Paul M. Alsing, Howard A. Blair, Matthew Corne* (cornem@uwstout.edu), Gordon Jones, Warner A. Miller, Konstantin Mischaikow and Vidit Nanda. Topological Signatures of Singularities in Ricci Flow.

We apply the methods of persistent homology to investigate singularity formation in a selection of geometries evolved numerically by Ricci flow. To implement persistent homology, we construct a triangular mesh for a sample of points. The scalar curvature along the edges of the triangulation, computed as an average of scalar curvatures at the endpoints of the edges, serves as a filtration parameter at each time step. We analyze the characterization of geometric criticality obtained from the application of persistent homology to a two–dimensional rotational solid that collapses and three–dimensional dumbbells that manifest neckpinch singularities under Ricci flow. Finally, we discuss the interpretation and implication of these results and future applications. (Received September 21, 2015)