1163-92-1148 **Laura S Storch*** (laura.storch@oregonstate.edu), Corvallis, OR 97331, and **Sarah L Day**.

A topological data analysis approach to understanding critical transitions in spatially explicit populations.

Understanding and predicting critical transitions in spatially extended populations is challenging, both due to the high dimensionality of the systems and complexity of their dynamics. Here, we track dynamical changes in a spatially extended population by observing and quantifying changes in the population distribution patterns through a critical transition. In these studies, the critical transition is a system parameter shift that leads to a global extinction event. We use a simple density-dependent coupled patch model with Ricker map growth on a 2D lattice to create population distribution patterns. Using topological data analysis to quantify the spatial patterns, we calculate Betti numbers, which count certain topological features in a topological space. We find that the change in Betti numbers (corresponding with the change in spatial patterns) en route to a critical transition depends on the time scale of the changing system parameter driving said critical transition. We explore the relationship between changing Betti numbers and the time scale of the parameter drift. We hope to use this technique on spatially explicit ecological data sets and/or GIS/satellite imaging time series. (Received September 14, 2020)