Speaker: Karl Dilcher, Dalhousie University, Halifax, Canada

Title: Heronian triangles, Gauss primes, and some linear recurrences

Abstract: We will see that certain sequences of Heronian triangles, that is, triangles with sides of integer length and with integer area, occur in an unexpected way in the study of some specific factorials. In particular, we will consider the multiplicative order of $((p-1)/4)!$ modulo a prime $p \equiv 1 \pmod 4$. The question of when this order can be a power of 2 leads to the concept of a "Gauss prime". Apart from explaining these various connections, I will derive some divisibility properties of the sequences in question.

Time allowing, I will also discuss factorials $((p-1)/3)!$ modulo primes $p \equiv 1 \pmod 6$, and generalizations of such factorials. Quite recently, a close relationship between "exceptional primes" in this setting and Iwasawa theory was established by M. Stokes in his Ph.D. thesis.

(Joint work with John B. Cosgrave, Dublin.)