The 5th Japan-China Geometry Conference

September 1--7, 2019 │ Ritsumeikan University, Kusatsu, Japan

Conference Venue: Ritsumeikan University, Biwako-Kusatsu Campus (BKC),
West-Wing, the 6th floor

Scientific Committee:

Akito Futaki (Tsinghua University)

Anmin Li (Sichuan University)

Toshiki Mabuchi (Osaka University)

Yoshihiro Ohnita (Osaka City University)

Gang Tian (Peking University)

Weiping Zhang (Nankai University)

Organizing Committee:

Qing-Ming Cheng (Fukuoka University)

Qing Ding (Fudan University)

Ryushi Goto (Osaka University)

Ryoichi Kobayashi (Nagoya University)

Haizhong Li (Tsinghua University)

Jiayu Li (University of Science and Technology of China)

Reiko Miyaoka (Tohoku University)

Hitoshi Moriyoshi (Nagoya University)

Takashi Shioya (Tohoku University)

Zizhou Tang (Nankai University)

Changping Wang (Fujian Normal University)

Local Organizers:

Toshikazu Natsume (Ritsumeikan University)

Hiroyuki Osaka (Ritsumeikan University)

Invited Speakers:

Daguang Chen (Tsinghua University)

Fuquan Fang (Capital Normal University)

Atsushi Fujioka (Kansai University)

Pengfei Guan (McGill University)

Xiaoli Han (Tsinghua University)

Shohei Honda (Tohoku University)

Rongli Huang (Guangxi Normal University)

Masashi Ishida (Osaka University)

Xiaoshang Jin (Peking University)

Haizhong Li (Tsinghua University)

Toshiki Mabuchi (Osaka University)

Shin-ichi Ohta   (Osaka University)

Kaoru Ono (Kyoto University)

Chao Qian (Beijing Institute of Technology)

Li Sheng (Sichuan University)

Gang Tian (Peking University)

Peng Wang   (Fujian Normal University)

Yong Wei (University of Science and Technology of China and
            Australian National University)

Hongwei Xu (Zhejiang University)

Takao Yamaguchi (Kyoto University)

Xi Zhang (University of Science and Technology of China)

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Traffic around Hotel and Conference Place

Most participants stay at the Hotel Boston Plaza Kusatsu:

http://www.hotel-bp.co.jp/

which is located at the west side of Kusatsu station:

(EN) http://www.hotel-bp.co.jp/en/access

(CN) http://www.hotel-bp.co.jp/cn/access

The conference is held at Ritsumeikan University, Biwako-Kusatsu Campus (BKC), West-Wing, the 6th floor.

Conference HP:

http://www.math.ritsumei.ac.jp/?cat=20

Access to Ritsumeikan University BKC campus:

(EN) http://en.ritsumei.ac.jp/file.jsp?id=246771&f=.pdf

(CN) http://en.ritsumei.ac.jp/common/pdf/crossroads_cn.pdf

There are buses between the Kusatsu station and Ritsumeikan University BKC campus, which run every 30 minutes and cost ¥330 (Japanese yen). The closest bus stop to the hotel is Kusatsu-eki-higashiguchi (草津駅東口), which is located at the opposite side of Kusatsu station from the hotel:

https://www.navitime.co.jp/poi?node=00025717

On weekdays we have the following buses:

To Ritsumeikan University BKC campus:

08:25 → 08:45

09:30 → 09:50

To Kusatu-eki-higashiguchi（草津駅東口）:

18:00 → 18:20

18:30 → 18:50

19:10 → 19:30

19:40 → 20:00

20:10 → 20:30

21:00 → 21:20

For those buses, Kusatsu-eki-higashiguchi（草津駅東口）is the starting bus stop and Ritsumeikan University BKC campus is the final destination and vice versa.

You can find the full timetable at:

Kusatu-eki-higashiguchi（草津駅東口）

https://www.navitime.co.jp/diagram/bus/00025717/00048314/0/

Ritsumeikan University BKC campus

https://www.navitime.co.jp/diagram/bus/00209317/00048314/1/

The 5th Japan-China Geometry Conference

September 1-7, 2019

Schedule

September 1, Sunday

Arrival day

September 2　Monday

Time: from 09:00

Chair:　Hitoshi Moriyoshi

09:00-09:10　Opening ceremony

Reiko Miyaoka (Tohoku University)

Changping Wang (Fujian Normal University)

09:10-09:20 Toshikazu Natsume (Ritsumeikan University)

Announcements for the 5th Japan-China Geometry conference

09:20-10:20　Gang Tian (Peking University)

Kahler-Ricci flow on Fano manifolds

10:20-11:00   Tea Break and photo

11:00-12:00   Peng Wang   (Fujian Normal University)

Some progress on Willmore surfaces in S^n

12:00-14:00   Lunch time

Chair: Jiayu Li

14:00-15:00   Li Sheng (Sichuan University)

A note on Quantum K-theory over symplectic manifolds

15:00-15:20   Tea Break

15:20-16:20   Xiaoli Han (Tsinghua University)

Rigid theorem for deformed Hermitian-Yang-Mills metric

16:20-16:40   Tea Break

16:40-17:40   Takao Yamaguchi (Kyoto University)

Limit spaces of Riemannian manifolds with boundary

18:00-- Reception

September 3   Tuesday

Time: from 10:00

Chair: Qing Ding

10:00-11:00   Kaoru Ono (*Kyoto University*)

Lagrangian Floer theory on symplectic orbifolds

11:00-11:20   Tea Break

11:20-12:20   Xi Zhang (*University of Science and Technology of China*)

Some results on the differential geometry of Higgs bundle

12:20-14:00   Lunch time

Chair: Yoshihiro Ohnita

14:00-15:00   Atsushi Fujioka (*Kansai University*)

Centroaffine surfaces of cohomogeneity one

15:00-15:20   Tea Break

15:20-16:20   Xiaoshang Jin (*Peking University*)

Uniqueness of conformally compact Einstein manifolds

16:20-16:40 Tea Break

16:40-17:40   Daguang Chen (Tsinghua University)

Starshaped compact hypersurfaces with prescribed Weingarden curvature in warped product manifolds

September 4   Wednesday

Time: from 10:00

Chair: Changping Wang

10:00-11:00   Pengfei Guan (McGill University)

Constrained hypersurface flows and isoperimetric type inequalities

11:00-11:20   Tea Break

11:20-12:20   Yong Wei (University of Science and Technology of China and Australian National University)

Volume preserving flow by powers of k-th mean curvature

12:20-14:00   Lunch time

Chair: Ryushi Goto

14:00-15:00   Masashi Ishida (Osaka University)

L-length, reduced volume, and B-field renormalization group flow

15:00-15:20   Tea Break

15:20-16:20   Rongli Huang (Guangxi Normal University)

On the entire self-shrinking solutions to Lagrangian mean curvature flow II

16:20-16:40   Tea Break

16:40-17:40   Haizhong Li (Tsinghua University)

Harmonic mean curvature flow and geometric inequalities

September 5   Thursday

Time: from 09:00

Chair: Takashi Shioya

09:00-10:00   Shin-ichi Ohta   (Osaka University)

Geometry of weighted Lorentz-Finsler manifolds

10:00-12:00   Free discussion

12:00-14:00   Lunch time

Chair: Qing-Ming Cheng

14:00-18:00   Free discussion

September 6 Friday

Time: from 10:00

Chair: Zizhou Tang

10:00-11:00   Fuquan Fang (*Capital Normal University*)

Tits buildings and their reflections on geometry

11:00-11:20   Tea Break

11:20-12:20   Shohei Honda (*Tohoku University*)

Embedding of spaces with Ricci bounds from below in L^2 via eigenfunctions

12:20-14:00   Lunch time

Chair: Reiko Miyaoka

14:00-15:00   Hongwei Xu (*Zhejiang University*)

Mean Curvature Flow and Sphere Theorem for Submanifolds

15:00-15:20   Tea Break

15:20-16:20   Chao Qian (*Beijing Institute of Technology*)

Geometric constructions related to isoparametric foliations

16:20-16:40   Tea Break

16:40-17:40   Toshiki Mabuchi (Osaka University)

Natural limits for sequences of pseudonormed graded algebras

17:40-17:50   Jiakuan Lu (Guangxi Normal University)

Announcements for the 6th China-Japan Geometry Conference

September 7 Saturday

Departure day

Title and abstract

Speaker: Daguang Chen (Tsinghua   University)

Title: Starshaped compact hypersurfaces with prescribed Weingarden curvature in warped product manifolds

Abstract: Given a compact Riemannian manifold M, the warped product manifold is defined by $I \times_h M$, where I is an open interval in $\mathbb{R}$ and $h: I \to \mathbb{R}^+$ is the positive differential function. For a positive function ψ defined on $I \times_h M$, the curvature estimates for Hessian equations $\sigma_k (\kappa) = \psi(V, \nu(V))$ are obtained. We also obtain some existence results for the starshaped compact hypersurface σ satisfying the above equation with various assumptions. This is the joint work with Professor Haizhong Li (Tsinghua University) and Professor Zhizhang Wang (Fudan University).

Speaker: Fuquan Fang (Capital Normal University)

Title: Tits buildings and their reflections on geometry

Abstract: Tits buildings are fundamental tool invented by Tits to study algebraic groups, which were applied historically to give the first proof of the celebrated Mostow rigidity. In this talk I will give a brief survey of Tits buildings and few of their reflections on geometry.

Speaker: Atsushi Fujioka (Kansai University)

Title: Centroaffine surfaces of cohomogeneity one

Abstract: We consider nondegenerate centroaffine surfaces of cohomogeneity one, which correspond to surfaces of revolution in Euclidean differential geometry. We show that such surfaces can be expressed in the special form, which enables us to study fundamental surfaces such as proper affine spheres or centroaffine minimal surfaces in the case of cohomogeneity one.

Speaker: Pengfei Guan (McGill University)

Title: Constrained hypersurface flows and isoperimetric type inequalities

Abstract: We discuss new type hypersurface flows with constraints. These flows resemble standard mean curvature and inverse mean curvature flows, but they also differ in significant way. Each of the new flow is designed with a special feature that it preserves certain given geometric quantity (e.g., volume constraint) and decreases another geometric quantity (e.g., surface area). This makes this new type of flows as a natural PDE tool to prove various isoperimetric geometric inequalities, like quermassintegrals in space forms. We will discuss some recent developments and applications on sharp geometric inequalities, we will also discuss open problems arising from these new flows.

Speaker: Xiaoli Han (Tsinghua University)

Title: Rigid theorem for deformed Hermitian-Yang-Mills metric

Abstract: The deformed Hermitian-Yang-Mills metric was defined by A. Jacob and S.T. Yau. In this talk, we studied the deformed Hermitian-Yang-Mills metric on compact Kahler manifold with nonnegative orthogonal bisectional curvature.

Speaker: Shohei Honda (Tohoku University)

Title: Embedding of spaces with Ricci bounds from below in L^2 via eigenfunctions

Abstract: Berard-Besson-Gallot proved that any closed Riemannian manifold can be embedded in L^2 via the heat kernel and that the original Riemannian metric can be approximated by the pull-back metrics. In this talk we generalize this theorem to singular spaces, so-called RCD(K, N) metric measure spaces. Combining the Gromov-Hausdorff compactness of the moduli space of noncollapsed spaces with Reifenberg flatness, we prove a quantitative sharp convergence result for the pull-back metrics, which is new even for closed Riemannian manifolds. This is a joint work with L. Ambrosio, J. W. Portegies and D. Tewodrose.

Speaker: Rongli Huang (Guangxi Normal University)

Title: On the entire self-shrinking solutions to Lagrangian mean curvature flow II

Abstract: We show Bernstein type results for entire self-shrinking solutions to Lagrangian mean curvature flow in $(R^n \times R^n, g_\tau)$. The proofs rely on a priori estimates and barriers construction. This is a joint work with Qian-Zhong Ou and Wen-Long Wang.

Speaker: Masashi Ishida (Osaka University)

Title: L-length, reduced volume, and B-field renormalization group flow

Abstract: Perelman introduced a length functional for paths in the space-times of solutions of the Ricci flow, called the L-length. The geometry which is based on the L-length is called the L-geometry. By using the L-length, an important monotone quantity was introduced by Perelman. The quantity is called the reduced volume, which becomes one of powerful tools for studying the Ricci flow. On the other hand, the B-field renormalization group flow is one of generalized versions of the Ricci flow and closely related to pluriclosed flow introduced by J. Streets and G. Tian. In this talk, we shall develop the L-geometry for the B-field renormalization group flow by introducing a new L-length. In particular, we shall introduce a reduced volume type quantity and discuss its property.

Speaker: Xiaoshang Jin (Peking University)

Title: Uniqueness of conformally compact Einstein manifolds

Abstract: In this talk I will introduce conformally compact Einstein manifolds, including the definition, examples, basic properties and some problems. Then I will talk about the global uniqueness of conformally compact Einstein metrics on the n-Ball constructed in the earlier work of Graham and Lee. This is joint work with Alice Chang, Yuxiin Ge and Jie Qing.

Speaker: Haizhong Li (Tsinghua University)

Title: Harmonic mean curvature flow and geometric inequalities

Abstract: In this talk, we use the harmonic mean curvature flow to prove Alexandrov-Fenchel type inequalities for strictly convex hypersurfaces in hyperbolic space. Using the new Alexandrov-Fenchel type inequalities and the inverse mean curvature flow, we show that the Alexandrov-Fenchel inequality for the total curvature in terms of the area   for strictly convex hypersurfaces. This is a joint work with Ben Andrews and Yingxiang Hu.

Speaker: Toshiki Mabuchi (Osaka University)

Title: Natural limits for sequences of pseudonormed graded algebras

Abstract: Graded algebras (such as canonical rings) coming from the spaces of sections on polarized algebraic varieties are studied by many mathematicians. For instance, the pseudonorm project proposed by S.-T. Yau and C.-Y. Chi gives us a new differential geometric aspect of the Torelli type theorem. In contrast to the GIT-limit in algebraic geometry (or to the Gromov-Hausdorff limit in Riemannian geometry), we have some straightforward compactification of the moduli space of pseudonormed spaces. This construction allows us to obtain natural limits for sequences of pseudonormed graded algebras. In examples of such compactifications, the notion of the orthogonal direct sum for pseudonormed spaces comes up very naturally.

Speaker: Shin-ichi Ohta   (Osaka University)

Title: Geometry of weighted Lorentz-Finsler manifolds

Abstract: We study a Lorentzian counterpart to the weighted Ricci curvature in Finsler geometry, and establish comparison-type results including the singularity theorems of Hawking and Penrose. This is joint work with Ettore Minguzzi (University of Florence) and Yufeng Lu (Osaka University).

Speaker: Kaoru Ono (Kyoto University)

Title: Lagrangian Floer theory on symplectic orbifolds

Abstract: In the construction of Gromov-Witten theory on symplectic orbifolds, twisted sectors play an important role.   We introduce a class of ``Lagrangians'' in a symplectic orbifold   and the notion of dihedral twisted sectors associated to them.   After explaining them, we move on to the construction of Lagrangian Floer theory for them.   It is based on a joint work with Bohui Chen and Bai-Ling Wang.

Speaker: Chao Qian (Beijing Institute of Technology)

Title: Geometric constructions related to isoparametric foliations

Abstract: In this talk, we will discuss some geometric constructions related to isoparametric foliation in unit spheres. For instance, we will talk about the generalization of OT-FKM construction and also the Pinkall-Thorbergsson construction. The fundamental aim is to show there are still interesting problems although the classification of isoparametric hypersurfaces in unit spheres has been completed. This talk is mainly based on joint work with Prof. Zizhou Tang.

Speaker: Li Sheng (Sichuan University)

Title: A note on Quantum K-theory over symplectic manifolds

Abstract: Due to the work of Ruan, Li-Ruan and Li-Sheng about the setting-up of the virtual neighborhood technique of GW-invariant and relative GW-invariant over symplectic manifolds, we study K-invariant version GW-invariant and relative GW-invariant. This is joint work with An-Min Li and Quan Zheng

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Speaker: Gang Tian (Peking University)

Title: Kahler-Ricci flow on Fano manifolds

Abstract: In this talk, I will first show some results on the regularity theory of Kahler-Ricci flow on Fano manifolds. Next I will discuss some recent progress, particularly, my joint work with Li and Zhu on limiting behavior of Kahler-Ricci flow.

Speaker: Peng Wang (Fujian Normal University)

Title: Some progress on Willmore surfaces in S^n

Abstract: In this talk, we will report some recent progress on the study of Willmore surfaces and Willmore energy, including classification of Willmore 2-spheres in S^5 and Willmore stability problems of minimal surfaces in S^n. This talk is based on joint works with Prof Xiang Ma, Changping Wang, Franz Pedit, Rob Kusner.

Speaker: Yong Wei (University of Science and Technology of China and
Australian National University)

Title: Volume preserving flow 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 hypersurface 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 include the monotonicity of a generalized isoperimetric ratio 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 Professor Ben Andrews.

Speaker: Hongwei Xu (Zhejiang University)

Title: Mean Curvature Flow and Sphere Theorem for Submanifolds

Abstract: In this talk, we will focus on the mean curvature flow theory with sphere theorems, and discuss the convergence theorems for the mean curvature flow of arbitrary codimension inspired by the rigidity theory of submanifolds. Several new differentiable sphere theorems for submanifolds are obtained as consequences of the convergence theorems for the mean curvature flow. It should be emphasized that our main theorem is an optimal convergence theorem for the mean curvature flow of arbitrary codimension, which implies the first optimal differentiable sphere theorem for certain submanifolds with positive Ricci curvature. Finally, we present a list of unsolved problems in this area. This is joint work with Dr. Li Lei.

Speaker: Takao Yamaguchi (Kyoto University)

Title: Limit spaces of Riemannian manifolds with boundary

Abstract: We consider the family of n-dimensional compact Riemannian manifolds having non-empty boundary with a lower sectional curvature bound and two sides bounds on the second fundamental forms of the boundaries. I will describe the Gromov-Hausdorff limit spaces in this family. If time permits, I will also discuss the convergence. This is a joint work with Zhilang Zhang (Foshan University).

Speaker: Xi Zhang (University of Science and Technology of China)

Title: Some results on the differential geometry of Higgs bundle

Abstract: In this talk, we first recall some basic knowledge and classical results on the differential geometry of holomorphic vector bundles, and then introduce our recent work on the the Hermitian-Einstein equation, the Hermitian-Yang-Mills flow on Higgs bundles and their applications. These works are joint with Jiayu Li, Changpeng Pan, Chuanjing Zhang and Pan Zhang.