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**Title: Analysing spatial point patterns on curved surfaces**

**Abstract:**
The development of statistical methods designed for analysing spatial point patterns has typically focused on Euclidean data and planar surfaces. However, with recent advances in 3D biological imaging technologies targeting protein molecules on a cell's plasma membrane, spatial point patterns are now being observed on complex shapes and manifolds whose geometry must be respected for principled inference. Consequently, there is now a demand for tools that can analyse these data for important scientific studies in cellular and micro-biology. For this purpose, we extend the functional summary statistics for point patterns to general convex bounded shapes. Using the Mapping Theorem, a Poisson process can be transformed from any convex shape to a Poisson process on the unit sphere where it's rotational symmetry can be exploited, and existing methods leveraged. We present the first and second order properties of these summary statistics and demonstrate how they can be used to construct test statistics to determine whether an observed pattern exhibits complete spatial randomness on the original convex space. This will be followed by the multivariate extension and a test for independence of component processes, including the development of a necessary plug-in estimator for the intensity of a spatial point process on a manifold.