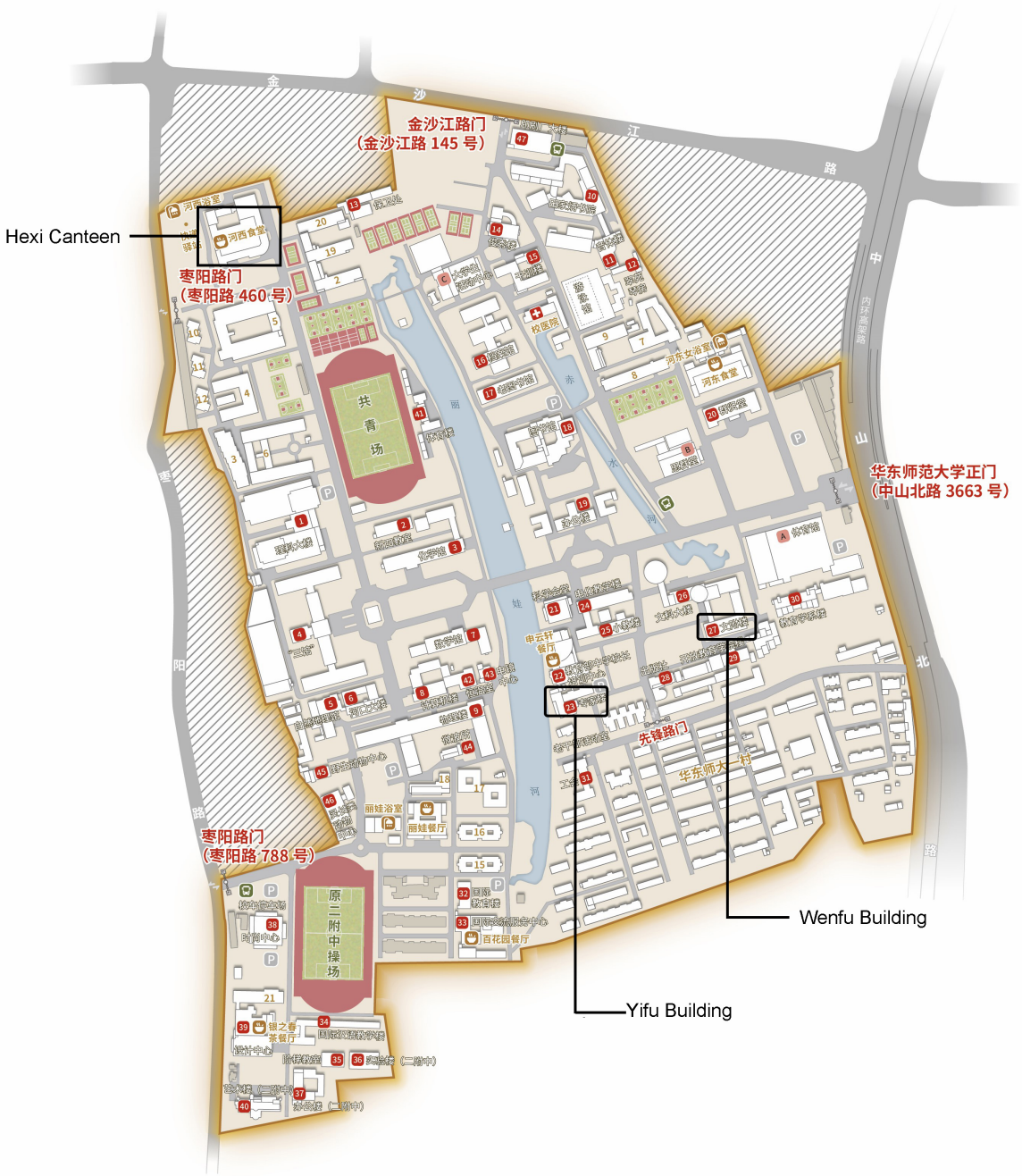
- **Hotel:** Yifu Building, Putuo Campus.

Contact

For any inquiries, please contact:

Research Center for Operator Algebras
School of Mathematics, East China Normal University
Email: wanghang@math.ecnu.edu.cn

Campus Map


Hexi Canteen
金沙江路门
（金沙江路 145 号）
枣阳路门
（枣阳路 460 号）
华东师范大学正门
（中山北路 3663 号）
枣阳路门
（枣阳路 788 号）
先锋路门
Wenfu Building
Yifu Building