華東師範大學 | 数学科学学院
School of Mathematical Sciences,East China Normal University

International Conference on Differential Geometry
In Honor of Jeff Cheeger's 75th Birthday

Program

East China Normal University, Shanghai
2018.6.28-2018.6.29

Invited Speakers
Xianzhe Dai (UC, Santa Barbara)
Ilkka Holopainen (University of Helsinki)
Wenshuai Jiang (Zhejiang University)
Chi Li (Purdue University)
Werner Mueller (University of Bonn)
Tony Phillips (Stony Brook University)
Weiping Zhang (Nankai University)
Yuguang Zhang (University of Bath)

Conference Organizing Committee
Xianzhe Dai, Fuquan Fang, Xiaochun Rong

Local Organizing Committee
Guofang Wei, Yu Zheng, Hongyan Zhang, Linfeng Zhou

Schedule

June 27

14:00-18:00 Registration at Loby of Yifu Hotel and Guoman Shanghai Hotel

June 28

Venue: Lecture hall of East China Normal University Press
地点：华东师范大学出版社四楼报告厅
Address: 3663 North Zhongshan Road, Putuo District, Shanghai
地址：上海市普陀区中山北路 3663 号

8:50-9:00 Openning

Chair: Wei, Guofang

9:00-10:00 **Werner Mueller**
Analytic torsion of locally symmetric spaces and torsion in the cohomology of arithmetic groups

10:00-10:30 Tea Break

10:30-11:30 **Dai, Xianzhe**
Holomorphic torsion and conical singularity

11:30-14:00 Lunch

Chair: Lu, Zhiqin

14:00-15:00 **Zhang, Weiping**
Positive scalar curvature on foliations

15:00-15:40 Group Photo and Tea Break

15:40-16:40 **Zhang, Yuguang**
Equivalence of degenerations of Calabi-Yau manifolds

16:40-17:30 Free Discussion

17:30 Banquet

June 29

Venue: Lecture hall of East China Normal University Press
地点：华东师范大学出版社四楼报告厅
Address: 3663 North Zhongshan Road, Putuo District, Shanghai
地址：上海市普陀区中山北路 3663 号

Chair: Dai, Xianzhe

9:00-10:00 **Ilkka Holopainen**
Asymptotic Dirichlet problem for the mean curvature operator in warped products

10:00-10:30 Tea Break

10:30-11:30 **Li, Chi**
On the algebraicity of metric tangent cones and equivariant K-stability

11:30-14:00 Lunch

Chair: Zheng, Yu

14:00-15:00 **Jiang, Wenshuai**
The singular set of non-collapsing Ricci limit spaces

15:00-15:30 Tea Break

15:30-16:30 **Tony Phillips**
Fifty-odd years of sphere eversion

16:30-17:30 Free Discussion

17:30 Dinner

Abstracts

Holomorphic Torsion and Conical Singularity

Xianzhe Dai
UC, Santa Barbara

Abstract: Holomorphic torsion is the complex analog of the Ray-Singer analytic torsion. Unlike the analytic torsion, it has no topological interpretation. Nevertheless it still plays crucial roles in diverse fields. We study the holomorphic torsion for complex manifolds with conical singularity, showing that it is well defined, and then study its basic properties and applications.

Asymptotic Dirichlet problem for the mean curvature operator in warped products

Ilkka Holopainen
University of Helsinki

Abstract: In the talk I will review recent joint works with Jean-Baptiste Casteras, Esko Heinonen, Jorge de Lira, Jaime Ripoll and myself on the asymptotic Dirichlet problem for the mean curvature operator on Cartan-Hadamard manifolds M under various curvature assumptions.

The first part of the talk concerns the solvability of the asymptotic Dirichlet problem for the minimal graph equation

$$\begin{cases} \dfrac{\nabla u}{\sqrt{1+|\nabla u|^2}} = 0 \quad in\ M \\ u|_{\partial_\infty M} = \varphi, \end{cases}$$

where $\varphi \in C(\partial_\infty M)$ is an arbitrary continuous function on the sphere at infinity.

We consider Cartan-Hadamard manifolds M whose sectional curvatures are bounded from below and above by certain functions depending on the distance $r = d(\cdot, o)$ to a fixed point $o \in M$. We are, in particular, interested in finding optimal (or close to optimal) curvature upper bounds.

In the second part I will report on the recent joint paper with Casteras, Heinonen, de Lira, and myself on the asymptotic Dirichlet problem for Killing graphs with prescribed mean curvature in warped products $M \times_\varrho R$ where M is a Cartan-Hadamard manifold.

The Singular set of Noncollapsing Ricci Limit Spaces

Wenshuai Jiang
Zhejiang University

Abstract: Let us consider $(M_i^n, g_i, p_i) \to (X, d, p)$ in Gromov-Hausdorff sense with $Vol(B_1(p_i)) > v > 0$ and $Ric \geq -(n-1)$. It is known that X is a metric space and X has a regular-singular decomposition $X = R \cup S$ with $\dim(S) \leq n-2$ by Cheeger-Colding. In this talk, we will show that the singular set S of X is (n-2)-rectifiable. More generally, for $0 \leq k < n$, we will shot that the k-stratum $S^k = \{x \in X: no\ tangent\ cone\ at\ x\ splits\ off\ a\ R^{k+1}\ factor\}$ is k-rectifiable. We will also discuss the quantitative estimate of S^k. This is joint work with Professor Jeff Cheeger and Aaron Naber.

On the algebraicity of metric tangent cones and equivariant K-stability

Chi Li
Purdue University

Abstract: Donaldson-Sun conjectured that the metric tangent cone at any point on a Gromov-Hausdorff (GH) limit of Kahler-Einstein Fano manifolds depends only on the algebraic structure of the GH limit. I will explain a proof of this conjecture which is based on joint works with Xiaowei Wang and Chenyang Xu. The proof depends on the characterization of K-semistable Fano cones via minimizers of normalized volumes, and proving uniqueness of K-polystable degeneration for any K-semistable Fano cone. Using similar method, we also prove that to test K-stability of any (possibly singular) Fano variety with a torus action, it is sufficient to test on torus equivariant special test configurations.

Analytic torsion of locally symmetric spaces and torsion in the cohomology of arithmetic groups

Werner Mueller
University of Bonn

Abstract: Analytic torsion is a spectral invariant of a compact Riemannian manifold defined in terms of regularized determinants of Laplace operators on forms twisted by a flat bundle. By a theorem, which is due to Jeff Cheeger and myself, the analytic torsion equals the Reidemeister torsion. Recently, this result has found interesting applications in the study of the growth of torsion in the cohomology of cocompact arithmetic groups. Since many arithmetic groups are not cocompact, it is interesting to extend these results to the non-cocompact case. In this talk I will report on recent progress concerning this problem.

Fifty-odd years of sphere eversion

Tony Phillips
Stony Brook University

Abstract: Stephen Smale proved in 1959 that any two immersions of the 2-sphere in 3-space are regularly homotopic. In particular, the sphere can be turned inside-out (everted) along a path of immersions with continuously varying tangent map. This lecture will survey the attempts, which started then and continue to this day, to make that process intelligible.

Positive scalar curvature on foliations

Weiping Zhang
Nankai University

Abstract: We present a generalization of the Lichnerowicz-Hitchin vanishing theorem to the case of foliations. As a consequence, there is no foliation of positive leafwise scalar curvature on any torus. This later result extends the corresponding result of Schoen-Yau and Gromov-Lawson, which states that there is no metric of positive scalar curvature on any torus, to the case of foliations.

Equivalence of degenerations of Calabi-Yau manifolds

Yuguang Zhang
University of Bath

Abstract: In this talk, we show the equivalence of degenerations of Calabi-Yau manifolds among the convergence of Ricci-flat Kahler-Einstein metrics, cohomological classes of calibration forms and the finiteness of Weil-Peterson metric.

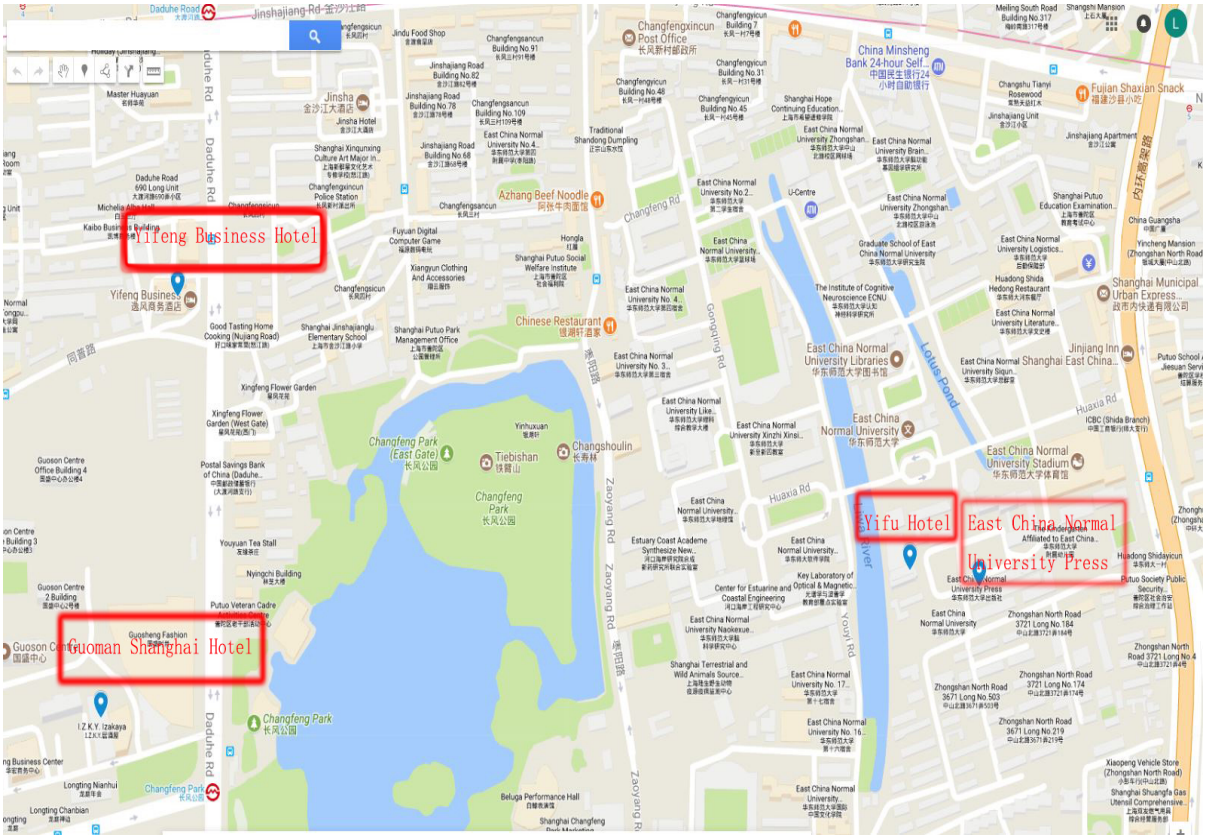
Shuttle Bus Info

There will be a shuttle bus to pick you up in the morning and the night between Guofeng Hotel, Yifeng Business Hotel and the location of the conference.

Timetable of the Shuttle

	June 28	June 29
Morning	8:30	8:30
Night	19:30	19:00

Campus and Hotel Map



Location of the conference: Lecture Hall of East China Normal Unviersity (4th floor),
3663 North Zhongshan Road, Putuo District, Shanghai.

Hotels:

(1)Yifu Hotel (逸夫楼)

Address: 3663 North Zhongshan Road, Putuo District, Shanghai (上海市普陀区中山北路 3663 号)

Tel: +86 21 6260 1058

(2) Guoman Shanghai Hotel (上海国丰酒店)

Address: 388 Daduhe Road, Putuo District, Shanghai (上海市普陀区大渡河路 388 号)

Tel: +86 21 6095 8888

(3)Yifeng Business Hotel (逸风商务酒店)

Address: 646 Daduhe Road, Putuo District, Shanghai (上海市普陀区大渡河路 646 号)

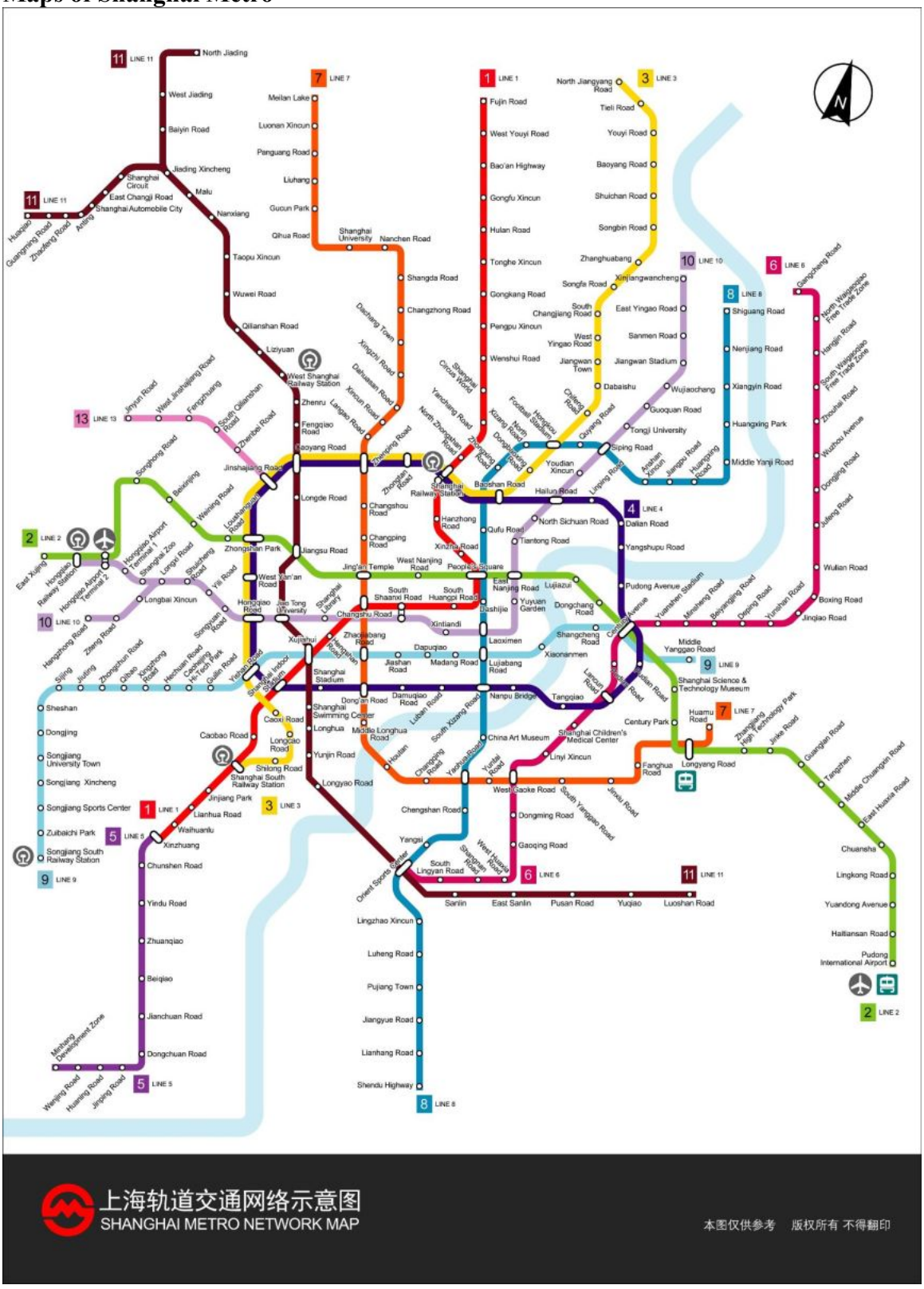
Tel: +86 21 5280 0808

Contact: Hongyan Zhang (张红艳) Tel: 13651698338

Linfeng Zhou (周林峰) Tel: 13818111461

Transportation

- **Maps of Shanghai Metro**



- **Routine from Airport to ECNU**
  1. **Arriving at Hongqiao International Airport:** (The distance is about 5.43 mi**)**

     By taxi (no transfer)

     It will cost about CNY ￥40 for the 30 minutes taxi drive from Shanghai Hongqiao International Airport to East China Normal University (ECNU).
  2. **Arriving at Pudong International Airport:** (The distance is about 31.63 mi)

     By taxi (no transfer)

     It will cost about CNY￥200 for 1 hour taxi drive from Pudong International Airport in the daytime and CNY￥250 at night to ECNU.

     By subway (transfer twice)

     First, take subway Line 2 (Identification Color: light green) to Zhongshan Park station(中山公园地铁站). It takes about 60 minutes from Pudong International airport to Zhongshan Park station stop, with the fare CNY￥7. You will have to transfer from 4-carriage train to 8-carriage train at Guanglan Road station. Then, take a taxi to ECNU (华东师范大学). This will cost CNY￥14 for approximately 7 minutes taxi drive.

     Special Notes:
     a. You can take Shanghai Maglev Train (SMT) to Longyang Road station near the east end of Line 2.
     b. The east extention part of Subway Line 2 is running separately from the other part. Passengers from Pudong International airport will get off the 4-car metro train at Guanglan Road station and change to an 8-car train to go ahead.
     c. Pudong Airport station of Subway Line 2 is located between T1 and T2. Follow the sign to get to the right terminal.

     By subway + maglev (transfer twice)

     First, take the Shanghai Maglev Train to Longyang Road station. The maximum speed of Maglev Train can reach up to 430km/h. It takes only 8 minutes from the Pudong International airport to the termination stop (Longyang Road station), with the fare about CNY￥50. The price of favorable single trip ticket would be CNY￥40 for passengers who take airplane at the same day. Second, in Longyang Road station (龙阳路地铁站), please take subway line 2 to Zhongshan Park subway station(中山公园地铁站). It takes about 30 minutes from the Longyang Road station to Zhongshan Park station, with the fare about CNY￥4. Third, take a taxi to ECNU.