1077-VG-2061 **Zachary M Harrison*** (zharris1@asu.edu), 5135 E. Evergreen St. Unit 1215, Mesa, AZ 85205, and **Peter Derek Bradshaw**. *A Generalization of Contour Advection with Surgery for Three Dimensional Flows.* Preliminary report.

In this talk, I will present a new algorithm based on Contour Advection with Surgery (CAS) for analyzing flow fields in three dimensional space. CAS is a Lagrangian method that simulates the evolution in time of selected contours that are stirred by a moving fluid. This method is excellent for resolving small scale structures that develop in these contours, even when the velocity fields used for advection are finitely resolved. This adaptive method is based on constantly refining a given contour by adding new nodes or particles to the contour or removing old nodes depending on the local curvature of the contour. The main result revealed in this presentation is the generalization of this method to three dimensions. For this purpose, a new algorithm using a new interpolation scheme was developed to maintain the high resolution of the contours based on the continuity of curvature in three dimensions. I will first show how this new computational method works, then I will give examples of applications of this method in an ideal flow and in a real atmospheric flow. (Received September 22, 2011)