Wider research context

Set theory is the mathematical study of infinity and has been very successful both in answering its own deep fundamental questions and in being applied elsewhere. Gödel's Program is a major set theoretic program addressing the most fundamental set theoretic issue: independence. One important aspect of Gödel's Program is bi-interpretability of various foundational frameworks. In this project our goal is to establish bridges between the area of set theory that studies generic large cardinals and the area of set theory that studies models of the Axiom of Determinacy.

Objectives

One of the prime objectives of this proposal is the construction of dense ideals on the first ω many uncountable cardinals. We aim to construct such ideals by forcing over models of determinacy as well as models of large cardinals. Such ideals have already been constructed on the first two uncountable cardinals, but the construction of such ideals on higher cardinals has been a major open problem in set theory. The existences of such ideals has number of applications in infinitary combinatorics and classic model theory.

Methods

We will use classical methods as well as novel methods which we will develop ourselves. Classicaly such ideals have been constructed from large cardinals using the method of forcing. We intend to extend and generalize this method, but also we intend to develop a new machinery for constructing such ideals by forcing over models of determinacy.

Innovation

While some aspects of the project have to do with classical questions, our approach to these classical problems is novel. We intend to develop new methodology for forcing ideals from large cardinals. Other aspects of the project that have to do with forcing over models of determinacy are completely novel and have never been tried before.