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## **Discrete Mathematics Seminar**

Time: Friday, November 17, 2017, 2:15-3:15 PM  
Room: 237 Derrick Hall  
Title: Rank Symmetry in Lower Bruhat Intervals of Finite Coxeter Groups  
Speaker: Robert McAlmon, Graduate Student, Department of Mathematics, Texas State University

### Abstract:

A Coxeter group is a kind of group which can be generated by reflections. They are of particular interest because of their connections to combinatorics and algebraic geometry. Finite Coxeter groups include the symmetry groups of regular polytopes and the Weyl groups of semi-simple Lie algebras. A partial order on Coxeter groups, called the Bruhat order, characterizes inclusion of Schubert cells in Schubert varieties of flag manifolds. The Bruhat order extends to subgroups of Coxeter groups and their corresponding factor groups. Rank-symmetric lower intervals in the Bruhat order turn out to be the necessary and sufficient condition for rational smoothness in Schubert varieties, since their rank-generating function coincides with the Poincaré polynomial of the variety. In this talk, we discuss a result that characterizes the structure of lower Bruhat intervals based on rank-symmetry as well as its connection to hyperplane arrangements