Colloquium

September 27, 4:05 p.m. (9th Period)
(in the Atrium)

**Speaker**: Dr. Paul Robinson

**Title**: Divergent Series

**Abstract**

Euler routinely manipulated divergent series and assigned numerical 'sums' to them: the examples

\[ 1 - 1 + 1 - 1 + ... = 1/2 \]
\[ 1 - 2 + 3 - 4 + ... = 1/4 \]

are perhaps familiar. Surprisingly, such 'insane' manipulations often resulted in perfectly 'sane' outcomes: for instance, they essentially led Euler to the functional equation for the Riemann zeta-function more than a century ahead of Riemann himself. Somewhat reluctantly, Cauchy and Abel banished divergent series in the early nineteenth century; in the late nineteenth century, they were welcomed back by Stieltjes and Poincare, among others. In the early twentieth century, the analysis of divergent series was largely responsible for one of the most famous mathematical collaborations: that between Hardy and Littlewood.

In this talk, we shall briefly outline some of the theory of divergent series; along the way, we shall indicate how it is possible to make perfect sense of the apparent nonsense.