# THE DEPARTMENT OF MATHEMATICS

$\mathfrak{F}_P(P) = \mathfrak{F}_P(G) \quad P \in Syl_p(G) \quad N = N_G(Z(J(P))),\ \mathfrak{F}_P(N) = \mathfrak{F}_P(G)$

# Algebra Seminar

Monday - September 11, 2017

***at 4pm, in the Alavi Commons, Everett Tower***

**Professor Clifton E. Ealy Jr.**

## ORGANIZATIONAL MEETING

This academic year the main thrust of the seminar will be Fusion Systems! But talks on other topics related to coding theory or algebraic geometry are welcomed. Historically, Fusion Systems arose in looking for conditions which tell us when a finite group, G, is not simple. For example, Burnside's Theorem: If **$P \in Syl_p(G)$ and P is a subgroup of $Z(N_G(P))$, then G has a normal subgroup, H, such that $G = H \rtimes P$.** Another example is Frobenius's Normal p-complement Theorem: **Let $P \in Syl_p(G)$. Then $G = H \rtimes P$ if and only if $N_G(S)$ has a normal p-complement for every non-identity p-subgroup S of G.** On the other hand, Frobenius's Theorem on Frobenius groups: **If G is transitive permutation group such that $G_{xy} = 1$ whenever $x \neq y$ and H is the set of fixed point free elements of G with 1 included, then H is a subgroup of G and $G = H \rtimes G_x$.**, played an important role in the development of Fusion Systems. So, the Seminar maybe viewed as a continuation of last years Algebra Seminar . The seminar in the main will be based on David Cravens text: *The Theory of Fusion Systems*. But other references are Aschbacher and Oliver paper "Fusion Systems", Bulletin of the AMS 10/2016; Aschbacher, Kessar, and Oliver's text: *Fusion Systems in Algebra and Topology;* and the text: *Finite Groups III,* Chapter 10, Local Finite Group Theory by Huppert & Blackburn. **All are welcomed.**

$\mathfrak{F}_P(P) = \mathfrak{F}_P(G) \quad P \in Syl_p(G) \quad N = N_G(Z(J(P))),\ \mathfrak{F}_P(N) = \mathfrak{F}_P(G)$

***W***ESTERN ***M***ICHIGAN ***U***NIVERSITY