Massachusetts Institute of Technology
Department of Mathematics

LUNCH SEMINAR FOR GRADUATE STUDENTS

Monday, October 29, 2012
12:00 - 1:00 PM Room 2-143

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"Singularities and dynamics of mean curvature flow"

Abstract

The classical heat equation describes how a temperature distribution changes in time. Over time, the temperature spreads itself out more and more evenly and, as time goes to infinity, the temperature goes to a steady-state equilibrium. There are a number of geometric heat equations, where some geometric quantity evolves over time and - in the best case — approaches an equilibrium. A simple example is the curve shortening flow where a curve in the plane evolves to minimize its length, but other examples include the Ricci flow and the mean curvature flow. All of these flows behave like the classical heat equation for a short amount of time, but they are nonlinear and these nonlinearities dominate over longer time intervals leading to many new phenomena.

I will give a brief introduction to mean curvature flow (MCF) of hypersurfaces and survey recent progress with Toby Colding on the dynamics of mean curvature flow near a singularity. MCF is a nonlinear heat equation where the hypersurface evolves to minimize its surface area and the major problem is to understand the possible singularities of the flow and the behavior of the flow near a singularity.

Followed by pizza in room 2-290