1125-55-958 **Thomas Wanner*** (`twanner@gmu.edu`), Department of Mathematical Sciences, George Mason University, Fairfax, VA 22030. *Topological Microstructure Analysis Using Persistence Landscapes.*

Phase separation mechanisms can produce a variety of intricate microstructures, which often are difficult to characterize in a quantitative way. In recent years, a number of novel topological metrics for microstructures have been proposed, which measure essential connectivity information and are based on techniques from algebraic topology. Such metrics are inherently computable using computational homology and provide a significant data reduction, passing from complicated patterns to discrete information. It is therefore natural to wonder what type of information is actually retained by the topology. In this talk, we show that averaged persistence landscapes can be used to recover central system information in the Cahn-Hilliard theory of phase separation. More precisely, we show that topological information of evolving microstructures alone suffices to accurately detect both concentration information and the actual decomposition stage of a data snapshot. Considering that persistent homology only measures discrete connectivity information, regardless of the size of the topological features, these results indicate that the system parameters in a phase separation process affect the topology considerably more than anticipated. (Joint work with Pawel Dlotko.) (Received September 13, 2016)