

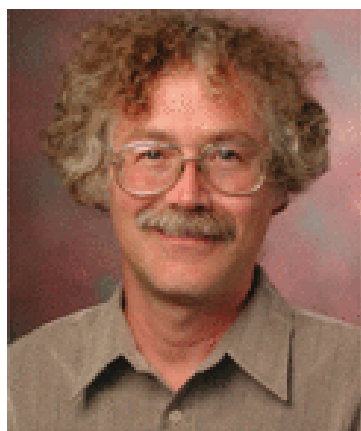
College of Arts and Sciences
Department of Mathematics
University of South Carolina

Math Colloquium

Special Colloquium and reception in honor of Jerry Griggs' retirement

Forbidden Configurations

Richard Anstee, The University of British Columbia



Friday
April
27th

Talk: 3:30 PM

LeConte 412

Reception: 4:30 PM

Wyman Williams
Lounge

Extremal Combinatorics asks how many sets (or other objects) can you have while satisfying some property (often the property of avoiding some structure). We encode a family of n subsets of elements $\{1,2,\dots,m\}$ using an element-subset $(0,1)$ -incidence matrix. A matrix is simple if it has no repeated columns. Given a $p \times q$ $(0,1)$ -matrix F , we say a $(0,1)$ -matrix A has F as a configuration if there is submatrix of A which is a row and column permutation of F . We then define our extremal function $\text{forb}(m,F)$ as the maximum number of columns of any m -rowed simple $(0,1)$ -matrix which does have F as a configuration.

Jerry was involved in some of the initial work on this problem and the construction that led to an attractive conjecture. Two recent results are discussed. One (with Salazar) concerns extending a $p \times q$ configuration F to a family of all possible $p \times q$ configurations G with F less than or equal to G (i.e. only the 1's matter). The conjecture does not extend to this setting but there are interesting connections to other extremal problems. The second (with Dawson, Lu and Sali) considers extending the extremal problem to $(0,1,2)$ -matrices. We consider a family of $(0,1,2)$ -matrices which appears to have behaviour analogous to $(0,1)$ -matrices. Ramsey type theorems are used and obtained.