RESEARCH STATEMENT

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I am a fourth year Ph.D. student at the CUNY Graduate Center. My advisor is Joel Hamkins. My main research interests are generalizations of the Kunen inconsistency and generalizations of Solovay's theorem on stationary sets, particularly as they relate to the class of hereditarily ordinal-definable sets, HOD. Some of my work in the first of these areas is joint with Hamkins and Kirmayer.

The Kunen inconsistency states that there is no nontrivial elementary embedding $j : V \to V$. In other words, a Reinhardt cardinal is inconsistent with ZFC. The result is best interpreted by allowing j to be a proper class in the sense of von Neumann- Gödel-Bernays set theory, rather than just a definable class, as otherwise it admits a trivial proof. We are working on generalizing the Kunen inconsistency to preclude nontrivial elementary embeddings between a wide variety of models of ZFC, for instance between V and its forcing extensions, between models one of which is eventually stationary correct in the other, from V to HOD and to gHOD, and from any definable inner model to V. The nonexistence of some of these embeddings was known to Woodin, while others are new results.

In Woodin's proof that there is no nontrivial elementary embedding from V to HOD, he shows that if there is such an embedding, then for a particular cardinal, κ, every V-stationary set $S \subseteq \kappa$ with $S \in HOD$ can be partitioned *in HOD* into κ many disjoint stationary sets. Thinking about this proof lead me to investigate the extent to which this situation occurs without assuming the existence of any sort of elementary embedding. The general pattern of my results has been that if κ is not too large of a large cardinal in HOD, then every V-stationary set in HOD can be partitioned in HOD into many V-stationary sets. The partition can be shown to exist even in some cases where the axiom of choice fails in V, whereas Solovay's theorem requires the axiom of choice. These partitions can then be used to prove theorems constraining elementary embeddings between models of set theory.

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