

**Meeting:** 1002, Pittsburgh, Pennsylvania, SS 15A, Special Session on PDE-Based Methods in Imaging and Vision

1002-35-112      **John B Greer\*** ([greer@cims.nyu.edu](mailto:greer@cims.nyu.edu)), Courant Institute of Mathematical Sciences, 251 Mercer St., New York, NY 10012-1185. *Fourth order diffusions for image processing.*

A number of fourth order diffusion equations have recently been introduced for image smoothing and denoising. Although numerical implementations of these methods produce impressive results, very little is known about the mathematical properties of the equations themselves. I will discuss some of the first results regarding a few of these nonlinear diffusions. In particular, I will describe the use of energy methods to prove the well-posedness of a class of  $H^1$  diffusions for image processing, including the ‘Low Curvature Image Simplifier’ (LCIS) equation of Tumblin and Turk (SIGGRAPH, August, 1999). I will demonstrate implementations of a new finite difference discretization of the LCIS equation that ensures the discrete Laplacian of the image intensity remains bounded. These results will be compared to second order methods such as the Perona-Malik equation and Total Variation flow. (Received September 09, 2004)