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*Geometric applications of monotone entropy quantities for parabolic PDE.*

I will discuss monotonic entropy quantities for solutions to a number of parabolic PDE, drawn from the work of Perelman, Hamilton, Chow, Ni, and others, and their (in cases, spectacularly successful!) application to geometric problems. I will also describe the fundamental relationship of these quantities to Li-Yau-type pointwise differential Harnack inequalities, and further explore this connection in the development of a new entropy formula for a nonlinear analog of the heat equation in joint work with Lei Ni. (Received February 17, 2009)