Abstracts

Lillian Pierce: Spheres and squares, sums and differences

Abstract: This series will invite participants into the beautiful world of the circle method. This method, which combines both arithmetic and analytic insights, originated 100 years ago in work of Hardy and Ramanujan, in their study of the partition function. It was then more fully developed by Hardy and Littlewood in the study of Waring's problem, which asks how many ways a given large integer may be expressed as a sum of s perfect k-th powers. We will introduce the mechanics of the circle method in the setting of Waring's problem. Then we will explore the circle method in the context of Ramsey Theory via this question: how big can a set of positive integers become before it is forced to contain two elements whose difference is a perfect square?

Trevor Wooley: Aspects of exponential sums and their mean values

Abstract: I plan to talk about (a) Vinogradov's mean value theorem and its relatives; (b) paucity problems associated with diagonal Diophantine equations; (c) Estimates of Weyl, Vinogradov and beyond; (d) optimal estimates beyond Vinogradov's systems.