

Where's the Matter?

(Tails from the Milky Way's destructive past)

A major accomplishment for large scale stellar surveys of the Milky Way has been the discovery of a multitude of debris structures from dead and dying satellites encircling our Galaxy. These structures unequivocally demonstrate the Milky Way's cannibalistic history, in agreement with our understanding of how structure formation proceeds in the Universe more generally. They also delve deep into our dark matter halo and provide invaluable probes of its mass distribution. This idea is particularly interesting at the moment with the prospect of significant improvements to the quantity, quality and dimensionality of stellar data sets that map debris. Recently, there has been renewed vigor in developing and testing techniques that can use this data to place rigorous constraints on the large-scale structure of our dark matter halo. While the Milky Way is "just one galaxy" it is the only one where we can hope to measure the 3-dimensional structure of a dark matter halo - not just the overall mass, but the shape, orientation and density as a function of radius. In this talk I will describe the properties that make debris structures such effective potential probes and outline the observational and analytical efforts being made to exploit these properties and pin down exactly where the matter is around our Galaxy.

Kathryn V Johnston
Professor & Chair of Astronomy
Columbia University