1176-51-59   **Tom Needham** and **Thomas Weighill*** (`t_weighill@uncg.edu`). *Geometric averages of redistricting plans and clustered datasets.*

We introduce a method for jointly registering ensembles of partitioned datasets in a way which is both geometrically coherent and partition-aware. Once such a registration has been defined, one can group partition blocks across datasets in order to extract summary statistics, generalizing the commonly used order statistics for scalar-valued data. By modeling a partitioned dataset as an unordered k-tuple of points in a Wasserstein space, we are able to draw from techniques in optimal transport. Our method is demonstrated on ensembles of political redistricting plans to extract and visualize basic properties of the space of plans for a particular state, using North Carolina as our main example. We also show the potential for broader applications using an analysis of clustering methods on point cloud data. (Received January 11, 2022)