

## **LOGIC SEMINAR**

**Guest Speaker: Ward Henson**  
**University of Illinois at Urbana Champaign**

**Date:** Tuesday, October 2, 2018

**Time:** 2:00 PM

**Location:** 125 Hayes-Healy Hall



**Lecture Title:**

**On the model theory of group actions on probability measure algebras**

**Abstract**

We treat such group actions using continuous model theory. For a finite or countable set  $S$ , let  $L_S$  be the continuous signature for probability measure algebras expanded by unary function symbols, one for each element of  $S$ . In this language, let  $T_S$  be the set of axioms for probability algebras (which we denote  $\text{Pr}$ ) together with conditions expressing that each of the unary function symbols is interpreted by an automorphism of the algebra. If  $G$  is a group generated by  $S$ , we consider the extension of  $T_S$  obtained by adding a condition for each word  $w$  on  $S$  that represents the identity in  $G$ , asserting that the composition of unary functions corresponding to  $w$  is the identity; denote this theory by  $T_S(G)$ . The main result to be discussed in this talk is that each  $T_S$  has a model companion  $T^*_S$ , for which we give explicit axioms; this model companion is complete and has quantifier elimination. Its models consist of very particular actions on atomless probability algebras by the free group generated by  $S$ . Expressing and justifying our axioms for  $T^*_S$  requires some information about the model theory of atomless probability algebras, which will be discussed in the first part of the talk. It is also true that when  $G$  is an amenable group, then  $T_S(G)$  has a model companion, which is very well behaved, but it will not be discussed much in this talk. (This is work in progress with Alex Berenstein; especially, we are aiming to understand the models of  $T^*_S$  better, when  $|S| > 1$ .)