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**Rachel A. Neville\*** (neville@math.colostate.edu), **Patrick Shipman**, **Mark Bradley**,  
**Francis Motta** and **Daniel Pearson**. *Topological Measure of Order on Lattice Patterns*.

Pattern forming systems can give rise to perfect or near perfect lattice patterns. For instance, bombarding a binary surface with a broad ion beam can lead to hexagonal arrays of nanodots. It is necessary to be able to measure the degree of order present in a pattern to identify not only variation in the pattern, but also defects. With D. Pearson, M. Bradley, F. Motta, and P. Shipman, we propose a topological method relying on persistent homology to measure the degree of order present in a pattern. There are several standard methods of measuring order using Fourier methods, the autocorrelation function and a nearest neighbor measure. We will compare these methods with our topological method for various lattice patterns. (Received September 20, 2016)