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James N. Damon and **Ellen K. Gasparovic*** (ellen@math.duke.edu). *Positional geometry of multi-object configurations from skeletal linking structures.*

We introduce “medial/skeletal linking structures” for configurations of multiple objects, which build upon the individual skeletal structures of the objects in a minimal way, and which enable us to analyze the “positional geometry” of the configuration along with the shapes of the individual objects. We use the skeletal linking structure to introduce and compute volumetric invariants of the positional geometry of the collection, which include measures of relative closeness and relative significance of the individual objects. The invariants are computed via “skeletal linking integrals” computed directly on the skeletal sets, and we use them to construct a “tiered linking graph.” When given thresholds of closeness and significance are applied to this graph, they yield subgraph(s) identifying subconfigurations and provide a hierarchical ordering of the objects. (Received September 15, 2013)