



# Algebra/Topology Seminar

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## CONSTRUCTING AND CLASSIFYING FULLY IRREDUCIBLE OUTER AUTOMORPHISMS OF FREE GROUPS

Thursday, March 8, 2012

1:15 p.m. in ES-143

(tea & coffee at 12:45 p.m. in ES-152)

ABSTRACT. The main theorem of my thesis emulates, in the context of  $Out(F_r)$  theory, a mapping class group theorem (by H. Masur and J. Smillie) that determines precisely which index lists arise from pseudo-Anosov mapping classes. Since the ideal Whitehead graph gives a finer invariant in the analogous setting of a fully irreducible  $\phi \in Out(F_r)$ , we instead focus on determining which of the 21 connected 5-vertex graphs are ideal Whitehead graphs of a geometric, fully irreducible  $\phi \in Out(F_3)$ . Our main theorem accomplishes this. The methods we use for constructing fully irreducible  $\phi \in Out(F_r)$ , as well as our identification and decomposition techniques, can be used to extend our main theorem, as they are valid in any rank. Our methods of proof rely primarily on Bestvina-Feighn-Handel train track theory and the theory of attracting laminations.