RESEARCH STATEMENT

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Right now I am interested in elementary embeddings (of the hypermeasurable type) and the ways they can be "made nicer" for the given context by means of forcing. For example, given $j : V \to M$ such that $(\kappa^{++})^M = \kappa^{++}$, and M is closed under κ-sequences in V (such an embedding can be obtained from the assumption $o(\kappa) = \kappa^{++}$), one can attempt to gauge the difference between $H(\kappa^{++})^M$ and $H(\kappa^{++})$ by looking at properties of a forcing notion $P \in M$ (typically $P \subset H(\kappa^{++})^M$) in the full universe V (take for example P to be the Cohen forcing at κ^{++} and look at the distributivity of this P in V). This generalizes the question which often occurs in the context of a product forcing: given $P \times Q$, how does P behave in V^Q? Since in $j : V \to M$, V is not a generic extension of M, the behaviour of $P \in M$ in V tends to be more complicated.

One can sometimes show that with a preparatory forcing, a class of certain forcing notions defined in M can be "forced" to behave properly in the full universe. A paradigmatic application of this technique is that $o(\kappa) = \kappa^{++}$ suffices to obtain (to take a specific example) a generic extension where κ is still measurable and $2^\alpha = \alpha^{++}$ for every regular cardinal $\alpha \leq \kappa$ (joint with Sy Friedman).

I am also interested in the ways one can attempt to generalize the concept of properness to larger cardinals (typically inaccessibles).