

Speaker: **Desmond Cummins**
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Thursday, April 12, 2012
1:00 pm
125 Hayes-Healy Hall

Title: Computable properties of finitely generated decidable group presentations

Abstract:

For a finitely generated group presentation P , the three following questions are of interest. Is the word problem solvable for P , is the bounded word problem solvable for P , and is the Dehn function of P computable? It is straightforward to show that there does not exist a decidable finitely generated presentation for which the word problem is solvable, the bounded word problem is solvable, and the Dehn function is not computable. Similarly, there is no decidable finitely generated presentation for which the word problem is unsolvable, the bounded word problem is solvable, and the Dehn function is computable.

We will show that there exist examples of finitely generated decidable minimal group presentations that satisfy every remaining combination of solvability/unsolvability for these three questions. We will make use of a result by Birget, Rips, and Sapir, who proved that it is possible to construct finite group presentations that “simulate” Turing machines. Our methods will involve generalizing this result to construct finitely generated decidable minimal group presentations that simulate computational devices similar to oracle Turing machines.