International Mini-Workshop on Algebras

September 19-20, 2025, USTC, Hefei

Sept. 19 (Friday)

Time	Chair	Talk
9:00-12:00		Arrival
12:00-14:30		Break
14:30-15:20		Srikanth Iyengar (The University of Utah)
15:25-16:15		Zhengfang Wang (Nanjing University)
16:15-16:40		Tea Break + Group Photo
16:40-17:30		Wei Ren (Chongqing Normal University)

Sept. 20 (Saturday)

Time	Chair	Talk
9:00-9:50		Alexander Zimmermann (Université d'Amiens)
9:55-10:45		Rasool Hafezi (Nanjing Univ. of Infor. Science and Technology)
10:45-11:05		Tea Break
11:05-11:55		Roozbeh Hazrat (Western Sydney University)
12:00-14:00		Break
14:00-17:00		Free Discussion

Lecture Room: the fifth Teaching Building 5306, close to Campus Guesthouse, with Tea Break/Discussion Room at 5305.

Lunch/Dinner: Guesthouse buffet, the second floor

Organizers: Xiao-Wu Chen, Huanhuan Li, Kai Wang, Ren Wang
Sponsors：NNSF of China, National Key R&D Program of China, School of Math. Sci. USTC

Abstracts

Unstable elements in cohomology and a question of Lescot

Srikanth Iyengar (The University of Utah)

Abstract: This talk concerns the Bass numbers of syzygy modules of modules over a commutative noetherian local ring. This topic was investigated by Lescot in a paper published in 1986. I will discuss some results from an ongoing project with Maitra and Tribone that grew out of our reading of Lescot's work. While the talk is focussed on commutative rings, the many of the questions that arise are of interest also for general Noether algebras.

The Tate-Hochschild (co)homology for dg algebras

Zhengfang Wang (Nanjing University)

Abstract: For any (non-proper) dg algebra we introduce the notion of Tate-Hochschild (co)homology by using Efimov's categorical formal punctured neighborhood of infinity. We will discuss the algebraic structures and properties of this cohomology when the dg algebra is smooth Calabi-Yau. This is based on the joint work with Rivera and Takeda.

Certain subclasses of Gorenstein modules over group algebras

Wei Ren (Chongqing Normal University)

Abstract: Over a group algebra, the classes of cofibrant, fibrant, and cofibrant-flat modules form subclasses of the Gorenstein projective, Gorenstein injective, and Gorenstein flat modules, respectively. These subclasses possess properties that are conjectured or known to hold for the Gorenstein classes. Since the Gorenstein classes are actually equal to the corresponding subclasses for large families of groups, we thus obtain (indirectly) some information about the Gorenstein classes over such groups. Additionally, we study the triangulated categories and model structures associated with these modules. This talk is based on joint work with Ioannis Emmanouil.

DG-division algebras

Alexander Zimmermann (Université d'Amiens)

Abstract: Though differential graded algebras were defined 70 years ago, they and the category of dg-modules were mainly explored emphasizing its role as a tool in homological algebra. The point of view that they are rings with additional structure played no role until very recently. Orlov studied the additional condition of the dg-algebra being finite dimensional, and Aldrich and Garcia Rozas classified the acyclic case completely. In the present talk I will show how one can define dg-division algebras and give a complete classification ofdg-fields. If time permits I will also examine dg-seperable extensions of dg-algebras, in particular dg-fields, and related questions.

τ-tilting theory via morphism category

Rasool Hafezi (Nanjing Univ. of Infor. Science and Technology)

Abstract: For an additive category $\CC$, we consider a natural functor from the morphism category ${\rm H}(\CC)$ to $\mmod \CC$, the category of finitely presented contravariant additive functors on $\CC$. Equipping ${\rm H}(\CC)$ with a component-wise split exact structure allows us to develop Auslander-Reiten theory and relate it via this functor to the Auslander-Reiten theory in $\mmod \CC$. We apply this to $\CC = \mmod A$, $\CC = \underline{{\rm Gprj}}\mbox{-}A$, and $\CC = {\rm proj}\mbox{-}A$, obtaining insights into stable Cohen--Macaulay Auslander algebras, (stable) Auslander algebras, and preprojective algebras. In my talk, I will particularly focus on the case $\CC = {\rm proj}\mbox{-}A$, where we observe how τ-tilting theory naturally arises from the tilting theory of the morphism category of projective modules. This part of the talk is based on recent joint work with Alireza Nasr-Isfahani and Jiaqun Wei.

Higher rank graphs and Leavitt path algebras associated to them

Roozbeh Hazrat (Western Sydney University)

Abstract: The Leavitt path algebras of higher rank graphs (aka, Kumjian-Pask algebras) are introduced. We then study invariants for their classifications.