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The rising STAR *of Texas*

Texas State Topology Seminar

Thursday, 2018, November 8, 2:00-3:15 p.m., in DERR 227
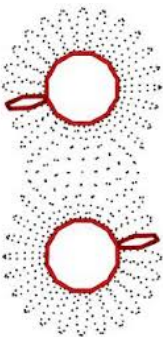
Speaker: Melissa McGuirl (Brown University)

Topic: *A Topological Study of Spatio-temporal Pattern Formation*

ABSTRACT

 Spatio-temporal pattern formation appears in a range of natural applications, from Rayleigh–Benard convection to vegetation patches. Many dynamical system models have been created and analyzed to better understand the evolution of these patterns. In this talk, we will see how methods from topological data analysis can be applied to study evolutionary properties of pattern formation. In particular, through the lens of persistent homology, we will study an agent-based model for pattern formation on zebrafish and the Rossler system for the study of spiral wave patterns. Topological properties of these spatio-temporal patterns will be used for classification and stability analyses. This work provides exciting insights into the utility of topological data analysis for the study of dynamical systems and pattern formation.