Persistent homology is a central tool in topological data analysis. It describes various structures such as components, holes, voids, etc. via a barcode (or a persistence diagram), with longer bars representing “real” structure and shorter bars representing “noise.” A natural question is how long are the bars we can expect to see from data with no structure, i.e. noise. In this talk, I will introduce some recent results regarding the persistent homology of random processes, specifically, a homogeneous Poisson process. Only an understanding of basic probability will be assumed, with the required topological and probabilistic methods introduced as needed.