Now I am become Death, the destroyer of worlds.

—J. Robert Oppenheimer

THE TRIVIAL NOTIONS SEMINAR

Kush Singhal

will speak on

How many integer solutions are there to $2x^2 + 2y^2 + 2z^2 + x = 190$?

ABSTRACT

While this question could be carried out manually by simply enumerating all possibilities, this is quite boring. A more fun way to answer this question is to use a nuclear bomb (modern number theoretic techniques) to kill this ant (a simple Diophantine equation). In this talk, our nuclear arsenal will consist of the theory of modular forms, and the p-adic properties of arithmetic lattices. The theory of modular forms provides a powerful yet simple tool to study interesting arithmetic sequences. In particular, theta functions of quadratic forms allow us to quickly calculate the number of solutions to certain quadratic Diophantine equations. It turns out that p-adic properties of arithmetic lattices yield interesting identities involving theta functions, which then give us remarkable elementary formulae for the number of solutions to certain quadratic Diophantine equations. These results vastly generalize some of Gauss' work on the number of representations of an integer as a sum of three squares.

Friday, October 7, 2022
at 12pm
Science Center, Room 232