

The identification and description of point sources is one of the oldest problems in astronomy; yet, even today the correct statistical treatment for point sources remains one of the field's hardest problems. For dim or crowded sources, likelihood based inference methods are required to estimate the uncertainty on the characteristics of the source population. I will present a new approach to this problem, that is derived directly from first principles using Compound Poisson Generator (CPG) functionals. In a head-to-head comparison against an existing method known as Non-Poissonian Template Fitting (NPTF), I will show that the CPG method outperforms NPTF in the experimentally challenging context of X-ray astronomy. In addition, I will discuss the choice of priors commonly used in this field, and how they can lead to unexpected outcomes if not considered carefully.