Logic Seminar

UNIVERSITY OF NOTRE DAME
Department of Mathematics

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2:00 PM
125 Hayes-Healy Hall

Title: Limits to joining with generics and randoms

Abstract:

It is a fundamental theorem of computability theory that the Turing jump of a set A always has strictly greater Turing degree than A itself, i.e., deg(A) < deg(A'). Posner and Robinson showed that this need not hold when we add joins with non-computable sets: if S is non-computable, there exists a set G such that S join G computes G'. Shore and Slaman extended this result to all n, by showing that if S is not computable in 0^(n-1) then there exists a G such that S join G computes G^n. Both arguments are forcing arguments, but with very different underlying forcing notions. Posner and Robinson use Cohen forcing, and the set G in their result can consequently be chosen to be (Cohen) 1-generic. By contrast, Shore and Slaman use a more intricate forcing notion, due to Kumabe and Slaman, and it is natural to ask whether this is a necessary complication. I will talk about work with Adam Day in which we answer this question, in the following sense: for all n, the set G o!
f the Shore-Slaman theorem cannot be chosen to be even weakly 2-generic, and so certainly not n-generic if n > 1. Our result applies generally to many other forcing notions commonly used in computability theory. I will also mention a variant of our result, showing that the set G cannot be chosen to be 2-random.