

## Discrete Mathematics Seminar

Time: Friday, 5 February 2010, 12:00-1:00 PM

Room: 238 Derrick Hall

Title: Generalization of the Friendship Theorem

Speaker: Dr. Jian Shen, Mathematics Department

### ABSTRACT:

The Friendship theorem (M. Aigner, *Proofs from The Book*, Springer-Verlag, Berlin, 1999) states that if any two people in a party have exactly one common friend, then there exists a politician who is a friend of everybody.

In this talk, I will prove the following generalization of the Friendship Theorem. If every pair of strangers in a party has exactly one common friend, then either 1) there exists a politician who is a friend of everybody; or 2) everyone has exactly the same number of friends and every pair of friends has exactly the same number of common friends; or 3) there exist two numbers  $d$  and  $r$  such that each person has either exactly  $d$  friends or exactly  $r$  friends. (The corresponding graphs for Cases 2 and 3 are strongly regular graphs and bi-regular graphs, respectively.) If time permits, some open problems will be discussed.

This is joint work with E. Curtin, Y. Jiang, and R. Qiu.