Titles/Abstracts

CHEN Boyong (Tongji University)
Title: Comparison of the Bergman and Szego kernels
Abstract: In this talk, we compare the Bergman and Szego kernels on pseudoconvex domains. A new concept called delta-regular was introduced which seems of independent interest.

CHEN Meng (Fudan University)
Title: On threefolds of general type with small invariants
Abstract: We classify algebraic threefolds of general type with small volume up to the level of orbifold baskets and the fiber structure.

FORNAESS John Erik (University of Michigan)
Title: Laminations by Riemann surfaces
Abstract: If we have a real vector field in the plane, the integral curves foliate the plane. Similarly, if we have a complex vector field in C2 then the complex integral curves foliate space by Riemann surfaces. An example of a question one might ask, is whether these Riemann surfaces are dense in space. In the case of vector fields in the plane, this is impossible, but if we do it on a torus instead, it is easy. One method to do analysis on a Riemann surface is to use the current of integration. For a foliation one needs to average suitably over the individual Riemann surfaces to get good currents. We will explore these currents in this lecture. The work covered is mostly joint work with Sibony and Wold.

FU Baohua (Chinese Academy of Sciences)
Title: Deformation rigidity of surjective morphisms onto some toric manifolds
Abstract: We shall show that for a holomorphic map f: Y->X onto a "complicated" toric projective manifold X, every deformation of f comes from the automorphisms of X. In particular, if Y is toric, then f is necessarily toric.

HONG Jaehyun (Seoul National University)
Title: Extremal cycles in rational homogeneous manifolds of Picard number one
Abstract: The homology class $\sigma$ of a Schubert variety in a rational homogeneous manifold is extremal in the sense that, if the sum $z_1 + z_2$ of the homology classes of two effective cycles is contained in the ray $\mathbb{Z}^+ . \sigma$, then both classes $z_1$ and $z_2$ are contained in the ray $\mathbb{Z}^+ . \sigma$. We call an effective cycle whose homology class is contained in this ray an extremal cycle. A sum of finitely many Schubert varieties of the same type is an extremal cycle but the converse is not true,
e.g., a subvariety of degree $\geq 2$ of a projective space. In this talk, we study when an extremal cycle is a sum of finitely many Schubert varieties of the same type.

HUANG Xiaojun (Rutgers University)
Title: CR links and isolated complex singularities
Abstract: I will discuss how the study of compact CR manifolds can be used to determine the holomorphic structure of isolated complex CR singularities.

MOK Ngaiming (University of Hong Kong)
Title: Germs of holomorphic isometries and measure-preserving holomorphic maps
Abstract: Motivated by problems arising from Arithmetic Geometry we are interested to study two types of germs of holomorphic maps between bounded symmetric domains: germs of holomorphic isometries and germs of holomorphic maps from a bounded symmetric domain to its Cartesian power preserving up to a scalar constant the sum of pull-backs by canonical projections of the Bergman volume form. The problem is to obtain algebraic extension of such maps and to prove total geodesy under certain conditions.

Solutions of both problems can be considered as applications of techniques of analytic continuation from Several Complex Variables. The problem for holomorphic isometries is solved by studying simultaneous solutions of holomorphic functional identities obtained by polarizing Calabi's identity on diastases (a notion due to Calabi defined by normalizing potential functions for Kaehler metrics).

Uniqueness is not guaranteed but we prove uniqueness when additional functional identities are introduced using the Bergman kernel function. The problem for measure-preserving maps is solved in a joint work with Sui-Chung Ng by using results of Webster-Huang on algebraic extension of germs of holomorphic maps between algebraic strongly pseudoconvex CR-hypersurfaces and by results on algebraic extension involving holomorphic G-structures. Especially, a new Alexander-type extension result is obtained in the case of irreducible bounded symmetric domains of rank at least 2.

NG Sui-Chung (University of Hong Kong)
Title: Proper holomorphic maps on bounded symmetric domains of rank at least 2 and characteristic symmetric subspaces
Abstract: We will talk about some rigidity results of proper holomorphic maps related to bounded symmetric domains of rank at least 2. In contrast to the rank 1 domains (i.e. unit balls), boundary regularities of the maps are not assumed in the first place. Instead, the rigidity originates from the existence of radial limits of bounded holomorphic functions and the preservation of certain symmetric subspaces, known as characteristic symmetric subspaces by proper holomorphic maps. These facts were first explored in the work of
Mok and Tsai in 1992 regarding the rigidity of convex realizations of bounded symmetric domains.

In this talk, we will focus on the rigidity of proper holomorphic maps from bounded symmetric domains onto arbitrary complex analytic spaces (a joint work with Mok and Tu) and the rigidity of proper holomorphic maps between equal rank bounded symmetric domains.

RONG Feng (Shanghai Jiao Tong University)
Title: Lattes maps on $P^2$
Abstract: Lattes maps on $P^k$ are holomorphic maps as quotient maps of affine maps on $T^k$, complex tori. These maps belong to so-called critically-finite maps, and have very interesting and unique dynamics. A few years ago, Milnor gave a complete classification of Lattes maps on $P^1$. In this talk, we present such a classification for Lattes maps on $P^2$.

RU Min (University of Houston)
Title: Large divisors on projective varieties
Abstract: Motivated by the classical Theorems of Picard and Siegel and their generalizations, we introduce the notion of (essentially) large divisors on projective varieties and derive its geometric and arithmetic consequences. We then provide several examples of (essentially) large divisors. Finally prove that on a nonsingular projective variety $X$ whose codimension is no greater than $\dim X - 2$, every effective divisor with $\dim X + 2$ or more components in general position is essentially large. This is a joint work with Gordon Heier.

SHIFFMAN Bernard (Johns Hopkins University)
Title: Asymptotics of the Bergman-Szego kernel and zeros of random holomorphic sections of high degree
Abstract: The properties of random polynomials on $C^n$ and random sections of a holomorphic line bundle are determined by the Szego kernel. In particular the distribution of zeros and of simultaneous zeros reflects the underlying geometry of the random ensembles. We shall discuss the asymptotics of the distribution of zeros as the degree of the polynomials or line bundles increases. Our methods include the asymptotics of the Bergman-Szego kernel and the almost orthogonality of coherent states centered at lattice points.

SIU Yum-Tong (Harvard University)
Title: Differential equations from variation of Hodge structure and Nevanlinna theory
Abstract: One important approach to Nevanlinna theory and, in particular, hyperbolicity problems is by holomorphic jet differentials. In this talk we will discuss the differential
equations and jet differentials arising from the variation of Hodge structure and their applications to hyperbolicity problems and Nevanlinna theory.

SUN Xiaotao (Chinese Academy of Sciences)
Title: Rational curves in moduli spaces of vector bundles
Abstract: In this talk, I will discuss the minimal rational curves in the moduli spaces of stable bundles over curves.

TAN Shengli (East China Normal University)
Title: Modular invariants of a family of algebraic curves
Abstract: The modular invariants of a family of curves is a natural generalization of the J-invariant of elliptic curves. The Chern numbers of a fibered algebraic surface can be computed from the modular invariants and the Chern numbers of the singular fibers defined by the speaker (a generalization of Kodaira’s formulas for elliptic surfaces). I am going to talk about the computation of the modular invariants for families of curves with a small genus. This is a joint work with Zhijie Chen and Jun Lu.

TO Wing Keung (Singapore National University)
Title: Bounding volumes of complex analytic subvarieties and some applications
Abstract: In this talk, I will discuss some joint works with Jun-Muk Hwang on obtaining sharp lower bounds of volumes of complex analytic subvarieties of certain domains in some classes of projective manifolds, and their applications related to the gonality of Riemann surfaces and the projective normality of abelian varieties. If time permits, I will also talk about very recent work of Lazarsfeld et al on syzygies of abelian varieties.

TU Zhenhan (Wuhan University)
Title: Montel-type theorems in higher dimension for continuously moving targets
Abstract: Classical Montel's theorem asserts the following result: Let $F$ be a family of meromorphic functions on a domain $D$ of the complex plane. Suppose that there exist three mutually distinct points $w_1, w_2, w_3$ on the Riemann sphere such that each $f$ in $F$ omits $w_i$ $(i=1, 2, 3)$. Then $F$ is a normal family on $D$.

In this talk, we introduce a new idea related to Montel-type theorems in higher dimension and prove some Montel-type criteria for normal families of holomorphic mappings and normal holomorphic mappings of several complex variables into $\mathbb{P}^N(\mathbb{C})$ for continuously moving targets in pointwise general position. Many examples are given to complement our results.

YANG Yihu (Tongji University)
Title: Harmonic maps from the punctured disk
Abstract: In this talk, we will observe equivariant harmonic maps from a punctured disk, in particular, for the case of finite energy.

YAO Weihong (Shanghai Jiao Tong University)
Title: Introduction to quantum Nevanlinna theory
Abstract: This talk is concerned with the distribution of normalized zero-sets of random meromorphic functions. The normalization of the zero-set is performed in the same way as that of the counting function for a meromorphic function in Nevanlinna theory. The results generalize the Shiffman and Zelditch theory on the distribution of the zeroes of random holomorphic sections of powers for positive Hermitian holomorphic line bundles from polynomial functions to meromorphic functions.

YEUNG Sai-Kee (Purdue University)
Title: On towers of locally Hermitian symmetric spaces
Abstract: By a tower of coverings, we consider a nested sequence of finite coverings of a fixed manifold. Interesting geometric results concerning a tower of projective varieties were known in the past. The purpose of this talk is to explain some geometric results for some towers of quasi-projective manifolds.

ZHANG Guanglian (Shanghai Jiao Tong University)
Title: Canonical bases for extended quantum Kac-Moody algebras
Abstract: In this talk, the singular Ringel-Hall algebras are defined. It is shown that the singular Ringel-Hall algebra is isomorphic to the positive part of the quantum extended Kac-Moody algebra. A new class of perverse sheaves is shown to have purity property. The canonical bases of the positive part of the quantum extended Kac-Moody algebras are constructed. As an application, the existence of Hall polynomials for the tame quiver algebras is proved.

ZHOU Xiangyu (Chinese Academy of Sciences)
Title: Automorphism groups, isometric groups in homogeneous spaces
Abstract: In this talk, we'll present a new result on rigidity property of automorphism groups of invariant domains, which generalizes the well-known result on Reinhardt domains.