Woojin Kim* (kim.5235@osu.edu) and Facundo Méndoli. Spatio-temporal persistent homology for dynamic metric spaces.

We study the problem of characterizing the time evolution of dynamic metric spaces within the framework of topological data analysis. Popular instances of dynamic metric spaces include flocking/swarming behaviors in animals and social networks in the human sphere. We will discuss (1) how to induce multiparameter persistent homology as a topological summary of dynamic metric spaces, and (2) how to express the stability of this summarization process. In order to address stability, we define a new distance between dynamic metric spaces which extends the standard Gromov-Hausdorff distance on metric spaces. Also, we propose poly-time algorithms for the classification of dynamic metric spaces. A preprint with these results is available on https://arxiv.org/abs/1812.00949. Some demos are available in https://research.math.osu.edu/networks/formigrams/. (Received September 05, 2019)