Geometry and topology seminar

Dr. Heberto del Rio
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will speak on

The Yamabe problem for almost Hermitian manifolds

Abstract:
The conformal class of a Hermitian metric g on a closed almost complex manifold (M^{2m}, J) consists entirely of metric that are Hermitian with respect to J. For each one of these metrics, we may define a J-twisted version of the Ricci curvature, the J-Ricci curvature, and its corresponding trace, the J-scalar curvature s^J. We ask if the conformal class of g carries a metric with constant s^J, an almost Hermitian version of the usual Yamabe problem posed fot the scalar curvature s. We answer our question in the affirmative. In fact, we show that $(2m-1)s^J - s = 2(2m-1)W(\omega, \omega)$, where W is the Weyl tensor and ω is the fundamental form of g. Using techniques developed for the solution for the problem for s, we construct an almost Hermitian Yamabe functional and its corresponding conformal invariant. This invariant is bounded from above by a constant that only depends on the dimension of M, and when it is strictly less than this bound, the problem has a solution that minimizes the almost complex Yamabe functional. By the relation above, we see that when $W(\omega, \omega)$ is negative at a least one point, or identically zero, our problem has a solution that minimizes the almost Hermitian Yamabe functional, and the universal bound is reached only in the case of the standard 6-sphere $\mathbb{S}^6$ equipped with a suitable almost complex structure. When $W(\omega, \omega)$ is non-negative and not identically zero, we prove that the conformal invariant is strictly less than the universal bound, thus solving the problem for this type of manifolds as well.

Friday, October 4th, 11:30am
DM 163.
See: http://www.fiu.edu/~ lenesst/GTop/GTop.htm for details