1146-92-511 **Yu-Min Chung***, 116 Petty Building, PO. Box 26170, Greensboro, NC 27402, and **Sarah Day** and **Madalena Costa**. *Topological data analysis, roughness, and human red blood cells.* Preliminary report.

Human red blood cells (RBCs) exhibit spontaneous vibratory motions, referred to as flickering. Previous work using measurements of cell roughness as well as detrended fluctuation analysis and multiscale entropy methods has shown that the short-term flickering motions of RBCs exhibit complex structure and dynamics over multiple spatial and time scales. In addition, these properties (both roughness and temporal complexity) have been shown to degrade with age or disease such that older or diseased cells show significantly less roughness and temporal complexity than newly-formed and healthy cells. However, analyzing time series of spatial patterns is a challenging problem. One difficulty is to quantify spatial patterns. In this work, we study spatial patterns of RBCs using persistent homology. We aim to measure topological features of flickering depicted in the phase contrast microscopy images. We explore the information in persistence diagrams, and find that short lifespan generators, which are commonly considered to be noise, also reveal useful information. In particular, the distribution of generators in persistence diagrams plays an essential role in classifying the cells by functional age. (Received January 29, 2019)