title: Set-theoretic problems in constructing localizations

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abstract: The talk will outline several results concerning set-theoretic problems related to the existence of localizations in various categories. Typical problem, the talk will be concerned with, is known as the orthogonal subcategory problem: given a category $\mathcal{C}$ and a full subcategory $\mathcal{D} \subseteq \mathcal{C}$ does there exist a localization functor $L : \mathcal{C} \to \mathcal{C}$ whose image is $\mathcal{D}$. Here, by a localization we understand a general functor L with coaugmentation $\eta : \mathrm{Id} \to \mathrm{L}$ which, for every object X, yields the commutative diagram

$$\begin{array}{ccc} X & \xrightarrow{\eta_X} & LX \\ {\scriptstyle \eta_X}\downarrow & & \downarrow{\scriptstyle \eta_{LX}} \\ LX & \xrightarrow{L\eta_X} & LLX \end{array}$$

where $\eta_{LX} = L\eta_X$ are isomorphisms in $\mathcal{C}$.

The talk will state the results and provide some comments without going into details of the constructions. It will be addressed to non-set-theorists.