The 6th International Workshop on Differential Geometry

February 13-19, 2016 | Niji-Matsubara Hotel, Karatsu, Japan

Supported by Grant-in-Aid for Scientific Research from JSPS

Invited Speakers

Cheng Qing-Ming (Fukuoka University)

Li Haizhong (Tsinghua University)

Li Xingxiao (Henan Normal University)

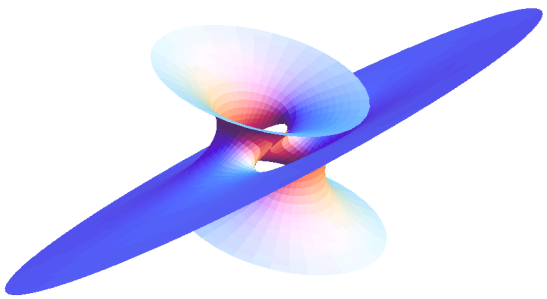
Shi Yuguang (Peking University)

Song Hongru (Henan Normal University)

Wei Guoxin (South China Normal University)

Xu Reiwei (Henan Normal University)

Zhou Detang (Fluminense Federal University)



Organizing Committee

Cheng Qing-Ming (Fukuoka University)

The 6th International Workshop on Differential Geometry

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Program

Feb. 13

16:50 -- 17:50
Cheng Qing-Ming (Fukuoka University)
Lecture 1. Mean curvature type flow

18:00 --19:30
Dinner time

19:30 -- 20:30
Discussion on Differential Geometry

Feb. 14
08 : 30 --09 : 15
Cheng Qing-Ming (Fukuoka University)
Lecture 2. Self-shrinkers of mean curvature flow

09 : 30 -- 11 : 00
Li Haizhong (Tsinghua University)
Lecture 1. Mean curvature Flow

11 : 20 -- 12 : 05
Wei Guoxin (South China Normal University)
Compact embedded λ-torus

Lunch time

14:10 -- 15:40
Shi Yuguang (Peking University)
Lecture 1. Introduction of asymptotically hyperbolic manifolds

16:10 -- 17:40
Zhou Detang (Fluminense Federal University)
Lecture 1. Huisken-Colding-Minicozzi's theorem:
Any mean convex proper self-shrinker must be a generalized round cylinder

18:00 --19:30
Dinner time

19:30 -- 20:30
Discussion on Differential Geometry

Feb. 15

08：30 --09：15
Cheng Qing-Ming
Lecture 3. Complete self-shrinkers with non-negative mean curvature

09：30 -- 11：00
Shi Yuguang (Peking University)
Lecture 2. Area comparison of isoperimetric surface in asymptotically hyperbolic manifolds

11：20 -- 12：05
Song Hongru (Henan Normal University)
Some classification theorems of submanifolds with particular Blaschke tensor

Lunch time

14:10 -- 15:40
Zhou Detang (Fluminense Federal University)
Lecture 2. Huisken-Colding-Minicozzi's theorem:
Any mean convex proper self-shrinker must be a generalized round cylinder II

16:10 -- 17:40
Li Haizhong (Tsinghua University)
Lecture 2. Gauss curvature Flow

18:00 --19:30
Dinner time

19:30 -- 20:30
Discussion on Differential Geometry

Feb. 16

08 : 30 --10 : 00
Cheng Qing-Ming (Fukuoka University)
Lecture 4. λ-Hypersurfaces of weighted volume-preserving mean curvature flow

10 : 30 -- 12 : 00
Zhou Detang (Fluminense Federal University)
Lecture 3. Brendle's theorem:
any genus zero compact self-shrinker surface must be a sphere

Lunch time

14:10 -- 15:40
Li Haizhong (Tsinghua University)
Lecture 3. Proof of Fiey conjecture for n=2

16:10 -- 17:40
Shi Yuguang (Peking University)
Lecture 3. Behavior of isoperimetric surface in asymptotically hyperbolic manifolds

18:00 --19:30
Dinner time

19:30 -- 20:30
Discussion on Differential Geometry

Feb. 17

08：30 --09：15
Cheng Qing-Ming (Fukuoka University)
Lecture 5. Complete λ-hypersurfaces

09：30 -- 11：00
Li Haizhong (Tsinghua University)
Lecture 4. Curvature Flow

11：20 -- 12：05
Xu Ruiwei (Henan Normal University)
On the rigidity theorems for Lagrangian translating solitons in pseudo-Euclidean space

Lunch time

14:10 -- 15:40
Shi Yuguang (Peking University)
Lecture 4. Volume comparison in asymptotically hyperbolic manifolds in higher dimension

16:10 -- 17:40
Zhou Detang (Fluminense Federal University)
Lecture 4. Colding-Minicozzi's compactness for proper self-shrinkers and its generalization to f-minimal surfaces

18:00 --19:30
Dinner time

19:30 -- 20:30
Discussion on Differential Geometry

Feb. 18

08：30 --09：15
Cheng Qing-Ming (Fukuoka University)
Lecture 6. Area growth of complete λ-hypersurfaces

09：30 -- 11：00
Shi Yuguang (Peking University)
Lecture 5. A new rigidity result for conformally compact Einstein manifolds

11：20 -- 12：05
Li Xingxiao (Henan Normal University)
The Kahler angle and the Lagrangian angle of complete surfaces in C^2

Lunch time

14:10 -- 15:40
Zhou Detang (Fluminense Federal University)
Lecture 5. Some more recent results about self-shrinkers in gradient shrinking Ricci solitons

16:10 -- 17:40
Li Haizhong (Tsinghua University)
Lecture 5. A new characterization of Clifford torus as a self-shrinker

18:00 --19:30
Dinner time

19:30 -- 20:30
Discussion on Differential Geometry

Feb. 19

08：50 -- 10：20
Shi Yuguang (Peking University)
Lecture 6. A new rigidity result for conformally compact Einstein manifolds II

10：40 -- 12：10
Li Haizhong (Tsinghua University)
Lecture 6. A new characterization of Clifford torus as a self-shrinker II

Lunch time

14:00 -- 15:30
Zhou Detang (Fluminense Federal University)
Lecture 6. Some more recent results about self-shrinkers in gradient shrinking Ricci solitons II

The 6th International Workshop on Differential Geometry

Abstracts

Geometry of Submanifolds in a Riemannian Manifold

Haizhong Li (Tsinghua University)

We plan to give six lectures in the 6th international workshop on differential geometry help from February 13-19, 2016 about geometry of curvature flow and Lagrangian self-shrinkers, the notes here is possible contents of my lectures.

Section 1. Mean curvature Flow

1. Huisken's mean curvature flow
2. Evolution formulas
3. self-shrinkers and related result

Section 2. Gauss curvature Flow

1. Firey's conjecture
2. Evolution formulas
3. self-shrinkers for Gauss curvature flow

Section 3. Proof of Firey conjecture for n=2

1. Some fundamental formulas
2. Evolution formulas
3. Ben Andrews's proof

Section 4. Curvature Flow

1. Some backgrounds
2. Evolution formulas

3. Ben Andrews's results

Section 5. A new characterization of Clifford torus as a self-shrinker

1. Basic properties of Lagrangian submanifolds
2. Lagrangian self-shrinkers in C^2
3. New examples of Lagragian self-shrinkers
4. A new characterization of Clifford torus as a self-shrinker

Isoperimetric surfaces in asymptotically hyperbolic manifolds

Shi Yuguang (Peking University)

An isoperimetric surface is boundary of a domain in a Riemannian manifold with the least area among all surfaces enclosed domains with the fixed volume. It is an important and interesting geometric object, and it has deep relation with global geometric properties of ambient manifolds. In this series lectures, I will talk about behaviours isoperimetric surfaces in 3-dim asymptotically hyperbolic manifolds with scalar curvature bigger or equal than -6. One of main results is to give a sufficient condition for a sequence of isoperimetric regions with unbounded volume to be exhausting domains. This part of talks is based on my recent joint work with my students Ji Dandan and Zhu Bo. If time is allowable, I will mention a new rigidity theorem on conformally compact Einstein manifolds, which is a joint work with Li Gang and Qing Jie.

Section 1. Introduction of asymptotically hyperbolic manifolds

Section 2. Area comparison of isoperimetric surface in asymptotically hyperbolic manifolds

Section 3. Behavior of isoperimetric surface in asymptotically hyperbolic manifolds

Section 4. Volume comparison in asymptotically hyperbolic manifolds in higher dimension

Section 5. A new rigidity result for conformally compact Einstein manifolds

Some topics about self-shrinkers and f-minimal sub-manifolds

Detang Zhou(Fluminense Federal University)

In my talks, I will discuss analysis on self-shrinkers of mean curvature flows in Eucilidean space and gradient shrinking Ricci solitons and geometric applications. I will start with basic resutls and explain the proofs of the following results.

1. Huisken-Colding-Minicozzi's theorem: Any mean convex proper self-shrinker must be a generalized round cylinder.
2. Brendle's theorem: any genus zero compact self-shrinker surface must be a sphere.
3. Colding-Minicozzi's compactness for proper self-shrinkers and its generalization to f-minimal surfaces.
4. Some more recent results about self-shrinkers in gradient shrinking Ricci solitons.

The Kahler angle and the Lagrangian angle of complete surfaces in C^2

Li Xingxiao (Henan Normal University)

We talk about immersed surfaces in the complex 2-plane C^2. Firstly, we provide an extension of Lagrangian angle, Maslov form and Maslov class to more general surfaces than Lagrangian in ones in C^2, and then naturally generalize a theorem by J.-M. Morvan to surfaces of constant Kahler angle, together with an application showing that the Maslov class of a compact self-shrinker surface with constant Kahler angle is generally non-vanishing. Secondly, we give two pinching results for the Kahler angle which imply rigidity theorems of self-shrinkers in terms of the Kahler angle and the second fundamental form of the surface. The second part of this talk is about the ξ-submanifolds which are natural generalizations both of the self-shrinkers for the mean curvature flow and also of λ-hypersurfaces to the higher codimension. As a result, we obtain a rigidity theorem for Lagrangian ξ-submanifold in C^2.These are jointly with Xiao Li and Xiufen Chang, respectively.

On the rigidity theorems for Lagrangian translating solitons in pseudo-Euclidean space

Xu, Ruiwei (Henan Normal University)

In this talk, I will report several rigidity results of space-like translating soliton for mean curvature flow in pseudo-Euclidean space R_n^{2n}. We show every entire classical strictly convex solution must be a quadratic polynomial under different completeness conditions. These works are joint with Rongli Huang and LingYun Zhu.

Some classification theorems of submanifolds with particular Blaschke tensor

Song Hongru (Henan Normal University)

We shall present in this talk some recently obtained classification theorems of submanifolds with conditions on their Blaschke tensors. Firstly, we give theorems for space-like regular hypersurfaces in the de Sitter space with either parallel Blaschke tensor or with parallel para-Blaschke tensor; Secondly we talk about the classifying problem for all Blaschke parallel submanifolds in the unit sphere. As a result, we obtain a theorem which gives a complete classification of Blaschke parallel submanifolds with vanishing Mobius form. This theorem covers the classification of Mobius parallel submanifolds. This is a joint-work with Prof. Xingxiao Li.