

**Speaker:**     **Russell Miller**  
                  Queens College - CUNY

Thursday, March 22, 2013  
2:00 pm  
Room: TBA

**Title:** Fields and the Complexity of Computable Categoricity

**Abstract:**

Since the work of Ash, Knight, Manasse, and Slaman, relative computable categoricity has been known to be a  $\Sigma_3^0$ -complete property of (indices for) computable structures. Goncharov, Kudinov, and others gave examples where relative computable categoricity of a structure did not follow from its computable categoricity, and Walker White showed in 2003 that computable categoricity is  $\Pi_4^0$ -hard. More recent work has apparently established that in fact computable categoricity is  $\Pi_1^1$ -complete, which is far more complex; this work has not yet appeared, but the authors include Downey, Kach, Montalban, Turetsky, and others.

This talk will consider computable categoricity for algebraic fields. The main result here (joint with Hirschfeldt, Kramer, and Shlapentokh) is that in this context, computable categoricity is  $\Pi_4^0$ -complete. We will explain this result, and show its connection to a conjecture which, if true, would produce classes of structures for which computable categoricity has complexities ranging throughout the arithmetical hierarchy.