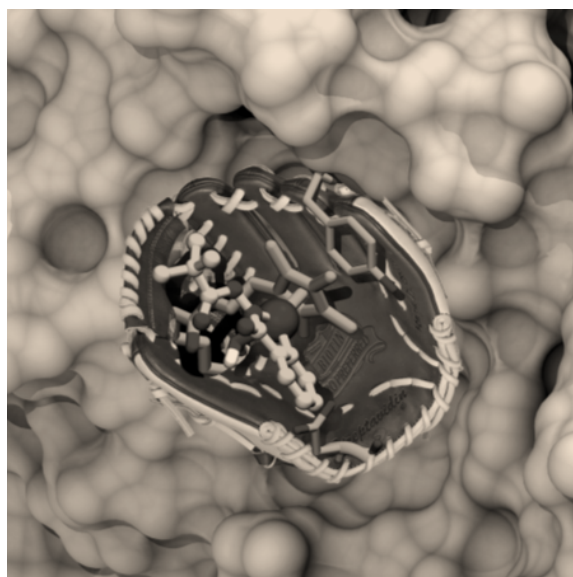


## Artificial Metalloenzymes: Challenges and Opportunities

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In stark contrast to enzymes, predictably exploiting second coordination sphere interactions remains challenging for homogeneous catalysts. To overcome this, artificial metalloenzymes offer an attractive means to engineer proteins as host for organometallic cofactors. Such artificial metalloenzymes can be improved either by chemical- (i.e. varying the spacer between the anchor and the metal moiety) or genetic- (i.e. mutation of the host protein) means. These chemogenetic schemes were applied to optimize the performance for a broad palette of metal-catalyzed transformations as well as reaction cascades in the presence of natural enzymes (see Figure). This talk will summarize our efforts to complement both homogenous- and enzymatic catalysts with artificial metalloenzymes. Particular emphasis will be set on recent results demonstrating the versatility of artificial metalloenzymes for performing organometallic catalysis *in vivo*.



**Figure.** Artificial metalloenzymes result from incorporation of an abiotic cofactor within a host protein.