STATEMENT OF RESEARCH

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My area of research is the Combinatorics of Singular Cardinals and more specifically Cardinal Arithmetic. In this area Shelah's PCF theory has become fundamental and the basic technical tool in this domain is the concept of the characteristic function of an internally approachable submodel.

A submodel always means a submodel of some large enough model $H(\Theta)$, where we usually add a predicate for a well-ordering thus automatically having access to Skolem functions and to Skolem Hulls of subsets of the model $H(\Theta)$. An uncountable submodel N is internally aproachable if it is the union of a continuous elementary chain of submodels and the initial segments of the chain belong to N. An important case is when N contains all of its subsets of size less than $|N|$. The characteristic function of a submodel N is the function that to every cardinal κ belonging to N attributes the value $\sup(N \cap \kappa)$. Another basic concept is the one of the set of μ's such that $\sup(N \cap \mu)$ belongs to the Skolem Hull of N united to the singleton $\sup(N \cap \kappa)$, this is the basic neighborhood of κ.

In Cardinal Arithmetic, Shelah's PCF conjecture has also become fundamental. There are two ways to attack this conjecture through the construction of internally approachable submodels whose characteristic functions satisfy certain properties of the sort: some cardinals being or not in the basic neighborhoods of other cardinals. The possible constructions of these submodels seem to be different from the known constructions of countable submodels that use games of length omega and trees of height omega, i.e, Namba combinatorics. To construct the mentioned internally apprachable submodels one is also allowed to use generic extensions by sufficiently distributive posets.