Algebra Seminar

The coefficients of q-series and asymptotics for partition ranks and cranks

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Abstract: Dyson's rank and crank statistics have long been important in the combinatorial study of integer partitions. Both statistics were introduced in efforts to better understand the famous Ramanujan congruences for the partition function $p(n)$, and there is no apparent relation between their simple combinatorial definitions. The main results of this talk (essentially) prove a remarkable conjecture of Garvan that the moments of the crank are always larger than the moments of the rank.

More generally, these inequalities are an important example of relations for the asymptotics of hypergeometric q-series that are governed by modularity properties. In this case, the crank is associated to a modular form, while the rank is associated to a mock theta function/harmonic Maass form. If time permits, I will also briefly discuss some ideas of Zagier for deriving asymptotic expansions in these settings.

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Mathematics and Science Center: W303

Mathematics and Computer Science
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