# Analysis and Applications:
# A Conference in Honor of Elias M. Stein

**Princeton University, Princeton, New Jersey**
**May 16-20, 2011**

Speaker: Gregg Zuckerman (Yale University)

Date/Time: Wednesday, May 18, 2011 / 3:30-4:30 pm

Talk Title: New Perspectives on Russell's Paradox

Abstract:

Russell's paradoxical "set of all sets that do not contain themselves as a member" is no longer a threat to the foundations of logic and mathematics. In axiomatic set theory, the Russell "set" is now understood as a proper class. We refer to intersecting with this class as the Russell operator R, defined on any model of set theory. Thus, R takes its place with other natural set theoretic operators, such as the power set operator, P, as well as the operators--so-called "selectors"--which arise by intersecting with arbitrary classes. The new challenge to logicians and mathematicians is to compare the action of these natural operators in non isomorphic models of set theory. In this talk we focus on von Neumann's universe of well-founded sets in contrast to Aczel's universe of sets modeling the axiom of anti-foundation. In von Neumann's universe, the Russell operator is the identity operator. In Aczel's universe, the Russell operator is highly nontrivial and difficult to compute. Effectively, the crisis brought about by Russell's Paradox in the foundations of mathematics has been replaced by serious combinatorial problems in graph theory and fundamental questions about the significance of self-reference. This talk is an introduction to joint work with Willard Miranker of Yale University.