

***NC State Logic and Cognitive Science Lecture Series***

## **ON THE QUESTION OF ABSOLUTE UNDECIDABILITY**

**Peter Koellner  
Harvard University**

Thursday, November 3, 2005, 4:30 p.m.  
Winston Hall 122

*Anyone interested is welcome to attend.*

### **ABSTRACT**

The incompleteness theorems show that for every sufficiently strong consistent formal system of mathematics there are mathematical statements undecided *relative* to the system. A natural and intriguing question is whether there are mathematical statements that are in some sense *absolutely* undecidable, that is, undecidable relative to any set of axioms that are justified. Gödel was quick to point out that his original incompleteness theorems did not produce instances of absolute undecidability. However, in his subsequent work in set theory, he uncovered what he initially regarded as a plausible candidate for an absolutely undecidable statement and, furthermore, he expressed the hope that one might actually prove this. Eventually he came to reject this view and, moving to the other extreme, expressed the hope that there might be a generalized completeness theorem according to which there are no absolutely undecidable sentences.

The talk will begin with an examination of Gödel's (largely unpublished) views on absolute undecidability and related topics in the foundations of set theory. These views will then be sharpened and assessed in light of modern developments. This will involve a discussion of a cluster of results (largely due to Steel and Woodin) that together amount to a compelling case for new axioms. The talk will end by looking at the prospects of absolute undecidability and the philosophical issues surrounding it.