Submittee: John Lee
Date Submitted: 2011-05-09 14:21
Title: Pacific NW Geometry Seminar
Event Type: Conference-Workshop

Location:
University of Washington Seattle, WA USA

Dates:
May 7 and 8, 2011

Topic:
Differential Geometry and Geometric Analysis

Methodology:
Six lectures by experts in their fields, with time at the end to present open problems.

Objectives Achieved:
Disseminating information about recent research in geometric analysis

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Organizers:
Lee, John M. (Mathematics Dept., UW) // Yuan, Yu (Mathematics Dept., UW)

Speakers:
Colleen Robles (Mathematics, Texas A&M), Homological rigidity of Schubert varieties in compact Hermitian symmetric spaces. Abstract: The integral homology of a compact Hermitian symmetric spaces (CHSS) is generated by the homology classes of its Schubert varieties. Most Schubert varieties are singular. In 1961 Borel and Haefliger asked: when can the homology class $[X]$ of a singular Schubert variety be represented by a smooth subvariety Y of the CHSS? Remarkably, the subvarieties Y with $[Y] = [X]$ are integrals of a (linear Pfaffian) differential system. I will discuss recent work with Dennis The in which we give a complete list of those Schubert varieties X for which there exists a first-order obstruction to the existence of a smooth Y. This extends (independent) work of M. Walters, R. Bryant and J. Hong. The sine qua non of our analysis is a new characterization of the Schubert varieties by a non-negative integer and a marked Dynkin diagram. The description generalizes the well-known characterization of the smooth Schubert varieties by connected subdiagrams of the Dynkin diagram. I will illustrate the talk with many examples. // Craig Sutton (Matematics, Dartmouth), Hearing the moments of inertia of a rigid body. (No abstract available) // Christina Sormani (Math & Computer Science, Lehman College), The Positive Mass Theorem, the Penrose Inequality and the Intrinsic Flat Distance. Abstract: The Schoen--Yau Positive Mass Theorem states that an asymptotically flat 3-manifold with nonnegative scalar curvature has

positive ADM mass unless the manifold is Euclidean space. Here we examine sequences of such manifolds whose ADM mass is approaching 0. We assume the sequences have no interior minimal surfaces although we do allow them to have boundary if it is a minimal surface as is assumed in the Penrose inequality. It is known that such sequences need not converge in the smooth sense (as can be seen with a sequence of Schwarzschild spaces). Nor do they converge in the Gromov--Hausdorff sense (due to the possible existence of thin deep gravity wells). We conjecture that they do converge to Euclidean space in the pointed Intrinsic Flat sense for a well chosen sequence of points. The Intrinsic Flat Distance, introduced in work with Stefan Wenger (UIC), can be estimated using filling manifolds which allow one to control thin wells and small holes.   Here we present joint work with Dan Lee (CUNY) constructing such filling manifolds explicitly and proving the conjecture in the rotationally symmetric case. We also discuss sequences of manifolds approaching equality in the Penrose Inequality, techniques that can be used to control the intrinsic flat distance, key examples in the nonrotationally symmetric case and open problems related to the conjecture stated above. // Ben ChowÂ (Mathematics, UC San Diego), Some estimates for gradient Ricci solitons. (No abstract available) // Lars AnderssonÂ (Max Planck Institute, Harvard Mathematics), The black hole stability problem. (No abstract available) // Bill MinicozziÂ (Mathematics, Johns Hopkins), Singularities and dynamics of Mean Curvature Flow. (No abstract available) //

Links:
http://www.math.washington.edu/~lee/PNGS/2011-spring/