Southeastern Algebraic Geometry Symposium VIII

June 9–13, 2025 *

Southern University of Science and Technology (SUSTech), Shenzhen, China

Overview

The **Southeastern Algebraic Geometry Symposium VIII** will take place from **Monday, June 9** to **Friday, June 13, 2025** at the **Southern University of Science and Technology (SUSTech)**, Shenzhen.

This handbook contains important details about the schedule, venue, registration, accommodation, and transportation. It will be updated periodically and finalized before the conference date.

Organizers

- Zhan Li (SUSTech), lizhan@sustech.edu.cn

Venue

- **June 9–11:** Science Building, Room M1001
- **June 12–13:** Taizhou Building (International Center for Mathematics) ICM Lecture Hall 240 A

Important Timeline

- **Banquet:** Tuesday evening (June 10)
- **Free afternoon:** Thursday (June 12)
- **Free discussion:** Friday (June 13)

Registration

The deadline for registration is **May 20th, 2025**.

Note: Invited speakers do *not* need to fill in the registration form. Accommodation has been reserved for speakers from **June 8 (check-in)** to **June 14 (check-out)**. If your travel plans differ, please contact the organizer as soon as possible.

*Last Updated: June 1st, 2025

Hotel Information

Vienna Best Sleep International Hotel (Shenzhen Tanglang Metro Station)

Google map: `https://maps.app.goo.gl/kKvkie1qp4Dw1bFQA`
Baidu map: `https://j.map.baidu.com/bd/74`

(i) It takes approximately 50 minutes and costs around 70 RMB to get from Shenzhen Bao'an Airport to the hotel. I recommend taking a taxi from outside Gate 13 of the airport. The taxis there use meters, so you can rest assured that you will be charged a fair rate. Please show the following message to the taxi driver:

"Please take me to the Vienna Best Sleep International Hotel (Shenzhen Tanglang Metro Station)."

请送我去：维也纳好眠国际酒店(塘朗地铁站店)

(ii) At check-in, please let the front desk know that you are attending the conference, or present the following information in Chinese:

我参加东南代数几何会议，预定人李展

(iii) Graduate students will be accommodated in double rooms (2 persons per room). The remaining attendees will be accommodated in single rooms. All rooms include breakfast.

Payment and SIM card

You can make payments using cash or by scanning a QR code. We recommend using the app **Alipay**, where you can link your credit card for convenient e-payment. If you're using a SIM card from your home country, you should still be able to access apps from home, such as Gmail and Google Maps.

Enter the Campus

There will be a shuttle service to take participants from the hotel to the campus each day (leave at 8:30am from the parking lot of the hotel). For registered participants, you can also go to the campus on your own (we have provided your name to the campus guards).

Speakers

(=To be confirmed)*

- Florin Ambro (Institute of Mathematics of the Romanian Academy)
- Sung Rak Choi (Yonsei University)
- Kenta Hashizume (Niigata University)
- Zhengyu Hu (Chongqing University of Technology)

- Zheng Hua* (University of Hong Kong)
- Chen Jiang (Fudan University)
- Vladimir Lazić (Universität des Saarlandes)
- Jihao Liu (Peking University)
- Yusuke Nakamura (Nagoya University)
- Yuri Prokhorov* (Steklov Mathematical Institute)
- Lu Qi (East China Normal University)
- Lei Song (Sun Yat-sen University)
- Hao Sun (South China University of Technology)
- Zhiyu Tian (Beijing International Center for Mathematical Research)
- Chengxi Wang (Tsinghua University)
- Zhixin Xie (Université de Lorraine)
- Jinsong Xu (Xi'an Jiaotong-Liverpool University)
- Zheng Zhang (ShanghaiTech University)
- Chuyu Zhou (Xiamen University)

Schedule of Talks

The schedule will be updated here closer to the conference date.

Titles and Abstracts

Titles and abstracts of the talks will be listed below as they become available.

Title: Classification of toric surface singularities
Speaker: Florin Ambro
Abstract: In the search of minimal models, singularities appear inevitably. Explicit classification of these singularities is possible in small dimension, with important global applications. In higher dimension, explicit classification is considered hopeless, expecting instead qualitative results on invariants of singularities, such as the minimal log discrepancy, or the index of complements. I will survey the above in the first half of the talk. In the latter half, I will discuss a new qualitative classification of toric surface singularities.

Title: Stability of syzygy bundles on varieties of Picard number one
Speaker: Chen Jiang
Abstract: We give a criterion for slope-stability of the syzygy bundle of a globally generated ample line bundle on a smooth projective variety of Picard number 1 in terms of Hilbert polynomial. As applications, we prove the stability of syzygy bundles on many varieties, such as smooth Fano or Calabi–Yau complete intersections and hyperkähler varieties.

Title: A valuative approach to the $-K$-MMP
Speaker: Sung Rak Choi

Abstract: We study the geometry of the triples which consist of a usual pair and a pseudoeffective divisor. We prove that there exists a quasi-monomial valuation which computes the log canonical threshold of the triple if the triple is potentially klt. As a by-product, we show that in such a case, we can run the $-K$-MMP. This is based on the joint work with S.Jang, D.Kim, and D.Lee.

Title: Symplectic foliations of grassmannian

Speaker: Zheng Hua

Abstract: We will construct a class of Poisson structures on grassmannian by realizing grassmannian as a certain moduli space of coherent systems on a degeneration of elliptic curve. Such a moduli space is equipped with a natural Poisson structure whose symplectic leaves are indexed by certain vector bundles on the curve. This generalizes the well known Richardson stratification on grassmannians.

Title: Syzygies of ample line bundles on abelian surfaces

Speaker: Lei Song

Abstract: Cohomological rank functions on polarized abelian varieties were introduced by Jiang and Pareschi. In particular, the first cohomological rank function of the ideal sheaf of a point is closely related to the syzygies of ample line bundles. Using Bridgeland stability conditions, Lahoz and Rojas defined Chern degree functions on polarized surfaces and showed these coincide with the cohomological rank functions for abelian surfaces. Employing this perspective, we sharpen results of Ito and of Rojas concerning the syzygies of ample line bundles on abelian surfaces, and affirmatively answer a question of Gross and Popescu. This is joint work in progress with Chunyi Li and Xiao Wang.

Title: Abundance conjecture when $\nu \leq 1$

Speaker: Jihao Liu

Abstract. In a recent joint work with Zheng Xu, we show that the non-vanishing conjecture implies the abundance conjecture when $\nu \leq 1$. We also prove the abundance conjecture in dimension ≤ 5 when $\kappa \geq 0$ and $\nu \leq 1$ unconditionally. I will discuss this work in my talk.

Title: Existence of Higgs-de Rham flow for principal G-bundles

Speaker: Hao Sun

Abstract: The theory of Higgs-de Rham flow is established and developed by Lan-Sheng-Zuo, which is based on the nonabelian Hodge correspondence in positive characteristic given by Ogus-Vologodsky and iterated destabilizing modifications given by Simpson. In this talk, I will discuss how to construct Higgs-de Rham flow for principal G-bundles. This is joint work with Mao Sheng and Jianping Wang.

Title: A simple remark on a conjecture of Suslin

Speaker: Zhiyu Tian

Abstract: Suslin made a conjecture on Lawson homology, which is an integral analogue of the conjecture of Bloch-Kato and Milnor (theorem of Voevodsky). I will discuss the first open case of the conjecture for one-cycles on threefolds.

Title: On the Cone conjecture beyond the trivial canonical class

Speaker: Vladimir Lazić

Abstract: In this talk I will discuss a possible extension of the Cone conjecture beyond the case of klt Calabi-Yau pairs. This is joint work in progress with Isabel Stenger and Zhixin Xie.

Title: On the relative cone conjecture for families of hyperkähler manifolds

Speaker: Zhixin Xie

Abstract: The Kawamata-Morrison cone conjecture predicts the geometry of the nef cone and the movable cone of a variety with trivial canonical class. In this talk, we will discuss families of varieties with trivial canonical class and vanishing irregularity. We will study the

relative nef cone and the relative movable cone of such families, using machinery from the Minimal Model Program. As application, we will show the relative cone conjecture for families whose very general fibre is a projective hyperkähler manifold of one of the known deformation types. This is joint work with Andreas Höring and Gianluca Pacienza.

Title: On the K-moduli of cubic hypersurface pairs

Speaker: Zheng Zhang

Abstract: A cubic hypersurface pair consists of a cubic hypersurface and a hyperplane section. In this talk, I will explain the following results. (1) Martinez-Garcia, Papazachariou and Zhao have shown that the K-moduli of cubic surface pairs (S, cE) is isomorphic to a GIT compactification. We give a uniformalization of a certain K-moduli as the Baily-Borel compactification of a ball quotient. (2) We also show that the K-moduli of cubic threefold pairs (X, cD) is isomorphic to a GIT compactification. This is joint work in preparation with Fei Si.

Title: On minimal model program for log canonical pairs in complex analytic setting

Speaker: Kenta Hashizume

Abstract: Remarkable progress has been made in recent years in the field of the minimal model theory for complex algebraic varieties. The first breakthrough was brought by Birkar, Cascini, Hacon and McKernan. In 2022, Fujino generalized their results to projective morphisms between complex analytic spaces. This is the first step of the minimal model theory in the complex analytic setting. In this talk, I will introduce recent progress of the minimal model theory for log canonical pairs in complex analytic setting. This talk contains joint works with Makoto Enokizono.

Title : K-moduli spaces of certain families of weighted projective hypersurfaces and the structure of wall-crossing

Speaker: Chengxi Wang

Abstract: In the talk, we will consider the K-moduli spaces of hypersurfaces of degree $2(n+3)$ in weighted projective spaces $\mathbf{P}(1, 2, n+2, n+3)$. We give an explicit description of the wall crossing for K-moduli spaces M_w of certain log Fano pairs with coefficient w whose double cover gives the weighted hypersurface. By this description, we show that the K-polystable limits of these weighted hypersurfaces are also weighted hypersurfaces of the same degree in the same weighted projective space. Furthermore, we obtain that the wall crossing of M_w coincides with variation of GIT except at the last K-moduli wall which gives a divisorial contraction. Our K-moduli spaces provide new birational models for some natural loci in the moduli space of marked hyperelliptic curves. This is based on my work with In-Kyun Kim and Yuchen Liu.

Title: A counterexample to the PIA conjecture

Speaker: Yusuke Nakamura

Abstract: In this talk, I will give a counterexample to the PIA (precise inversion of adjunction) conjecture for MLD's (minimal log discrepancy). The usual inversion of adjunction is a type of claim "the information of the singularity of a pair (X, D) can be recovered from the information of the singularity of D". The precise version (PIA conjecture) states that this is correct at the level of MLD (minimal log discrepancy), the invariant of the singularity. The PIA conjecture is known to be true in dimension 3. In this talk, I will give a counterexample in dimension 5. This talk is based on joint work with Kohsuke Shibata.