



Pacific Institute for the
Mathematical Sciences

PIMS Distinguished Speakers Series

GREG MARTIN

Professor, University of British Columbia



Title: Statistics of the multiplicative group

Abstract: For every positive integer n , the quotient ring $\mathbb{Z}/n\mathbb{Z}$ is the natural ring whose additive group is cyclic. The "multiplicative group modulo n " is the group of invertible elements of this ring, with the multiplication operation. As it turns out, many quantities of interest to number theorists can be interpreted as "statistics" of these multiplicative groups. For example, the cardinality of the multiplicative group modulo n is simply the Euler phi function of n ; also, the number of terms in the invariant factor composition of this group is closely related to the number of primes dividing n . Many of these statistics have known distributions when the integer n is "chosen at random" (the Euler phi function has a singular cumulative distribution, while the Erdos-Kac theorem tells us that the number of prime divisors follows an asymptotically normal distribution). Therefore this family of groups provides a convenient excuse for examining several famous number theory results and open problems. We shall describe how we know, given the factorization of n , the exact structure of the multiplicative group modulo n , and go on to outline the connections to these classical statistical problems in multiplicative number theory.

Bio: Greg Martin is a Professor at the University of British Columbia. He obtained his PhD from the University of Michigan in 1997. His area of research is primarily in analytic number theory but he also has research interests in other fields such as: Diophantine equations and approximations, linear algebra, special functions, geometry, game theory, and more recently in history and sociology of mathematics. He is the recipient of several awards: Lester R. Ford Prizes (2002 and 2007) and UBC Faculty of Science Killam Teaching Prize (2007). In his spare time, he is actively involved in swing dancing, and he is a member of the internationally known choir Chor Leoni.

Wednesday– April 27, 2016

12:00 to 12:50 pm

UHall D634

Light refreshments