Titles and Abstracts

1. Shibing Chen, Australian National University

Title: On the planar dual Minkowski problem
Abstract: In this talk, I will discuss our recent work on the planar dual Minkowski problem, proposed by Huang-Lutwak-Yang-Zhang (ACTA2016), without any symmetry assumptions. More precisely, given any q > 0, and function *f* on S^1, bounded by two positive constants, we show that there exists a convex body Ω in the plane, containing the origin in its interior, whose dual curvature measure has density *f*. In particular, if *f* is smooth, then ƏOmega is also smooth. Our method can be also applied if *f* is a function of multi-variables. This is based on a recent joint work with Qirui Li

2. Ronan Conlon，Florida International University

Title: New examples of gradient expanding Kähler-Ricci solitons
Abstract: A complete Kähler metric g on a Kähler manifold M is a “gradient expanding Kähler-Ricci soliton" if there exists a smooth real-valued function $f: M \to \mathbb{R}$ with $\nabla_g f$ holomorphic such that $\mathrm{Ric}(g) - \mathrm{Hess}(f) + g = 0$
I will present new examples of such metrics on the total space of certain holomorphic line bundles. This is joint work with Alix Deruelle (Jussieu).

3. Mario Garcia-Fernandez, Universidad Autónoma de Madrid and ICMAT

Title: Canonical metrics on (string) holomorphic Courant algebroids
Abstract: Yau's solution of the Calabi Conjecture implies that every projective Calabi-Yau manifold X admits a metric with holonomy contained in $SU(n)$, and that these metrics are parametrized by the Kähler cone on $H^2(X,\mathbb{R})$. In this talk I will give evidence of an extension of Yau's theorem to non-Kähler manifolds, where the Calabi-Yau is replaced by a pair (X, Q), given by a compact complex manifold X with vanishing first Chern class endowed with a (string) holomorphic Courant algebroid Q. Holomorphic Courant algebroids appear naturally in conformal field theories in physics and are closely related to Hitchin's theory of generalized geometry. The particular equations that we study correspond to a mild generalization of the Hull-Strominger system. Joint work with Roberto Rubio, Carlos Shahbazi and Carl Tipler.

4. Frederick Tsz-Ho Fong, Hong Kong University of Science and Technology

Title: Self-Similar Solutions to Homogeneous Curvature Flows
Abstract: In this talk, the speaker will examine a large class of curvature flows by degree -1 homogeneous functions of principal curvatures in Euclidean spaces. This class of curvature flows includes the well-known inverse mean curvature flow and many others in the current literature. Self-expanding solutions to these curvature flows are solutions that expand homothetically without changing their shapes. We will talk about the uniqueness, rigidity, and constructions problems of both compact and non-compact self-expanding solutions to these flows. Part of these are joint work with G. Drugan, H. Lee; P. McGrath; and A. Chow, K.

Chow.

5. Jian Ge, Peking University

Title: On the Parallel Axiom
Abstract: In this talk, we will discuss a rigidity result for the Riemannian metric satisfying the Parallel Axiom, based on the joint work with L. Guijarro and P. Solorzano.

6. Erlend Grong,
Universitè Paris-sud, Laboratoire De Signaux Et Systèmes (L2S),Supelec, 3, Rue Julio-Curie, 91192 Gif-Sur-Yvette, France

Title: Comparison Theorems For The Sub -Laplacians
Abstract: We want to study hypoelliptic second order differential operators that are not elliptic, but satisfy the strong Hörmander condition. Just as elliptic operators correspond to a Riemannian geometric structure, such hypoelliptic operators correspond to a sub-Riemannian geometric structure. One can consider the sub-Riemannian manifolds as the limit of Riemannian manifolds where the length of vectors in a certain subbundle go to infinity. Unfortunately, this limit will make the Ricci curvature become unbounded. Hence,we loose important results in the process, such as the Laplace comparison theorem. We will show how to recover a comparison theorem for certain cases. We will consider sub-Riemannian manifolds that appear as limits of totally geodesic foliations. In particular, we will focus on Sasakian manifolds. This result is a joint work with Fabrice Baudoin, Kazumasa Kuwada and Anton Thalmaier.

7. Bang-Xian Han, University of Bonn, Germany

Title: Curvature-dimension condition under perturbation of metric and measure
Abstract: In this talk, we firstly recall some basic notions and results on the differential calculus on metric measure space. Then we will show how to study the curvature-dimension condition of metric measure space under perturbation, including the curvature-dimension condition under time change and conformal transformation.

8. Genggeng Huang, School of Mathematical Sciences, Fudan University

Title: Compactness of Alexandrov-Nirenberg surfaces
Abstract: In this talk, we study a class of compact surfaces in R^3 introduced by Alexandrov and generalized by Nirenberg. As a model step, in this talk we shall restrict ourself to the study on the compactness of positively curved part of such surfaces called by Alexandroff-Nirenberg surfaces.

9. Brett Kotschwar, Arizona State University

Title: A uniqueness theorem for asymptotically cylindrical shrinking Ricci solitons

Abstract: I will discuss some recent joint work with Lu Wang in which we prove that a shrinking gradient Ricci soliton which agrees to infinite order at spatial infinity with one of the standard cylindrical metrics on $S^k \times \mathbb{R}^{n-k}$ for $k \geq 2$ along some end must be isometric to the cylinder on that end. When the underlying manifold is complete, this result implies that the shrinker is either globally isometric to the cylinder or to its $\mathbb{Z}_2$-quotient. I will also discuss the relationship of this work to the larger problem of classi_cation for four-dimensional shrinking Ricci solitons and survey some recent related results.

10. Ping Li, Tongji University, China

Title: Alexandrov-Fenchel Type Inequalities , Revisited
Abstract: Various Alexandrov-Fenchel type inequalities have appeared and played important roles in convex geometry, matrix theory and complex algebraic geometry. It has been noticed for some time that they share some striking analogies and have intimate relationships. In this talk we will shed new light on this by comparatively investigating them in several aspects. This talk is based on the speaker's preprint, which is available on the arX-iv:1710.00520.

11. Xiangyu, Liang , Beihang University, School of mathematics and system Sciences

Title: Plateau's problem, Minimal sets and Classi_cation of singularities
Abstract: A minimal set is a closed set (in an Euclidean space) whose Hausdor_ measure cannot be decreased by any compactly supported Lipschitz deformation. This notion was invented by Almgren to give a reasonable model for Plateau's problem, which aims at understanding the behavior of physical objects that admit certain minimizing property,such as soap films. We shall introduce some basic definitions, examples and facts about minimal sets and cones, as well as some results and open problems.

12. Hai Lin, Tsinghua University

Title: Non-minimally coupled scalar field and AdS backgrounds
Abstract: We look for AdS solutions to generalised gravity theories in the bulk in various spacetime dimensions. The bulk gravity action includes the action of a non-minimally coupled scalar field with gravity, with higher-derivative terms. The usual Einstein-Hilbert gravity is induced when the scalar acquires a non-zero vacuum expectation value. The equation of motion in the bulk shows scenarios where AdS geometry emerges on-shell. We further obtain the action of the fluctuation fields on the background at quadratic and cubic orders.

13. Shiping Liu, University of Science and Technology of China

Title: Discrete Bonnet-Myers theorem and rigidity properties of hypercubes

Abstract: It is a general principle in the study of geometry to derive global properties from information at every local of a space. We will discuss such an approach on discrete structures in this talk. It is natural to ask whether a graph is a hypercube if the 2-ball of each vertex isomorphic to that of a vertex in a hypercube. It turns out that this is not true and we need curvature-like restrictions. We will present a discrete Bonnet-Myers theorem and discrete Cheng-type and Obata-type rigidity theorems. The discrete curvature notion we use is Bakry-Émery curvature dimension inequalities. This is based on joint works with Florentin Münch (Potsdam), Norbert Peyerimhoff (Durham), and Christian Rose (Chemnitz).

14. Jason D. Lotay, University College London

Title: Remarks on the self-shrinking Clifford torus
Abstract: The Clifford torus in the 3-sphere is a simple and important example of a Lagrangian mean curvature flow self-shrinker in $\mathbb{C}^2$. In this talk I will discuss two related but distinct issues concerning the Clifford torus: stability under Lagrangian mean curvature flow, and rigidity as a self-shrinker. This is joint work with Christopher G. Evans and Felix Schulze.

15. Ngoc Cuong Nguyen, Jagiellonian University and Postech University

Title: On The Hölder Continuous Subsolution Problem For The Complex Monge-Ampère Equation
Abstract: We give a necessary and sufficient condition for positive Borel measures such that the Dirichlet problem, with zero boundary data, for the complex Monge-Ampère equation admits Hölder continuous plurisubharmonic solutions. In particular, when the subsolution has finite Monge-Ampère total mass, we obtain an affirmative answer to a question of Zeriahi.

16. Armin Schikorra , University of Pittsburgh

Title: Hölder Topology of the Heisenberg group
Abstract: The Heisenberg groups are examples of sub-Riemannian manifolds homeomorphic, but not diffeomorphic to the Euclidean space. Their metric is derived from curves which are only allowed to move in so-called horizontal directions. When one considers approximation or extension problems for Sobolev maps into the Riemannian manifolds it is known that topological properties of the target manifold play a role. However, due to the homeomorphism, the topology of the Heisenberg group is the same as the Euclidean space. A notion of Hölder topology is needed. I will report on some progress (with Hajlasz) on some topological features of the Heisenberg group, in particular on an embedding question due to Gromov.

17. Ryokichi Tanaka, Tohoku University, Sendai, Japan

Title: Random walks on the discrete affine group
Abstract: We discuss (bounded) harmonic functions on finitely generated groups. In particular, we introduce the discrete affine group of a regular tree as a finitely generated subgroup of the affine group. We give a description of the space of bounded harmonic functions | the Poisson boundary of random walks on it as a space of configurations. We also discuss metric relationship with some lamplighter groups and lamplighter graphs.

18. Yong Wei, The Australian National University

Title: Volume preserving ow by powers of k-th mean curvature
Abstract: We consider the flow of closed convex hypersurfaces in Euclidean space with the speed given by positive powers of the k-th mean curvature plus a global term such that the volume of the domain enclosed by the flow hyper-surface remains constant. We prove that if the initial hypersurface is strictly convex, then the solution of the flow exists for all time and converges to a round sphere smoothly. No curvature pinching assumption is required on the initial hypersurface. The key ingredients are the monotonicity of the mixed volume V_{n+1-k} and the Schneider's generalized Alexandrov Theorem for convex bodies with constant curvature measures. In the end of this talk, I will discuss some generalizations. This is a joint work with Ben Andrews.

19. Chao Xia, Xiamen University

Title: Uniqueness of stable capillary hypersurfaces in a ball
Abstract: Capillary surfaces in a ball B is minimal or CMC surfaces whose boundary intersects ЭB at a constant angle. They are critical points of some energy functional under volume preserving variation. The study of stability of capillary hypersurfaces in *B* was initiated by Ros and his collaborators in 90's. An open problem is whether any immersed stable capillary hypersurfaces in a ball in space forms are totally umbilical. In this talk, we present our solution to this problem.The key ingredient in the proof is a discovery of a new Minkowski formula for the setting of capillary hypersurfaces in a ball. We remark that the related uniqueness result for closed hypersurfaces is due to Barbosa-Do Carmo-Eschenburg. The talk is based on a joint work with Guofang Wang.

20. Changwei Xiong , Australian National University

Title: Gap theorems involving second fundamental form: from closed surfaces to open surfaces

Abstract: Since Fraser and Schoen's work in 2011 (Adv. Math.), more and more similarities have been found between two fields: closed minimal submanifolds in a sphere, and open minimal submanifolds with free boundary in a Euclidean ball. In this talk I will first review some basic settings in these two fields, and then focus on the gap theorems in them. The classical gap theorem in the former field is due to Chern, do Carmo and Kobayashi, and Lawson, independently. In view of the similarities above, gap theorems in the latter field are established recently, including the Euclidean case by Ambrozio and Nunes (arXiv:1608.05689), and the hyperbolic and spherical cases by Haizhong Li and myself (J. Geom. Anal., to appear).

21. Xiaomeng Xu , Massachusetts Institute of Technology

Title: Frobenius manifolds and quantum groups
Abstract: In this talk, we introduce an isomonodromic Knizhnik – Zamolodchikov connection with respect to the quantum
Stokes matrices, and prove that the semiclassical limit of the KZ type connection gives rise to the Dubrovin connections of semisimple Frobenius manifolds. This quantization procedure of Dubrovin connections is parallel to the quantization from Poisson Lie groups to quantum groups, and is conjecturally formulated as a deformation of Givental's twisted loop group.