LIGHTNING TALKS

THURSDAY (August 07)

11:00-11:15

Abdul Halim: Fell Algebras and Their Role in Noncommutative Complex Geometry.

Abstract: Fell algebras, a class of C^*-algebras with locally continuous traces, play a significant role in noncommutative geometry, particularly in relation to complex geometry. Their structure can be interpreted through sheaf-theoretic methods, linking them to holomorphic operator algebras and noncommutative complex spaces. This presentation explores the classification of Fell algebras, their connection to twisted groupoid C^*-algebras, and their applications in index theory and K-theory. Understanding these algebras provides new insights into the geometric and analytical foundations of noncommutative spaces, bridging operator algebras and complex analytic structures.

11:15-11:30

Jie Xu: Complex Geometry Analogy of The S1-Stability Conjecture

*Abstract:*A result of Xiaokui Yang [Math. Z. (2020)] says that if (X, ω) is a compact Hermitian manifold such that the background Riemannian metric has quasi-positive Riemannian scalar curvature, then there exists a Hermitian metric $\tilde{\omega}$ with positive Chern scalar curvature. Let Y be a compact Hermitian manifold. In this talk, we explain how to generalize this to noncompact Hermitian manifolds Y $\times$ C by imposing some conformal-geometry-related geometric conditions on Y $\times$ C. It is inspired by our recent work, joint with S. Rosenberg, in the proof of the S1 -stability conjecture.

11:30-11:45

Nzaganya Nzaganya: In the lecture I will consider coherent loop states on a general Riemann surface M. We will show that for a regular polarization of M, the second derivatives of the Bergman kernel on the diagonal of M can be completed precisely in terms of the Kahler form of M. Therefore, the asymptotics of the inner product of coherent loop states can be computed using the complex phase principle. This gives an alternative proof, for regular polarised Riemann surfaces, of a result of Borthwick, Paul and Uribe.

11:45-12:00

Anand Chavan: Holomorphicity of Kobayashi Isometry

Abstract: In this talk we will discuss the rigidity problem of holomorphicity of Kobayashi isometry. Given an isometry between two domains in complex Euclidean space with respect to their Kobayashi distance/metric, it is an interesting problem to know when is this isometry holomorphic. We will see through few examples that Kobayashi isometry need not be holomorphic and mention some important results in this context. In the end we will show for the domain diamond $\triangle = \{|z_1| + |z_2| < 1\} \subset \mathbb{C}^2$ and special Carathéodory sets of Tridisc $D_{a,b} = \{(z, w) \in \mathbb{D}^2 : |az_1 + bz_2 - z_1z_2| < |az_2 + bz_1 - 1|\}$ for $a, b > 0$ the Kobayashi isometry is indeed holomorphic.

FRIDAY (August 08)

9:30-9:45

Dashen Yan: Metric Bubble tree in collapsing warped QAC-Calabi-Yau manifold

Abstract: We will discuss a gluing construction for collapsing warped QAC-Calabi-Yau manifolds. Let X be a compact Calabi-Yau manifold admitting holomorphic fibration to CP^1. This kind of manifold can be viewed as a blow-up model near the critical points of the fibration, when the metric in the fiber sufficiently collapses. We will discuss a bubble tree structure on a family of these manifolds.

9:45-10:00

Yacoub Hendi: Machine Learning for Calabi-Yau Metrics

Abstract: By the Calabi-Yau Theorem, we have that a Ricci flat metric satisfies a complex Monge-Ampere equation. In this talk, I will show how we can solve this complex Monge-Ampere equation using machine learning techniques which in turn will give us an approximation of the Ricci flat metric on the Calabi-Yau manifold.

10:00-10:15

Kenett Martinez-Ruiz: On orthogonal decomposition of Hermitian Higgs bundles

Abstract: In this talk, we will see that some classical propositions concerning orthogonal decompositions of holomorphic vector bundles, the second fundamental form of their sub-bundles and the deformations of Hermitian-Einstein metrics can be extended to Hermitian Higgs bundles.

10:15-10:30

Kyobeom Song: Characterization of Zoll Manifolds via Algebraization

Abstract: A manifold is called Zoll if all geodesics are periodic with the same period (e.g. a round sphere). The classification of Zoll manifolds is a longstanding problem, originating in the late 19th century. Under the assumption that the tangent bundle can be suitably complexified (i.e. entire Grauert tube), this problem can be approached via Complex Algebraic Geometry. As an application of this perspective, we prove that a Zoll manifold with the cohomology of complex projective space with an entire Grauert tube must be the Fubini-Study metric.

FRIDAY (August 08)

11:00-11:15

Shotaro Murayama:Mabuchi soliton on project bundles

Abstract: Using Mabuchi's formula for the Mabuchi constant, we completely determine the existence and non-existence of Mabuchi solitons on the projective line bundle $\mathbf{P}_{\mathbf{P}^{n-1}}(\mathcal{O}_{\mathbf{P}^{n-1}} \oplus \mathcal{O}_{\mathbf{P}^{n-1}}(k))$ over $\mathbf{P}^{n-1}$.

11:15-11:30

Patrick Browne: Root systems and Einstein nilmanifolds

11:30-11:45

Alexis Garcia: Cartan geometries and infinitesimal automorphisms of meromorphic geometric structures

Abstract: With the example of affine connections as guiding example, we will recall the equivalence between (meromorphic) Cartan geometries and some (meromorphic) geometric structures. We will motivate the use of this equivalence by the description of infinitesimal automorphisms of meromorphic geometric structures. We will see how this can be applied, through the generalized Ambrose-Singer theorem of Pecastaing to the classification of compact complex manifolds endowed with meromorphic geometric structures (in particular meromorphic affine connections).