Title: Higher-order Transversality in Fourier Analysis

Abstract: In modern Fourier analysis, there is a ubiquity of operators whose functional-analytic properties depend on the geometric properties of an underlying submanifold, such as Fourier extension operators or Radon-like transforms, for example. In the analysis of the boundedness of such operators, it is often useful to employ a linear to multilinear reduction so that one may appeal to a multilinearised version of the linear estimate one would like to obtain. These multilinear estimates usually require that the submanifolds involved are uniformly transversal in some suitable sense, however, standard linear algebra tools are sometimes insufficient to capture an appropriately general notion of transversality for the estimates in which we are interested. Brascamp–Lieb inequalities offer a robust framework for understanding higher-order transversality in a manner that is well-suited to applications in Fourier analysis. In my talk, I shall introduce the notion of a Brascamp–Lieb inequality, describe the broader role they play in the subject, and discuss the topic of nonlinear Brascamp–Lieb inequalities, a recent variant that generalises this framework to the manifold setting.