Bay Area Differential Geometry Seminar
Saturday November 1, 2014
MSRI, Berkeley

Seminar participants and their significant others are invited to dinner at the home of David Hoffman, 37 Hill Road, Berkeley, CA 94708 (tel: 510 649-1641). Directions will be provided at the meeting. Please use the **signup list** *to indicate your participation and dietary restrictions if any. (Click on the boldfaced text in the previous sentence to get to the signup list.)*

• 10:00–11:00 **Reception, Morning Coffee**

• 11:00-12:00 **Gang Liu, UC Berkeley**: *Three-circle theorems on Kähler manifolds, and applications*

The classical Hadamard Three Circle theorem is generalized to complete Kähler manifolds with nonnegative holomorphic sectional curvature. Various applications will be discussed, including the connection with Yau's uniformization conjectures and the resolution of Ni's conjecture on complete Kähler manifolds with nonnegative bisectional curvature.

• 12:00–2:00 **Lunch**

Lunch will be available for purchase at MSRI. Orders will be taken before the first talk. There will be a brief organizational meeting at 1:45.

• 2:00–3:00 **Davi Máximo, Stanford**: *On the topology and index of minimal surfaces*

We show that for an immersed two-sided minimal surface in $\mathbf{R^3}$, there is a lower bound on the index depending on the genus and number of ends. Using this, we show the nonexistence of an embedded minimal surface in $\mathbf{R^3}$ of index 2, as conjectured by Choe. Moreover, we show that the index of an immersed two-sided minimal surface with embedded ends is bounded from above and below by a linear function of the total curvature of the surface.

This is joint work with Otis Chodosh.

• 3:00–4:00 **Afternoon Tea**

• 4:00–5:00 **Richard Bamler, UC Berkeley**: *On the scalar curvature blow up conjecture in Ricci flow*

It is a basic fact that the Riemannian curvature becomes unbounded at every finite-time singularity of the Ricci flow. Sesum showed that, more precisely, even the Ricci curvature becomes unbounded at every such singularity. Whether the same can be said about the scalar curvature has since remained a conjecture, which has resisted several attempts of resolution.

In this talk, I will present a new result that partially confirms this conjecture in dimension 4 and motivates some interesting questions in 4-dimensional Ricci flow. Its proof relies on a combination of multi-scale arguments and Perelman's Harnack inequality on the conjugate heat equation. As a byproduct, we obtain an unconventional backwards pseudolocality theorem, which holds in any dimension.

This project is joint work with Qi Zhang.

• 6:00 **Dinner** *Please see the invitation and signup link at the top of this announcement.*