Title: Regio- and Site-Selective Synthesis Using Small Molecule and Biological Catalysts

Abstract: The combination of nickel-catalyzed reductive macrocyclizations and cytochrome P450 oxidations is being explored as a versatile method for the assembly of oxygenated macrocyclic frameworks from simple structural motifs. The reductive macrocyclization process relies on regiodivergent nickel-catalyzed couplings, and the development and mechanistic study of this class of reactions will be discussed. The site-selective oxidation of macrocyclic frameworks thus obtained is being explored using engineered cytochrome P450 biocatalysts in collaborative work with David Sherman and Ken Houk. Put together, these methods allow an array of potentially bioactive structures to be rapidly prepared from simple ynal substrates.