The 31st Symposium of Complex Geometry (Kanazawa) 2025

	December 1	December 2	December 3	December 4
9:15-9:30	tea	tea	tea	tea
9:30-10:30	Ohsawa	Andreasson	Yu-Shen Lin	Nakamura
10:50-11:50	Kasuya	Fujita	Takayama	Mabuchi
Lunch				
13:45-14:00	tea	tea	tea	
14:00-15:00	Hattori	Wakabayashi	Hisamoto	
15:20-16:20	Ono	Shiyu Zhang	Aoi	
16:40-17:40	Tazoe	Jinnouchi	Kanda	

Venue: The Kanazawa Chamber of Commerce & Industry （金沢商工会議所 大会議室）

December 1

9:30- 10:30 Takeo Ohsawa (Nagoya University)
Title: On ramified Riemann domains over $\mathbb{C}^2$

10:50-11:50 Hisashi Kasuya (Nagoya University)
Title: GIT stability and biquotients of SU(3)

14:00-15:00 Kota Hattori (Keio University)
Title: The energy of maps accompanying the collapsing of the K3 surface to a flat 3-dimensional orbifold

15:20-16:20 Takashi Ono (The University of Osaka)
Title: Dimensional Reduction of Stable Higgs Bundles and the Doubly-Coupled Vortex Equations

16:40-17:40 Itsuki Tazoe(Kyoto University)
Title: Bubbling limits of Ricci-flat K3 surfaces

December 2

9:30- 10:30 Rolf Andreasson (The University of Gothenburg and Chalmers University of Technology)
Title: Gibbs polystability of Fano manifolds, symmetry breaking and stability thresholds

10:50-11:50 Kento Fujita (The University of Osaka)
Title: On the coupled Ding stability and the Yau-Tian-Donaldson correspondence for Fano manifolds

14:00-15:00 Yasuhiro Wakabayashi (The University of Osaka)
Title: Moduli space of opers with real monodromy

15:20-16:20 Shiyu Zhang (University of Science and Technology of China)
Title: Nonabelian Hodge Correspondence over Kähler Log Terminal Varieties

16:40-17:40 Satoshi Jinnouchi (The University of Osaka)
Title: On the Kobayashi-Hitchin correspondence for big classes

December 3

9:30- 10:30 Yu-Shen Lin (Boston University)
Title: Tropical-Special Lagrangian Correspondence for Locally Planar Tropical Curves

10:50-11:50 Shigeharu Takayama (The University of Tokyo)
Title: Mumford goodness of canonical L^2-metrics on direct image sheaves over a curve

14:00-15:00 Tomoyuki Hisamoto (Nagoya University)
Title: Optimal degeneration and some application to the Chern number inequality

15:20-16:20 Takahiro Aoi (National Institute of Technology, Wakayama College)
Title: Microscopic stability thresholds and constant scalar curvature Kähler metrics

16:40-17:40 Shuho Kanda (The University of Tokyo)
Title: Several complex structures on the Oeljeklaus-Toma manifolds

December 4

9:30- 10:30 Satoshi Nakamura (Institute of Science Tokyo)
Title: Sasaki-extremal metrics and Sasaki-Mabuchi solitons

10:50-11:50 Toshiki Mabuchi (The University of Osaka)
Title: Deformation invariance problem of plurigenera for manifolds in the class $\mathcal{C}$

Abstracts

December 1

Takeo Ohsawa (Nagoya University)
Title: On ramified Riemann domains over $\mathbb{C}^2$
abstract: Locally pseudoconvex ramified Riemann domains over $\mathbb{C}^2$ will be discussed. It will be shown that there exists a proper modification of $\mathbb{C}^2 - \{(0,0)\}$ such that the open kernel of the preimage of a Hartogs domain in $\mathbb{C}^2$ is not holomorphically convex but can be realized as a locally closed complex submanifold of $\mathbb{C}^3$.

Hisashi Kasuya (Nagoya University)
Title: GIT stability and biquotients of SU(3)
abstract: In the joint work with H. Ishida, we proved that we can construct non-left-invariant complex structures on SU(3) associated with parameters satisfying Japanese fun (Sensu) condition. The purpose of this talk is to give a new interpretation of this construction in terms of GIT. In conclusion, we obtain a family of projective varieties(orbifolds) which are variants of the flag variety expressed as biquotients of SU(3). This talk is based on the joint work with Y. Hashimoto and H. Ishida.

Kota Hattori (Keio University)
Title: The energy of maps accompanying the collapsing of the K3 surface to a flat 3-dimensional orbifold
abstract: In this talk, I study the behavior of the Dirichlet energy of some smooth maps associated with a collapsing family of hyper-Kahler metrics on the K3 surface constructed by Foscolo. I introduce an invariant for homotopy classes of smooth maps, and observe the asymptotic behavior of the values for the above collapsing family.

Takashi Ono (The University of Osaka)
Title: Dimensional Reduction of Stable Higgs Bundles and the Doubly-Coupled Vortex Equations
abstract: We introduce the doubly-coupled vortex equation on a compact Riemann surface X, a system coupling two Higgs bundles by morphisms in both directions. We show that its solutions arise from $SU(2)$-invariant Hermitian-Einstein metrics on Higgs bundles over $X \times \mathbb{P}^1$ via dimensional reduction. We define Higgs quadruplets and a corresponding σ-stability. Our main result is a Kobayashi-Hitchin type correspondence:

a Higgs quadruplet is σ-polystable if and only if there exist Hermitian metrics solving the doubly-coupled vortex equation.

Itsuki Tazoe(Kyoto University)
Title: Bubbling limits of Ricci-flat K3 surfaces
abstract: Studying Gromov-Hausdorff limits of manifolds is one of the central topics in recent geometry. In particular, it is known that non-collapsing limits of polarized compact Kähler-Einstein manifolds are normal projective varieties. For a sequence of polarized Kähler manifolds converging to a normal variety, we may obtain a new (non-compact and complete) limit by taking the limit with rescaled metrics, so-called a bubbling limit. Bubbling limits are again algebraic, and they are expected to provide abundant information about the formation of singularities. In this talk, I will explain these topics in the case of Ricci-flat K3 surfaces and give a classification of their bubbling limits.

December 2

Rolf Andreasson (the University of Gothenburg and Chalmers University of Technology)
Title: Gibbs polystability of Fano manifolds, symmetry breaking and stability thresholds
abstract: In a series of works, Berman has developed a probabilistic or statistical mechanical approach to Kähler-Einstein metrics. For example for a canonically polarized variety, this theory allows the approximation of the unique Kähler-Einstein metrics by a canonical sequence of explicit metrics. In the Fano case, there are many open problems but the approach breaks down completely if one does not assume an algebraic condition dubbed Gibbs stability, which implies, and is conjecturally equivalent with, K-stability. It turns out that a Fano manifold with non-trivial holomorphic vector fields is never Gibbs stable. I will define a notion of Gibbs polystability, and explain a refinement of the probabilistic approach in the case Fano manifolds with non-trivial holomorphic vector fields. Moreover, I will formulate some natural conjectures which we essentially settle in the case of log Fano curves. This is based on joint work with Robert Berman and Ludvig Svensson.

Kento Fujita (The University of Osaka)
Title: On the coupled Ding stability and the Yau-Tian-Donaldson correspondence for Fano manifolds
abstract: We interpret the reduced coupled Ding stability of Fano manifolds in the notion of reduced coupled stability thresholds. As a corollary, we solve a modified version of the

conjecture by Hultgren and Witt Nystroem for coupled Kaehler-Einstein metrics on Fano manifolds. This is a joint work with Yoshinori Hashimoto.

Yasuhiro Wakabayashi (The University of Osaka)
Title: Moduli space of opers with real monodromy
abstract: A G-oper (where G is a connected reductive algebraic group) is a flat G-bundle on a Riemann surface or an algebraic curve equipped with a certain additional structure. The moduli space of such objects plays a fundamental role in various contexts, including the geometric Langlands correspondence and Teichmüller theory. A distinctive feature of PGL(2)-opers on Riemann surfaces, established by Faltings, is the discreteness of the subspace consisting of those with real monodromy. This discreteness provides a conceptual foundation for the development of p-adic Teichmüller theory, which realizes uniformizations of algebraic curves defined over fields of positive characteristic and over p-adic fields. In this talk, I plan to discuss several topics arising from this result of Faltings, including an extension of the Eichler-Shimura isomorphism, a construction of Hodge structures, and comparisons with the corresponding phenomena in positive characteristic.

Shiyu Zhang (University of Science and Technology of China)
Title: Nonabelian Hodge Correspondence over Kahler Log Terminal Varieties
abstract: In this talk, I will present our recent work on the nonabelian Hodge correspondence over the regular locus of compact Kahler analytic spaces with log terminal singularities. The central contribution lies in establishing the correspondence from Higgs sheaves to local systems. Specifically, we prove that a semistable reflexive Higgs sheaf with vanishing orbifold first and second Chern numbers—defined on the regular part of a compact Kahler klt space—arises from a linear representation of the fundamental group. The proof is divided into two main parts: first, we address the stable case by adapting an argument of Bando-Siu to a partial orbifold resolution; second, we treat the semistable case through an in-depth analytic study of Jordan-Holder filtrations.

Satoshi Jinnouch(The University of Osaka)
Title: **On the Kobayashi-Hitchin correspondence for big classes**
abstract: The Kobayashi–Hitchin correspondence asserts that a holomorphic vector bundle is slope polystable if and only if it admits a Hermitian–Yang–Mills metric. The correspondence has been extensively studied in the Kähler setting, and its extension beyond the Kähler case has attracted significant interest. In this talk, we present a generalization of the correspondence to big cohomology classes and establish several results under suitable assumptions.

December 3

Yu-Shen Lin (Boston University)
Title: Tropical-Special Lagrangian Correspondence for Locally Planar Tropical Curves
abstract: Given a tropical curve in $\mathbb{R}^n$, it is a central question in tropical geometry whether it can be lifted to a holomorphic curve in the corresponding toric variety. Inspired by semi-flat mirror symmetry, Mikhalkin showed that they can always lift to a Lagrangian. In this talk, we will show that every locally planar tropical curve can be lifted to a special Lagrangian in $(\mathbb{C}^*)^2$ based on a gluing construction. Moreover, there exists a 1-parameter family of special Lagrangians such that Gromov-Hausdorff collapses to the given tropical curve in the adiabatic limit. The feature is different from the lifting of tropical curves to holomorphic curves, which can be obstructed. This is a joint work with S.-K. Chiu and Y. Li.

Shigeharu Takayama (The University of Tokyo)
Title: Mumford goodness of canonical L^2-metrics on direct image sheaves over a curve
abstract: I will talk about the singularities of the canonical L^2-metrics of direct image sheaves of adjoint type. Let $f : X \to Y$ be a "fibration", and let be a semi-positive line bundle L on X. We can define a canonical L^2-metric g on $f_*(K_{X/Y} \otimes L)$ by fiberwise integration. This Hermitian metric g may have singularities when f is not smooth. We show that g is a good metric in the sense of Mumford, assuming that Y is one-dimensional and f is semi-stable.

Tomoyuki Hisamoto (Nagoya University)
Title: Optimal degeneration and some application to the Chern number inequality
abstract: Optimal degeneration is the algebraic correspondence of geometric flow (such as Calabi flow) and minimizes K-stability thresholds (such as Donaldson-Futaki invariants). There are several variants of optimal degenerations, and some of them have been shown to exist quite recently. Their distinctions, however, are still not well understood. In this talk, I will overview these developments including our results and give some application to the Chern number inequality. This is a joint work with S. Boucksom.

Takahiro Aoi (National Institute of Technology, Wakayama College)
Title: Microscopic stability thresholds and constant scalar curvature Kähler metrics
abstract: Fujita-Odaka proved that a uniformly Gibbs stable Fano manifold is uniformly K stable (so, there exists a Kähler-Einstein metric). After their work, Berman gave

a direct and analytic proof that uniformly Gibbs stable Fano manifold has a Kähler-Einstein metric. I will talk about a generalization of Berman's result: if the microscopic stability threshold for a polarized manifold satisfies some conditions, then there exists a constant scalar curvature Kähler (cone) metric. This is an analogue of Kewei Zhang's application of the delta-invariant to constant scalar curvature Kähler metrics.

Shuho Kanda (The University of Tokyo)
Title: Several complex structures on the Oeljeklaus-Toma manifolds
abstract: Oeljeklaus-Toma (OT) manifolds, discovered in 2005 as higher-dimensional analogues of Inoue surfaces, are compact non-Kähler manifolds constructed from number fields and their rings of integers. By slightly modifying the algebraic data in the construction, one obtains several distinct complex structures sharing the same underlying differential structure. In this talk, I will present algebraic conditions under which these complex structures are biholomorphic. As an application, we obtain, for instance, compact non-Kähler manifolds of dimension $2t + 1$ that admit 2^t different rigid complex structures.

December 4

Satoshi Nakamura (Institute of Science Tokyo)
Title: Sasaki-extremal metrics and Sasaki-Mabuchi solitons
abstract: We introduce the notion of a Sasaki-Mabuchi soliton on Sasaki manifolds, and establish, under a certain sharp condition, the equivalence between its existence and the existence of Sasaki-extremal metrics in the sense of Boyer-Galicki-Simanca (2008). In the Kähler case, the corresponding theorem has been obtained by Apostolov-Lahdili-Nitta (2025) and Hisamoto-N. (2025). We also provide several examples of Sasaki-Mabuchi solitons, including those arising from irregular Reeb fields.

Toshiki Mabuchi (The University of Osaka)
Title: Deformation invariance problem of plurigenera for manifolds in the class $\mathcal{C}$
abstract: In this talk, we discuss our recent study of deformation invariance problem of plurigenera for manifolds in the class C. Our study is based on Levine's obstruction and a generalized version of Deligne-Fujiki-Ueno's injectivity.