The SUMO Speaker Series for Undergraduates

Thursday, January 31st

4:15-5:05, room 380C

(Food Provided)

The Fifteen Theorem

Professor Kannan Soundararajan

$$10 = 1^2 + 1^2 + 2^2 + 2^2$$

$$103 = 2^2 + 3^2 + 3^2 + 9^2$$

$$312 = 2^2 + 4^2 + 6^2 + 16^2$$

ABSTRACT:

In 1770 Lagrange showed that every natural number is the sum of four squares. In 1916 Ramanujan produced a number of other examples of quadratic forms that represent all natural numbers. For example, every number may be written as x^2 + y^2 + 2(z^2+w^2) or as x^2 + y^2 + z^2 + 7w^2. In 1993 Conway and Schneeberger gave a beautiful criterion to determine whether a positive definite quadratic form with integer matrix (these terms will be explained in the talk) represents all natural numbers. Namely, it represents all natural numbers if it represents all the numbers up to fifteen. I will explain some of the ideas behind Manjul Bhargava's proof, published in 2000, of the Fifteen Theorem.

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