1100-62-135 **Sebastian Kurtek*** (kurtek.1@stat.osu.edu), 1958 Neil Avenue, 404 Cockins Hall, Columbus, OH 43082, and **Qian Xie**, **Ian H Jermyn** and **Anuj Srivastava**. *Elastic Statistical Shape Analysis of 3D Objects Using Square Root Normal Fields.*

We present a comprehensive Riemannian framework for statistical shape analysis of 3D objects represented by their boundaries, which form parameterized surfaces. This framework provides tools for registration, comparison, averaging, summarizing variability, and statistical modeling of shapes. It is based on a special representation of surfaces called square root normal fields (SRNFs) and a related elastic Riemannian metric. The main advantages of this method are: (1) the elastic metric provides an intuitive interpretation of shape deformations that are being quantified, (2) this metric is invariant to re-parameterizations of surfaces, and (3) under the SRNF representation, the complicated elastic metric becomes the standard L2 metric, simplifying parts of the implementation. We present numerous examples of shape comparisons for various types of surfaces in different application areas including medical imaging and graphics. We also compute shape averages, covariances and perform principal component analysis. These quantities can then used to define generative models on the shape space and for random sampling. (Received February 05, 2014)