天元數學國際交流中心
Tianyuan Mathematics Research Center

Conference on Poisson Geometry and Mathematical Physics



Organizers:

Honglei Lang (China Agricultural University)

Yunhe Sheng (Jilin University)

Xiaomeng Xu (Peking University)

Chenchang Zhu (Georg-August-Universität Göttingen)

Oct 26, 2025 - Nov 1, 2025
Tianyuan Mathematicsl Research Center, Kunming

Schedule

October 27, 2025 (Monday)			
08:50-09:00	**Opening**		
Time	Speaker	Title of talk	Chair
09:00-10:00	Anton Alekseev	Morita equivalence for the coadjoint Virasoro action	Zhangju Liu
10:00-10:30	Coffee break		
10:30-11:30	Christian Blohmann	Functoriality of bornological groupoid convolution	Zhangju Liu
12:00-14:30	Lunch break		
14:30-15:30	Alberto Cattaneo	Quantization of corner algebras	Katarzyna Grabowska
15:30-16:00	Coffee break		
16:00-17:00	Shuo Zhang	Quilted TCFT and applications	Katarzyna Grabowska
	Maosong Xiang	Cohomology of differential graded manifolds	
18:00-	Dinner		

October 28, 2025 (Tuesday)			
8:45-9:00	**Group Photo**		
Time	Speaker	Title of talk	Chair
09:00-10:00	Huijun Fan	Landau-Ginzburg model, tt^* geometry and integrable system	Yunhe Sheng
10:00-10:30	Coffee break		
10:30-11:30	Cristian Ortiz	Higher Poisson algebras of 1-shifted symplectic and 1-shifted Poisson groupoids	Yunhe Sheng
12:00-14:30	Lunch break		
14:30-15:30	Noriaki Ikeda	Hamiltonian Lie algebroids and Poisson maps	Bin Zhang
15:30-16:00	Coffee break		
16:00-17:00	Mykola Matviichuk	Deformations of T-log-symplectic log-canonical Poisson brackets	Bin Zhang
	Miquel Cueca Ten	Reduction at critical values	
18:00-	Dinner		

October 29, 2025 (Wednesday)			
Time	Speaker	Title of talk	Chair
09:00-10:00	Shuai Guo	An introduction to global mirror symmetry	Jipeng Cheng
10:00-10:30	Coffee break		
10:30-11:30	Free Discussion		
12:00-14:30	Lunch break		
Afternoon	Free Discussion		
18:00-	Dinner		

October 30, 2025 (Thursday)			
Time	Speaker	Title of talk	Chair
09:00-10:00	Hui Li	K-contact manifolds with minimal closed Reeb orbits	Zhujun Zheng
10:00-10:30	Coffee break		
10:30-11:30	Luca Vitagliano	Tensor products of VB groupoids	Zhujun Zheng
12:00-14:30	Lunch break		
14:30-15:30	Xiudi Tang	Spherical pendulums: linear and quadratic	Yanhui Bi
	Daniel Alvarez	The global Courant sigma model for Lie algebra actions	
15:30-16:00	Coffee break		
16:00-17:00	Florian Michael Zeiser	Unimoduliarity and linearization for Nambu-Poisson structures	Yanhui Bi
	Yingdi Qin	Generalized complex geometry and double Lie algebroids	
18:00-	Dinner		

October 31, 2025 (Friday)			
Time	Speaker	Title of talk	Chair
09:00-10:00	Vladimir Salnikov	Super Poisson impressions and applications	Honglei Lang
10:00-10:30	Coffee break		
10:30-11:30	Janusz Grabowski	Jacobi algebroids, and lifts of Jacobi brackets	Honglei Lang
12:00-14:30	Lunch		
Afternoon	Free Discussion		
18:00-	Dinner		

Title and Abstract

Morita equivalence for the coadjoint Virasoro action

Anton Alekseev (University of Geneva)

Abstract: The set of coadjoint orbits of the Virasoro algebra Vir is in bijection with the set of conjugacy classes in a certain open subset S_+ of the universal cover of SL(2,R). We strengthen this bijection to a Morita equivalence of quasi-symplectic groupoids, integrating the Poisson structure on Vir^* and the Cartan-Dirac structure on S_+, respectively. The talk is based on a joint work with E. Meinrenken, arXiv:2211.06216.

The global Courant sigma model for Lie algebra actions

Daniel Alvarez (Instituto de Matemática Pura e Aplicada)

Abstract: Lie algebra actions with coisotropic stabilizers give rise to so called action Courant algebroids, which include many remarkable examples, from ordinary quadratic Lie algebras to transitive Courant algebroids over homogeneous spaces and logarithmic Courant algebroids over wonderful compactifications. By studying their global counterparts in the shape of shifted symplectic 2-groupoids, we may define the global version of the corresponding Courant sigma model. In the same way that global Chern-Simons theory corresponds to flat principal bundles, our definition is given by flat principal 2-bundles, thus linking our work with higher gauge theory. This is ongoing work with Marco Gualtieri.

Functoriality of bornological groupoid convolution

Christian Blohmann (Max Planck Institute for Mathematics)

Abstract: In a recent result with D. Aretz, we proved that the complete bornological convolution algebras of Lie groupoids and convolution bimodules of groupoid bibundles define a monoidal functor from the 2-category of differentiable stacks to the Morita 2-category of complete bornological algebras. (This is not true for the C^* completion). The convolution algebras can be thought of as the smooth noncommutative geometry of the orbit space of the groupoid. I will give a number of examples and applications. In particular, I will comment on the prequantization of Poisson structures by convolution.

Quantization of corner algebras

Alberto Cattaneo (University of Zurich)

Abstract: After an introduction to BV and AKSZ model, I will describe the corner Poisson algebra for four-dimensional BF theory and its quantization.

Landau-Ginzburg model, tt* geometry and integrable system

Huijun Fan (Wuhan University)

Abstract: Singularity theory studies the local behavior of a map near its critical locus and is the main topic of algebraic geometry since the middle of last century. It can be also considered as part of Landau-Ginzburg model arising from the study of mirror symmetry. In this talk, I will report the progress on how to quantize the LG models via the method of geometrical analysis.

Jacobi algebroids, and lifts of Jacobi brackets

Janusz Grabowski (Polish Academy of Sciences)

Abstract: G-groupoids and G-algebroids are Lie groupoids and Lie algebroids that are simultaneously principal G-bundles such that the Lie group G acts by Lie groupoid/ Lie algebroid isomorphisms. A particularly interesting case is of G being the multiplicative group $\mathbb{R}^\times$ of invertible reals, which plays a prominent role in contact and Jacobi geometry. We will work with Jacobi structures defined by brackets on sections of line bundles, rather than just on functions, using the terminology of Jacobi bundles as defined by Marle.

We intend to present results describing the structure of G-algebroids, especially in the case of $\mathbb{R}^\times$-algebroids, called in the literature Jacobi or Kirillov algebroids. We will also discuss tangent and cotangent lifts of principal actions, which are more general than the standard ones. In the case of $G = \mathbb{R}^\times$, they can be used for lifting Jacobi structures and for associating Jacobi algebroids with Jacobi bundles.

An introduction to global mirror symmetry

Shuai Guo (Peking University)

Abstract: Mirror symmetry originates from string duality in physics. Mathematically, classical mirror symmetry establishes a fundamental connection between certain enumerative geometry problems on a family of Calabi-Yau threefolds and the period integrals on its mirror family. In this talk, we will first provide an overview of the background to this problem, as well as its precise mathematical formulation. We will then introduce more conjectures from physics and relevant developments related to global mirror symmetry. Finally, we will present the recent progress in mathematics regarding high-genus mirror symmetry.

Hamiltonian Lie algebroids and Poisson maps

Noriaki Ikeda (Ritsumeikan University)

Abstract: A Hamiltonian Lie algebroid is a generalization of a Hamiltonian G-space.

In a Hamiltonian Lie algebroid, a Lie group (a Lie algebra) action is replaced by a Lie groupoid (a Lie algebroid) action and a momentum map is generalized to a momentum section. Though a momentum map is a Poisson map from the manifold M to the dual of Lie algebra, a momentum section is not necessarily a Poisson map from the manifold M to the dual of Lie algebroid. For that reason, a Marsden-Weinstein reduction in a Hamiltonian Lie algebroid does not work. We discuss a construction of Poisson maps in a Hamiltonian Lie algebroid.

K-contact manifolds with minimal closed Reeb orbits

Hui Li (Soochow University)

Abstract: We use the Boothby-Wang fibration to construct certain simply connected K-contact manifolds and we give sufficient and necessary conditions on when such K-contact manifolds are homeomorphic to the odd dimensional spheres. If the symplectic base manifold of the fibration admits a Hamiltonian torus action, we show that on the total space of the fibration, other than the regular K-contact structures which have infinitely many closed Reeb orbits, there are K-contact structures whose closed Reeb orbits correspond exactly to the fixed points of the Hamiltonian torus action on the base manifold. Then we give a collection of examples of compact simply connected K-contact manifolds with minimal number of closed Reeb orbits which are not homeomorphic to the odd dimensional spheres, while having the real cohomology ring of the spheres.

Deformations of T-log-symplectic log-canonical Poisson brackets

Mykola Matviichuk (The Chinese University of Hong Kong)

Abstract: A Poisson bracket is called log-canonical if it is of the form $\{x_i, x_j\} = \lambda_{ij} x_i x_j$. This talk presents a method for deforming such a bracket under an additional assumption of T-log-symplecticity, which will be defined. An application to Lie theory, in particular Bott-Samelson varieties, will be presented. This is joint work with J.-H. Lu.

Higher Poisson algebras of 1-shifted symplectic and 1-shifted Poisson groupoids

Cristian Ortiz (Universidade de São Paulo)

Abstract: The algebra of functions on a manifold equipped with either a symplectic 2-form or a Poisson bivector has natural induced structures of Poisson algebra. Additionally, if a Poisson bivector and a symplectic 2-form are inverse of each other, then the induced Poisson algebra structures on its functions coincide. In this talk we show a similar result in the setting of 1-shifted symplectic and 1-shifted Poisson

groupoids, giving rise to degree 1 graded Poisson algebras which are Morita invariant. This is a joint work with Gabriel Sevestre and Marco Zambon.

Generalized complex geometry and double Lie algebroids

Yingdi Qin (Shanghai Institute for Mathematics and Interdisciplinary Sciences)

Abstract: Generalized complex geometry encompasses complex geometry and symplectic geometry as extremal special cases. By making use of the underlying Poisson structure, we reinterpreted a generalized complex manifold as a 1-shifted symplectic stack together with a homotopy complex structure. This newly defined homotopy complex structure will be presented by complex double Lie algebroids. If time permits, I will discuss generalized complex branes whose underlying geometry induces a homotopy holomorphic Lagrangian map into the aforementioned stack.

Super Poisson impressions and applications

Vladimir Salnikov (La Rochelle Université)

Spherical pendulums: linear and quadratic

Xiudi Tang (Beijing Institute of Technology)

Abstract: Spherical pendulums model the motion of a particle on a frictionless sphere. This is an integrable Hamiltonian system which enjoys the property that one of the first integrals has a periodic flow, provided that the potential V is a function of a single spacial variable z. These systems are natural and intuitional, and so are exact and can be quantized by differential operators. They have enough symmetries to belong to the class of faithful semitoric systems which can be classified by invariants. They admit focus-focus singularites which generate local singularities and global monodromies. Note that the dynamics is completely determined by the shape of the potential function V. The linear case is standard and thoroughly studied. The quadratic case is not well studied. It has a fiber with two focus-focus points instead of one in the linear case, and is of our particular interest, especially because the semiglobal invariants consist of two Taylor series. We will list some known results on linear spherical pendulums. Then, we study the symmetric quadratic case of $V = z^2$, solve the equations explicitly, find the action-angle coordinates, and calculate the Taylor series invariants. Our future plan is to study the dependence of the invariants in terms of a general $V = V(z)$. This is a joint work with Chengle Peng; reference arXiv:2509.04207.

Reduction at critical values

Miquel Cueca Ten (Katholieke Universiteit Leuven)

Abstract: In this talk, I will explain how to deal with several kinds of reductions (Hamiltonian, quasi-Hamiltonian, Poisson-Lie,...) at critical values of the moment map. This is joint work with Florian Dorsch, Reyer Sjamaar, and Chenchang Zhu.

Tensor products of VB groupoids

Luca Vitagliano (University of Salerno)

Abstract: In this talk I will present joint work in progress with João Mestre and Lennart Obster on the tensor product of VB groupoids and their linear cohomology. VB groupoids are vector bundle objects in the category of Lie groupoids and play a distinguished role in Poisson Geometry. Noteworthy examples are provided by the tangent and the cotangent groupoids. In many applications (Bott-Schulmann-Stasheff double complex, multiplicative tensors, the Atiyah class, etc.) it is necessary to take a tensor product of VB groupoids. The latter are not VB groupoids in general. However, they are the first floor of simplicial vector bundles, whose linear cohomology can be interpreted as tensors on a differentiable stack. Moreover, the linear cohomology of the tensor product of VB groupoids is an intrinsic model for the tensor product of representations up to homotopy, a complicated construction which is only partly canonical. I will explain these aspects with special emphasis on Morita invariance and the Van Est map.

Cohomology of differential graded manifolds

Maosong Xiang (Huazhong University of Science and Technology)

Abstract: Differential graded (DG for short) manifolds are graded smooth manifolds equipped with a homological vector field. DG manifolds emerged from a number of areas of mathematics and theoretical physics such as algebraic topology, string theory, Hamiltonian mechanics, Poisson geometry, and derived geometry. In this talk, I will talk about cohomology of DG manifolds and its application in these various areas.

Unimoduliarity and linearization for Nambu-Poisson structures

Florian Michael Zeiser (Institute for Basic Science)

Abstract: In an attempt to generalize Hamiltonian dynamics to a multi-Hamiltonian setting, Nambu generalized the Poisson bracket to what is now known as the Nambu(-Poisson) bracket. In this talk we recall their definitions, highlight similarities and differences between Poisson and Nambu structures and discuss local normal form

results. In particular, we present a new linearization result under a unimodularity assumption.

Quilted TCFT and applications

Shuo Zhang (Chinese Academy of Sciences)

Abstract: Invariants defined by counting pseudo-holomorphic maps from Riemann surfaces with boundary are ubiquitous in symplectic geometry, low dimensional topology and mathematical physics. Some examples include various types of Floer homologies, Fukaya categories and Gromov-Witten theory. In this talk I will give a short survey about a generalization of this developed by Wehrheim-Woodward called pseudo-holomorphic quilts. Then I will present some applications of quilted invariants including my proof of a conjecture of Seidel regarding the Floer homology of composed Dehn twists.