

# **The 17th Special Week on Operator Algebras**

August 1st -August 5th, 2022



# East China Normal University

SHANGHAI·CHINA

# Calendar

**Remark**: The time beneath the speaker's name represents the speaker's local time when he/she should start the talk (only for reference). Please double check.

Beijing time Chair	Monday 8.1 Huaxin Lin/Jiawen Zhang	Tuesday 8.2 George Elliott/Jianchao Wu/ Francesc Perera/Qin Wang	Wednesday 8.3 Huaxin Lin/Hang Wang	Thursday 8.4 Yasuhiko Sato/ Qin Wang	Friday 8.5 Niu Zhuang/Qin Wang
9:00-10:00 George Elliott 7.31 (Sun.) 21:00-22:00		Luis Santiago 8.1 21:00-22:00	N.Christopher Phillips 8.2 18:00-19:00	Xiang Tang 8.3 20:00-21:00	Guihua Gong 8.4 21:00-22:00
10:30-11:30	Leonel Robert 7.31 (Sun.) 21:30-22:30	Zhuang Niu 8.1 20:30-21:30	Ping Wong Ng 8.2 21:30-22:30	Xin Ma 8.3 21:30-22:30	Guoliang Yu 8.4 21:30-22:30
14:00-15:00	Yasuhiko Sato 8.1 15:00-16:00	Hanfeng Li	Jianchao Wu	Xuanlong Fu 8.4 2:00-3:00	Hang Wang
15:30-16:30	Qin Wang	Hongzhi Liu	Francesc Perera 8.3 9:30-10:30	Mikael Rordam 8.4 9:30-10:30	Eusebio Gardella 8.5 9:30-10:30
16:35-17:35	Kang Li 8.1 10:35-11:35	Hannes Thiel 8.2 10:35-11:35	Valerio Proietti 8.3 10:35-11:35	Joachim Zacharias 8.4 9:35-10:35	Hao Guo
17:40-18:40	Free Discussion	Jiawen Zhang	Free Discussion	Jintao Deng	Free Discussion

# **Organizers:**

Huaxin Lin (University of Oregon) Qin Wang (East China Normal University) Hang Wang (East China Normal University) Jianchao Wu (Fudan University)

# **Speakers:**

Jintao Deng (University of Waterloo) George Elliott (University of Toronto) Xuanlong Fu (Fields Institute) Eusebio Gardella (Göteborgs Universitet) Guihua Gong (University of Puerto Rico) Hao Guo (Tsinghua University) Hanfeng Li (University of New York at Buffalo) Kang Li (Friedrich-Alexander-Universität Erlangen-Nürnberg) Xin Ma (The University of Memphis) Hongzhi Liu (Shanghai University of Finance and Economics) Ping Wong Ng (University of Louisiana at Lafayette) Zhuang Niu (University of Wyoming) Francesc Perera (Autonomous University of Barcelona) N.Christopher Phillips (University of Oregon and Ben Gurion University of the Negev) Valerio Proietti (East China Normal University) Leonel Robert (University of Louisiana at Lafayette) Mikael Rordam (University of Copenhagen) Luis Santiago (Lakehead University) Yasuhiko Sato (Kyushu University) Xiang Tang (Washington University in St.Louis) Hannes Thiel (Christian-Albrechts Universität Kiel)

Hang Wang (East China Normal University)
Qin Wang (East China Normal University)
Jianchao Wu (Fudan University)
Guoliang Yu (Texas A&M University)
Joachim Zacharias (University of Glasgow)
Jiawen Zhang (Fudan University)

# Schedule

# Location: online via Zoom.

Meeting room for all lectures:

Zoom Meeting ID: 878 9000 0739

Passcode: 416548

Discussion room:

There are three discussion rooms during the virtual coffee break. Speakers and audiences may use the discussion rooms to conduct further discussions if needed.

Because of our international participants, we encourage all talks to follow the schedule strictly.

Speakers will be reminded 5 minutes before the scheduled end time.

The time for discussion at the main meeting room will be limited. Participants wishing to have longer discussions may use the discussion rooms during each break. Speakers before each break may use the discussion rooms to conduct further discussions with the autdience if needed.

# Schedule of the talks (Beijing time):

Monday, 1 August			
Chair: Huaxin Lin			
9:00-10:00	George Elliott: Pushing forward the non-simple classification		
10:00-10:30	Tea Break		
10:30-11:30	Leonel Robert: Simplicity, bounded normal generation, and automatic continu-		
	ity of groups of unitaries		
14:00-15:00	Yasuhiko Sato: Non-simple Rationally AF algebras and KMS states		
15:00-15:30	Tea Break		
Chair: Jiawen Zhang			
15:30-16:30	Qin Wang: Amenability and K-theory of Roe algebras of metric spaces with		
	A-by-CE coarse fibrations		
16:35-17:35	Kang Li: Kirillov's orbit method to the Baum-Connes conjecture for algebraic		
	groups		
17:40-18:40	Free Discussion		

Tuesday, 2 August			
Chair: George Elliott			
9:00-10:00	Luis Santiago: Classification of Real AI algebras		
10:00-10:30	Tea Break		
Chair: Jianchao Wu			
10:30-11:30	Zhuang Niu: Structure of crossed product $C^*$ -algebras		
14:00-15:00	Hanfeng Li: Malcolmson semigroups		
15:00-15:30	Tea Break		
Chair: Francesc Perera			
15:30-16:30	Hongzhi Liu: On the localization algebra and a product formula of the signature		
16:35-17:35	Hannes Thiel: The zero-product structure of $C^*$ -algebras		
Chair: Qin Wang			
17:40-18:40	Jiawen Zhang: Quasi-local algebras for groupoids		

Wednesday, 3 August		
Chair: Huaxin Lin		
9:00-10:00	N.Christopher Phillips: The radius of comparison of $C(X)$ is about half the	
	covering dimension of $X$	
10:00-10:30	Tea Break	
10:30-11:30	Ping Wong Ng: $K_1$ injectivity of Paschke dual algebras	
Chair: Hang Wang		
14:00-15:00	Jianchao Wu: Three shades of dynamical strict comparison	
15:00-15:30	Tea Break	
15:30-16:30	Francesc Perera: A notion of almost finiteness for $C^*$ -dynamical systems and	
	its relation to dynamical strict comparison	
16:35-17:35	Valerio Proietti: Classification via index theory on the mapping torus	
17:40-18:40	Free Discussion	

Thursday, 4 August		
Chair: Yasuhiko Sato		
9:00-10:00	Xiang Tang: Helton-Howe Trace, Connes-Chern Character, and Quantization	
10:00-10:30	Tea Break	
10:30-11:30	Xin Ma: Boundary actions of $CAT(0)$ spaces and their C <sup>*</sup> -algebras	
Chair: Qin Wang		
14:00-15:00	Xuanlong Fu: Tracial matricial structure and approximation by invertibles	
15:00-15:30	Tea Break	
15:30-16:30	Mikael Rordam: Irreducible inclusions of simple $C^*$ -algebras	
16:35-17:35	Joachim Zacharias: Almost Elementary $C^*$ -Dynamics and $\mathcal{Z}$ -stability	
17:40-18:40	Jintao Deng: The coarse Baum-Connes conjecture for some relative expanders	

Friday, 5 August		
Chair: Zhuang Niu		
9:00-10:00	Guihua Gong: On the classification of simple separable nuclear $\mathcal{Z}$ -stable $C^*$ -	
	algebras	
10:00-10:30	Tea Break	
10:30-11:30	Guoliang Yu: Index theory at infinity and Gromov's compactness conjecture	
Chair: Qin Wang		
14:00-15:00	Hang Wang: Connected Lie groups and their covering groups: representations	
	and $C^*$ -algebras	
15:00-15:30	Tea Break	
15:30-16:30	Eusebio Gardella: $\mathcal{Z}$ -stability of crossed products	
16:35-17:35	Hao Guo: Covering complexity and scalar curvature via quantitative K-theory	
17:40-18:40	Free Discussion	

# Abstracts

# Jintao Deng (University of Waterloo)

**Title**: The coarse Baum-Connes conjecture for some relative expanders

**Abstract**: In this talk, I will talk about the coarse Baum-Connes conjecture for some relative expanders, which are coarsely embeddable sequences of extensions of finite groups. This is joint work with Qin Wang and Guoliang Yu.

# George Elliott (University of Toronto)

### Title: Pushing forward the non-simple classification

Abstract: In recent work, with Y. Sato, the early classification of AF algebras has been extended to the class of what might be called rationally AF algebras, where "rationally AF" means that the tensor product with an arbitrary (infinite-dimensional) Glimm UHF algebra is AF (approximately finite-dimensional). In the stable case, the invariant is the same as for AF algebras—of course, the range of the invariant is larger (rational dimension groups instead of just dimension groups). This result suggests considering also analogous classes, such as rationally AI algebras.

### Xuanlong Fu (Fields Institute)

### **Title**: Tracial matrical structure and approximation by invertibles

Abstract: If every element in a unital  $C^*$ -algebra can be approximated in norm by invertible elements, then such  $C^*$ -algebra is called has stable rank one. A non-unital  $C^*$ -algebra has stable rank one if its minimal unitization has stable rank one. Stable rank one is a frequently occur phenomenon. In 2004, M. Rordam showed that every simple unital finite  $\mathcal{Z}$ -stable  $C^*$ -algebra has stable rank one. In 2015, L. Robert showed that  $\mathcal{Z}$ -stable projectionless  $C^*$ algebras almost has stable rank one. In a joint work with Kang Li and Huaxin Lin in 2021, we showed that every simple finite  $\mathcal{Z}$ -stable (not necessary unital)  $C^*$ -algebra has stable rank one. And many not necessary  $\mathcal{Z}$ -stable  $C^*$ -algebra (for example, Villadson's first type algebras, and simple unital diagonal AH-algebras) also has stable rank one.

In this talk, I will talk about a joint work with Huaxin Lin in 2021. We showed that for a

separable simple  $C^*$ -algebra A which has comparison, A has stable rank one is equivalent to has a tracial matricial structure, also equivalent to has tracial approximately oscillation zero, and also equivalent to A has almost stable rank one with the map  $\Gamma : Cu(A) \to LAff_+(QT(A))$ is surjective.

## Eusebio Gardella (Göteborgs Universitet)

### **Title**: $\mathcal{Z}$ -stability of crossed products

Abstract: Jiang-Su stability is a fairly prevalent property, and it is preserved by a number of standard constructions for  $C^*$ -algebras. We are interested in studying preservation by formation of crossed products by actions of amenable groups, and we focus on the case of simple, nuclear  $C^*$ -algebras. Even though we are far from having a general result, several special cases are known, and I will report on recent progress in this direction. My talk will be based on joint works with Ilan Hirshberg and Andrea Vaccaro, and with Shirly Geffen, Petr Naryshkin and Andrea Vaccaro.

### Guihua Gong (University of Puerto Rico)

**Title**: On the classification of simple separable nuclear  $\mathcal{Z}$ -stable  $C^*$ -algebras **Abstract**: In this talk, I will present the classification of simple separable nuclear  $\mathcal{Z}$ -stable  $C^*$ -algebras in term of Elliott invariant. The talk is based on the joint work with Huaxin Lin and previous joint work with Elliott, Lin and Niu.

# Hao Guo (Tsinghua University)

**Title**: Covering complexity and scalar curvature via quantitative K-theory

Abstract: I will discuss a certain notion of covering complexity of a Riemannian manifold and how it relates to lower bounds of positive scalar curvature in the spin case. This makes use of a pairing between quantitative K-theory and Lipschitz K-theory, together with a quantitative vanishing theorem for Dirac operators. This is joint work with Guoliang Yu.

### Hanfeng Li (University of New York at Buffalo)

### **Title**: Malcolmson semigroups

Abstract: The Cuntz semigroup is an important invariant in the study of  $C^*$ -algebras. I will introduce two semigroups, called Malcolmson semigroups, one for matrices and one for finitely presented modules, as analogues of the Cuntz semigroup for unital rings. The relation between Cuntz semigroups and Malcolmson semigroups, and dimension functions and Sylvester matrix rank functions for unital  $C^*$ -algebras will be discussed. This is joint work with Tsz Fun Hung.

### Kang Li (Friedrich-Alexander-Universität Erlangen-Nürnberg)

**Title**: Kirillov's orbit method to the Baum-Connes conjecture for algebraic groups

Abstract: The orbit method for the Baum-Connes conjecture was first developed by Chabert and Echterhoff in the study of permanence properties for the Baum-Connes conjecture. Together with Nest they were able to apply the orbit method to verify the conjecture for almost connected groups and p - adic groups.

In this talk, we will discuss how to prove the Baum-Connes conjecture for linear algebraic groups over local fields of positive characteristic along the same idea. It turns out that the unitary representation theory of unipotent groups plays an essential role in the proof. As an example, we will concentrate on the Jacobi group, which is the semi-direct product of the symplectic group with the Heisenberg group. It is well-known that the Jacobi group has Kazhdans property (T), which is an obstacle to prove the Baum-Connes conjecture. If time permits, we will also discuss my recent joint work with Maarten Solleveld about quasi-reductive groups.

### Xin Ma (The University of Memphis)

### **Title**: Boundary actions of CAT(0) spaces and their $C^*$ -algebras

Abstract: In this talk, I will demonstrate some new examples of strongly purely infinite  $C^*$ algebras with origins from geometric topology, which include actions of right-angled Artin/Coxeter groups on certain boundaries and actions of generalized Baumslag-Solitar (*GBS*) groups
on the boundaries of their Bass-Serre trees. This framework even provides a new criterion for
determining the  $C^*$ -simplicity of certain *GBS* groups.

This is joint work with Daxun Wang.

### Hongzhi Liu (Shanghai University of Finance and Economics)

### Title: On the localization algebra and a product formula of the signature

**Abstract**: We prove product formula for the higher index and the higher rho invariant of the signature operator on a fibered manifold. Our result implies the classical product formula for the numerical signature of a fibered manifold obtained by Chern, Hirzebruch and Serre.

# Ping Wong Ng (University of Louisiana at Lafayette)

**Title**:  $K_1$  injectivity of Paschke dual algebras **Abstract**:  $K_1$  injectivity of Paschke dual algebras.

# Zhuang Niu (University of Wyoming)

### **Title**: Structure of crossed product C\*-algebras

Abstract: Consider a dynamical system, and let us study the structure of the corresponding crossed product  $C^*$ -algebra, in particular on the classifiability, comparison, and stable rank. More precisely, let us introduce a uniform Rokhlin property and a relative comparison property (these two properties hold for all free and minimal  $Z^d$  actions, and it is plausibly that they hold for all free and minimal actions by an arbitrary amenable group). With these two properties, the crossed product  $C^*$ -algebra is shown to always have stable rank one, to satisfy the Toms-Winter conjecture, and that the comparison radius is dominated by half of the mean dimension of the dynamical system. If time permits, let us also discuss  $C^*$ -dynamical systems and groupoids.

### Francesc Perera (Autonomous University of Barcelona)

**Title**: A notion of almost finiteness for  $C^*$ -dynamical systems and its relation to dynamical strict comparison

Abstract: We introduce the notion of noncommutative castle in a  $C^*$ -dynamical system, thus generalising the corresponding notion coming from actions of discrete groups on compact metric spaces. This is used to propose an extension of Kerr's almost finiteness for minimal actions on general  $C^*$ -algebras, by combining approximations of the action and the algebra up to a small remainder, measured in the dynamical Cuntz semigroup. We term such systems almost elementary, and this notion may be considered as a dynamical generalization of  $\mathcal{Z}$ stability. This extension admits a number of possible variations, essentially related to how smallness of the abovementioned remainder is measured. If time permits we shall discuss some of them.

This talk is based on joint work with Joan Bosa, Jianchao Wu, and Joachim Zacharias.

# N.Christopher Phillips (University of Oregon and Ben Gurion University of the Negev)

### **Title**: The radius of comparison of C(X) is about half the covering dimension of X

Abstract: Let X be a compact metric space. In 2013, Elliott and Niu proved that the radius of comparison rc(C(X)) is, up to an additive constant, at least half the rational cohomological dimension of X. We prove that, up to a slightly worse additive constant, rc(C(X)) is at least half the covering dimension of X. This gives new information both about spaces whose integer cohomological dimension is much greater than their rational cohomological dimension and about spaces with finite integer cohomological dimension but infinite covering dimension.

The proof is fairly short, but all vector bundles implicit in it are stably trivial.

### Valerio Proietti (East China Normal University)

#### **Title**: Classification via index theory on the mapping torus

Abstract: Given a class of topological dynamical systems, we study the associated mapping torus from the point of view of foliated spaces. By studying the interaction between the leafwise Dirac operator and the invariant transverse measures, we completely reframe in a geometric fashion the Elliott invariant for the crossed poduct of the dynamical system, and prove a rigidity result for the mapping torus, lifting leafwise homotopy equivalences to isomorphism of the noncommutative leaf space.

# Leonel Robert (University of Louisiana at Lafayette)

**Title**: Simplicity, bounded normal generation, and automatic continuity of groups of unitaries **Abstract**: I'll discuss a number of properties of the special unitary group of a  $C^*$ -algebra. Under standard regularity conditions, this group has local bounded normal generation, a unique polish group topology, and satisfies the invariant automatic continuity. Moreover, it can be used as a classifying invariant for simple  $C^*$ -algebras up to (anti)-isomorphism.

This is joint work with Abhinav Chand.

# Mikael Rordam (University of Copenhagen)

### **Title**: Irreducible inclusions of simple $C^*$ -algebras

Abstract: There are several naturally occurring interesting examples of inclusions of simple  $C^*$ -algebras with the property that all intermediate  $C^*$ -algebras likewise are simple. Moreover, in many cases one even has a Galois type classification of intermediate  $C^*$ -algebras of such inclusions. By analogy with von Neumann algebras, we refer to such inclusions as being  $C^*$ -irreducible. We give an intrinsic characterization of  $C^*$ -irreducible inclusions, and use this characterization to exhibit (and revisit) such inclusions, both known ones and new ones, arising from groups and dynamical systems. In a recent joint work with Echterhoff we show when inclusions of the form  $A^H \subseteq A \rtimes G$  are  $C^*$ -irreducible, where G and H are groups acting on a  $C^*$ -algebra A, and use this to exhibit new  $C^*$ -irreducible inclusions with interesting properties. We explore an averaging technique introduced by Popa and show how this can be used both to prove irreducibility of certain inclusions arising from crossed products and to establish a classification of their intermediate  $C^*$ -algebras.

### Luis Santiago (Lakehead University)

### Title: Classification of Real AI algebras

Abstract: In this talk I will discuss a classification of not necessarily simple real  $C^*$ -algebras

that can be written as an inductive limit of real forms of finite direct sums of matrix algebras over the continuous functions on the unit interval.

This is a joint work with Andrew Dean.

## Yasuhiko Sato (Kyushu University)

### Title: Non-simple Rationally AF algebras and KMS states

Abstract: In order to realize all possible KMS-bundles on the Jiang-Su algebra, we introduce a class of  $C^*$ -algebras which we call rationally approximately finite dimensional (RAF). Using these, we show that for a given proper simplex bundle  $(S, \pi)$  with a singleton  $\pi^{-1}(0)$  and a unital separable monotracial  $C^*$ -algebra A absorbing the Jiang-Su algebra tensorially (for instance, the irrational rotation algebra), there exists a flow on A whose KMS-bundle is isomorphic to  $(S, \pi)$ .

This is joint work with G. A. Elliott.

### Xiang Tang (Washington University in St.Louis)

### Title: Helton-Howe Trace, Connes-Chern Character, and Quantization

Abstract: In the early 70s, Helton and Howe proved a beautiful formula for the trace of commutators of Toeplitz operators. In the 80s, Connes greatly generalized the Helton-Howe trace formula using cyclic cohomology. The Connes-Chern character contains the Helton-Howe trace as the top degree component. In this talk, we will study the Connes-Chern character for the Toeplitz extension from the viewpoint of quantization. As an outcome, we will establish the Helton-Howe trace formula for Toeplitz operators with  $C^2$ -symbols for all weighted Bergman spaces. This talk is based on joint work with Yi Wang and Dechao Zheng.

### Hannes Thiel (Christian-Albrechts Universität Kiel)

### **Title**: The zero-product structure of $C^*$ -algebras

**Abstract**: It is well-known that every  $C^*$ -algebra is determined by its linear and multiplicative structure: Two  $C^*$ -algebras are \*-isomorphic if and only if they admit a multiplicative, linear bijection.

We study if instead of the whole multiplicative structure it suffices to record when two elements have zero product. While it is not clear if every  $C^*$ -algebra is determined this way, we obtain many positive results. In particular, two unital, simple  $C^*$ -algebras are \*-isomorphic if and only if they admit a linear bijection that preserves zero products.

This is joint work with Eusebio Gardella.

## Hang Wang (East China Normal University)

**Title**: Connected Lie groups and their covering groups: representations and  $C^*$ -algebras **Abstract**: Unitary representations of a linear reductive group are well established, while the representations of its covering group (usually nonlinear) do not have a systematic description. Observing that the unitary dual of a locally compact group can be identified with the spectrum of the  $C^*$ -algebra of the group, we investigate relations between the  $C^*$ -algebras and K-theory of a connected Lie group G and its covering group. The representation of the covering group can be covered by representations of G and those of the fundamental group of G, and are encoded in the construction of a continuous field of  $C^*$ -algebras.

This is joint work with Kuok Fai Chao.

# Qin Wang (East China Normal University)

**Title**: Amenability and K-theory of Roe algebras of metric spaces with A-by-CE coarse fibrations

Abstract: Let X be a discrete metric space with bounded geometry. We show that if X admits an "A-by-CE coarse fibration", then the canonical quotient map from the maximal Roe algebra to the reduced Roe algebra of X induces an isomorphism on K- theory. A typical example of such a space arises from a sequence of group extensions such that the sequence of normal subgroups has Yu's property A, and the sequence of quotient groups admits a coarse embedding into Hilbert space. This implies that the maximal coarse Baum-Connes conjecture holds for a large class of metric space which may not admit a fibred coarse embedding into Hilbert space.

This is joint work with Liang Guo, Zheng Luo, and Yazhou Zhang.

### Jianchao Wu (Fudan University)

### Title: Three shades of dynamical strict comparison

Abstract: The notion of strict comparison of a  $C^*$ -algebra was inspired by the theory of  $II_1$  factors and has played an instrumental role in the Elliott classification program. Recently, the study around a dynamical analog of strict comparison has been gaining interest, pioneered by Kerr and his coauthors. In this talk, I will focus on a part of my joint work with Bosa, Perera, and Zacharias, which takes a more systematic look at the formulation of dynamical strict comparison and, as a result, produces three different kinds of dynamical strict comparison for a topological dynamical system. The weakest of the three agrees with Kerr's dynamical strict comparison, while the other two are properties of dynamical analogs of the Cuntz semigroup (one of the semigroups turns out to be isomorphic to Xin Ma's generalized type semigroup). Contrary to previous speculations, we now know for many topological dynamical systems that Kerr's dynamical strict comparison holds without the presence of other regularity properties

such as mean dimension zero and strict comparison of the crossed products. This somewhat unexpected mismatch may be remedied by replacing Kerr's dynamical strict comparison with the strongest of our three dynamical strict comparison properties. As an application, our work widens the scope of topological dynamical systems whose crossed products are classifiable.

# Guoliang Yu (Texas A&M University)

Title: Index theory at infinity and Gromov's compactness conjecture

Abstract: We introduce an index theory at infinity for Dirac operators and apply it to solve Gromov's compactness conjecture for scalar curvature. K-theory of  $C^*$ -algebras plays an essential role in this new index theory.

This is joint work with Shmuel Weinberger and Zhizhang Xie.

# Joachim Zacharias (University of Glasgow)

### **Title**: Almost Elementary $C^*$ -Dynamics and $\mathcal{Z}$ -stability

Abstract: Joint work with Joan Bosa, Francesc Perera and Jianchao Wu.

Motivated by the Toms-Winter conjecture and Kerr's notion of almost finiteness for actions of amenable discrete groups on compact metric spaces, which may be regarded as a dynamical analogue of  $\mathcal{Z}$ -stability in this setting, we propose a generalisation of this concept to actions of discrete groups on general  $C^*$ -algebras which we coin almost elementary actions. Our starting point is a generalisation of Kerr's notion of a castle which we define as a simultaneous approximation of the algebra and the action, up to an arbitrarily small remainder in a dynamically tracial sense. It turns out that many different natural smallness conditions are equivalent. In the case of no group action our condition is a weak form of being tracially AF or having tracial nuclear dimension 0. We can show that in this case almost elementariness is equivalent to  $\mathcal{Z}$ -stability for separable simple nuclear algebras, thus it maybe added as another equivalent condition to the Toms-Winter conjecture. Moreover, almost elementary actions lead to  $\mathcal{Z}$ -stable crossed products, in line with it being a kind of dynamical  $\mathcal{Z}$ -stability.

# Jiawen Zhang (Fudan University)

### Title: Quasi-local algebras for groupoids

Abstract: The notion of quasi-locality was originally introduced by Roe to describe operators in (uniform) Roe algebras, and it attracted more and more attention recently. In this talk, I will introduce a generalisation of quasi-locality to the theory of groupoids, based on a joint work with Baojie Jiang and Jianguo Zhang. We show that when the groupoid is etale and amenable, then the quasi-local algebra coincides with the reduced groupoid  $C^*$ -algbera. This unifies the classic case of groups and metric spaces, and also gives new results for group actions and groupoid uniform Roe algebras.

# About Us

Research Center for Operator Algebras is under the direct auspices of East China Normal University and was founded in 2010. Currently, it is located on the 5th floor of Science Building A (the highest building) in ECNU North ZhongShan Road campus, Shanghai, China.

This center focuses on the research related to operator algebra and functional analysis. It attaches great importance to collaboration home and abroad. So far it has set up frequent academic relationships and links with several well-known institutes and research centers in terms of scientific researches and cooperations.

Quite a few international conferences and symposiums on operator algebras have been held here. Every year, a number of famous mathematicians are invited to give lectures and conduct researches in the center.

To promote the developments in operator algebra and related fields, we welcome students and visiting scholars all over the world to come for study and work (for either long term or short term).