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Isoperimetry and Viscosity Solutions in Geometric Evolution Equations

This talk will focus on studying geometric evolution equations through isoperimetric quantities. Such quantities are by their nature extrema, which makes them non-smooth in general. However, a degree of regularity remains and the appropriate tool here appears to be the use of viscosity equations. These have been well studied in the context of the closely related Hamilton–Jacobi equation. A particularly relevant technique for studying geometric evolution equations this way (and more generally), originating with Huisken in this context, is to extract as much information as possible from the full Hessian. I will illustrate this idea by describing joint work with Ben Andrews, extending Huisken's distance comparison theorem for the curve shortening flow in the plane. Time permitting, I will also discuss a sort of higher dimensional analogue—non-collapsing—for mean curvature flow and its relationship to minimal and CMC surfaces, in particular leading to Brendle's recent proof of the Lawson conjecture for embedded tori in the three-sphere.