1086-VL-2776 **Holly Timme*** (htimme@vt.edu), Virginia Tech, Department of Mathematics, 460 McBryde Hall, Blacksburg, VA 24061. *Modeling the curvature of a fluid interface using the height function method.* Preliminary report.

Fluid interface properties are typically computed numerically within the framework of a PDE solution method. Volume of Fluid (VOF) is a simple finite-difference based method that exhibits excellent volume-conserving properties of the fluid. Within this framework, however, differential properties such as the normal and curvature of the interface are poorly computed. Recently, the use of a local integral property, or "height function," has been shown to allow more accurate curvature computation within VOF for some interface configurations. The height function (HF) method is a technique for estimating interface normals and curvatures from well-resolved volume fraction data that shows second-order convergence with grid refinement. In this presentation, we use HF to approximate the geometrical properties of an elliptical interface and analyze the errors that result for arbitrary curvatures and orientations with respect to a wide range of grids. We demonstrate that HF's best results occur when the interface curvature is weak and its orientation aligns with one of the underlying computational grid directions. Finally, we examine the impact of the height function method in two-dimensional simulations of ferrofluids in an imposed uniform magnetic field. (Received September 25, 2012)