

# BI-CO MATHEMATICS COLLOQUIUM

*Joint with Philadelphia Area  
Number Theory Seminar*

**Robert J. Lemke Oliver**

Tufts University

*“Prime Numbers, Randomness, and  
The Gambler’s Fallacy”*

**Monday, February 13, 2017**

Talk at 4:00 – Park 338  
Tea at 3:30 – Park 355, Math Lounge

**Abstract:**

Prime numbers are often said to be “random”, but, given that primes are deterministic, what does that actually mean? One way in which this randomness manifests is in the last digits of primes: it turns out that each possible last digit is equally likely in a certain strong sense. A similar story holds for the residue class of primes modulo any fixed integer, and this is a well-understood classical theorem of analytic number theory. Surprisingly, however, in joint work with K. Soundararajan, we find that an analogous phenomenon does not hold for patterns of consecutive primes. For example, a string of consecutive primes ending in the digit 1 strongly predisposes the following prime to not end in a 1; thus, prime numbers are subject to the gambler's fallacy. This talk will be aimed at the level of undergraduates, but should be satisfying to practicing number theorists as well.

**BRYN MAWR COLLEGE**