Discrete Mathematics Seminar

Time: Friday, March 29, 2019, 2:15 - 3:15 PM
Location: 330 Derrick Hall
Title: Automorphisms of some finite $p$-groups
Speaker: Dr. Jeffrey Riedl, Department of Theoretical and Applied Mathematics, University of Akron

Abstract:

Group theory is the branch of mathematics that provides a framework for describing the structural symmetry of objects in mathematics and in the natural world. If $G$ is a group, then the set of all automorphisms of $G$ forms a group denoted $\text{Aut}(G)$ which encodes all the information about the internal symmetry of $G$ itself. Obtaining a full description of $\text{Aut}(G)$ is a difficult problem in general but one that is of interest to mathematicians. Suppose $G$ is a finite group that is a subgroup of a larger group $W$ whose automorphism group $\text{Aut}(W)$ is known. Let $N(G)$ and $C(G)$ denote the pair of subgroups of $\text{Aut}(W)$ consisting of respectively those automorphisms of $W$ that fix $G$ setwise and those that fix $G$ elementwise. The quotient group $N(G)/C(G)$ is naturally isomorphic to a subgroup of $\text{Aut}(G)$. If we can compute $N(G)$ and $C(G)$ we may capture new information about $\text{Aut}(G)$. For some finite $p$-groups $G$ and some carefully-chosen groups $W$, the quotient represents most or all of $\text{Aut}(G)$. We present results and discuss techniques related to this approach to the problem of describing $\text{Aut}(G)$.