

# Colloquium

University of Notre Dame  
Department of Mathematics

**Speaker:** Russell Miller

Queens College---City University of New York

**Will give a lecture entitled**

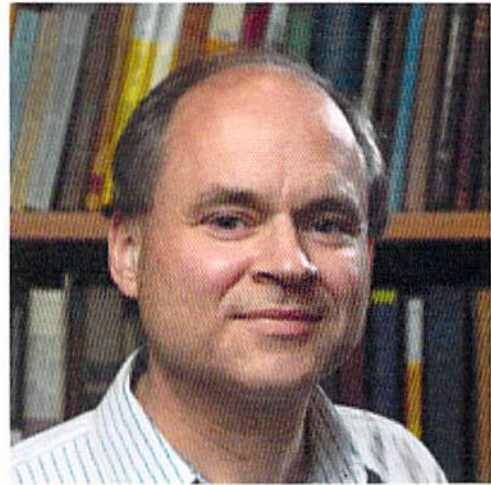
Hilbert's Tenth Problem for Subrings of the Rational Numbers

**Date:** Wednesday, February 27, 2019

**Time:** 4:00 PM

**Location:** 129 Hayes-Healy Hall

**Departmental Tea:** Tea in Room 257 (lounge in Hurley Hall) at 3:30 p.m.



**Abstract:**

Hilbert's original Tenth Problem demanded an algorithm that decides, for an arbitrary diophantine equation in arbitrarily many variables over  $\mathbb{Z}$ , whether there exists an integer solution to that equation. In 1970, in a triumph of computability theory, Matiyasevich completed work by Davis, Putnam, and Robinson, showing that there is no such algorithm. That being the case, attention shifted to the question of whether such an equation has a rational solution. It remains open whether an algorithm exists for deciding this question. In this talk, after introducing Hilbert's Tenth Problem and its history, we will discuss it not just for the rational numbers, but for arbitrary subrings of  $\mathbb{Q}$ . These subrings form a topological space, with a form of Lebesgue measure and also with the property of Baire, and one can therefore ask whether various properties of rings (usually involving HTP) hold on a small or a large class of the subrings of  $\mathbb{Q}$ . Potentially the answers about the sizes of these classes of subrings might lead to an answer regarding  $\mathbb{Q}$  itself.