1173-55-206 **Woojin Kim*** (woojin@math.duke.edu) and **Facundo Mémoli** (facundo.memoli@gmail.com).

Persistent Cluster Analysis in Dynamic Data via Möbius Inversion.

Identifying and representing *clusters* in time-varying network data is of particular importance when studying collective behaviors emerging in nature, in mobile device networks or in social networks. For achieving this goal, we exploit the lattice structure underlying the set of (sub)partitions of a given space together with the notion of Möbius inversion. We first construct a summary of a given time-varying network over a set of entities X of which takes the form of a *formigram*. This formigram can be understood as a certain Reeb graph $\mathcal{R}$ that is labeled by subsets of X. By applying Möbius inversion to the formigram in two different manners, we obtain two dual notions of diagram: the *maximal group diagram* and the *persistence clustergram*. Whereas the maximal group diagram encodes all *maximal groups*, a notion introduced by Buchin et al., the persistence clustergram is an "annotated" version of the zigzag barcode of the Reeb graph $\mathcal{R}$. It turns out that both diagrams are complete invariants of formigrams. We also study the stability of these and other invariants via ideas related to interleaving and Gromov-Hausdorff distances. (Received September 20, 2021)