Searching for New Reactivity: Iron-Catalyzed Selective Nitrogen Atom Transfer

Numerous pharmaceuticals contain at least one nitrogen atom and many of those nitrogen atoms are directly attached to stereogenic centers. Therefore, synthetic methods that incorporate selective nitrogen atom transfer to readily available hydrocarbons are important tools for the synthesis of these valuable molecules. While methods for selective olefin aziridination and direct C–H amination are well-established, methods for direct functionalization of olefins with a nitrogen atom and a range of heteroatom-based functional groups are less explored yet critically important to organic synthesis and its applications to the biomedical sciences.

This lecture is about the discovery and development of a range of iron-catalyzed nitrogen atom transfer reactions with an emphasis on stereoselective olefin aminohydroxylation, aminofluorination, and diazidation–diamination reactions. This lecture will also discuss mechanistic studies that have enabled the gram-scale Tamiflu® synthesis.