Grothendieck's inequality and the propeller conjecture

Date Tuesday, February 7

Time 4:30 pm **please note the unusual time!!!**

Location 317 Mudd

Abstract: We will start with a description of the classical Grothendieck inequality, and the corresponding Grothendieck constant. We will then indicate a few of the numerous applications of the Grothendieck inequality, and review the work on the problem of estimating the Grothendieck constant. In particular, we will describe the 1977 Krivine conjecture on the exact value of the Grothendieck constant, and a related conjecture of Koenig, on maximizers of a certain oscillatory kernel, that was made as a step towards proving the Krivine conjecture. The main new result that we will discuss is the solution of Krivine's conjecture (joint with M. Braverman, K. Makarychev and Y. Makarychev). While Krivine asked for a specific counter example showing that his bound is sharp, we will obtain an improved Grothendieck inequality for all matrices, showing that the Grothendieck constant is strictly smaller than Krivine's bound. The new analytic contribution here is establishing the usefulness of higher dimensional rounding schemes, and we will discuss their impact on approximation algorithms. We will also discuss recent works (one joint with Khot and the other joint with Heilman and Jagannath) on a useful extension of the Grothendieck inequality that relates to an isoperimetric problem called the propeller conjecture. This conjecture has been recently proved in R^3.

1