Abstracts

Speaker: Meng-Kiat Chuah (National Tsing Hua University, Hsinchu)
Title: **Symplectic and complex geometry of $G \times \mathfrak{h}$**
Abstract: Let G be a connected real semisimple Lie group, and $\mathfrak{h}$ a Cartan subalgebra of the Lie algebra of G. We discuss certain symplectic forms and partially complex structures on $G \times \mathfrak{h}$, and subsequently perform geometric quantization. This leads to a unitary G-representation on the Hilbert space, which is a direct integral of a series of G-representations indexed by the image of the moment map.

Speaker: Jianxun Hu (Sun Yat-sen University, Guangzhou)
Title: **Degeneration technique in local Gromov-Witten and Donaldson-Thomas invariants**
Abstract: Degeneration formula is one of the most important techniques in the Gromov-Witten and Donaldson-Thomas theory. In this talk, I will talk about how to use the degeneration technique to study the change of Gromov-Witten and Donaldson-Thomas invariants of local surfaces under blowing up along points.

Speaker: Jun-Muk Hwang (Korea Institute for Advanced Study, Seoul, Korea)
Title: **Variety of minimal rational tangents of codimension 1**
Abstract: We prove that if the VMRT at a general point of a uniruled projective manifold X of dimension at least 4 is a smooth hypersurface, then the VMRT-structure is locally flat. This shows that X is birational to the quotient of an explicit rational variety by a finite group action. As an application, we show that, if furthermore X has Picard number 1, then X is biregular to a hyperquadric.

Speaker: Bai-Ling Wang (Australian National University, Canberra)
Title: **Geometry of D-branes and twisted index theorem**
Abstract: In string theory D-branes were proposed as a mechanism for providing boundary conditions for the dynamics of open strings moving in spacetime. As D-branes themselves can evolve over time one needs to study equivalence relations on the set of D-branes. An invariant of the equivalence class is the topological charge of the D-brane, which should be thought of certain index of Atiyah-Singer type operators. In this talk, I will explain the geometry of spacetime with a background flux, and propose a mathematical definition of D-branes. As an application, we will study the Atiyah-Singer index theorem for a given twisting datum defined by the flux.

Speaker: Xingwang Xu (National University of Singapore)
Title: **The scalar curvature flow**
Abstract: One will discuss the prescribing scalar curvature problem on the standard sphere. The flow method is known to be very powerful tool in dealing with geometric problem. One will show this powerful tool can also be adopted to the prescribing scalar curvature problem. Together with infinite dimensional Morse theory, one achieved some new results which will be reported in this talk.