1154-92-2771 **Megan J Chambers*** (mjchambe@ncsu.edu). *Topological Data Analysis on Murine Pulmonary Arterial Networks Under Hypoxia-Induced Pulmonary Hypertension.*

From micro-CT images of the lungs of mice, one can observe that the pulmonary arterial network forms a rapidly branching structure. Using image analysis software, such as 3D Slicer and DGTal, spatial graphs $G = (N, E)$ were extracted from images of control mice and mice with hypoxia-induced pulmonary hypertension. These graphs include the (x, y, z) coordinates of terminal and junction nodes (N) and edges between nodes (E), as well as radii of the vessels. While it is apparent that these graphs are branching trees, their exact topological and geometric structure varies widely due to experimental conditions, parameters set during the segmentation process, and presence of hypertension. Recently, topological data analysis (TDA) has emerged as a useful tool for detecting structural differences in data. By viewing a data set as a topological object, persistent homology can be computed and provide insight into the structure of the data. Regarding the networks in this study, we ask two questions: can TDA on pulmonary arterial networks distinguish control and hypertensive mice? And what, if anything, can persistent homology tell us about the space-filling properties of the vasculature? (Received September 17, 2019)