

Speaker: **Calegari, Danny**

Title: *Bounded cochains on 3-manifolds*

Authors: Danny Calegari

Affiliations: California Institute of Technology

Abstract: We study the large-scale geometry of 3-manifolds whose fundamental groups admit 1-cochains with certain geometric properties, as an intermediate step towards the geometrization conjecture.

An unbounded 1-cochain with bounded coboundary is *weakly uniform* if the coarse level sets are coarsely connected, and *uniform* if the coarse level sets are coarsely connected and coarsely simply connected.

Theorem 1. A 1-cochain on a 3-manifold is weakly uniform iff it is uniform.

This theorem is a coarse analogue of Stallings fibration theorem, and Novikov's theorem about taut foliations; it may also be thought of as a kind of "coarse Scott core theorem".

Theorem 2: If M admits a uniform 1-cochain, then either M is homotopic to a Seifert fibered or solv manifold, or contains a reducing torus, or the fundamental group is word-hyperbolic. Moreover in the last case, there is a precise quasi-isometric model for the universal cover of M , analogous to a singular solv metric, and a dynamical system which conjecturally should produce a hyperbolic structure on M .

This theorem shows that such manifolds M are good generalizations of manifolds which fiber or slither over the circle, and have a similar associated "pseudo Anosov package".