



# School of Natural Sciences Chemistry Seminar Series

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## Searching for New Reactivity: Iron-Catalyzed Stereoselective Olefin Aminohydroxylation and Aminofluorination Reactions

**By Hao Xu**

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### Abstract:

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 difunctionalization 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. The lecture is about the discovery and development of a series of iron-catalyzed nitrogen atom transfer reactions with an emphasis on stereoselective olefin aminohydroxylation and aminofluorination reactions.

### Bio:

Hao Xu went to Peking University (Beijing) for college in 1997. He enrolled in the Chemistry Graduate Program at Scripps Research Institute (La Jolla, CA) in 2001 and carried out his Ph.D. research with Professor K.C. Nicolaou for complex-molecule synthesis. In 2006, he joined Professor Eric Jacobsen's lab at Harvard University (Cambridge, MA) as a Dreyfus Postdoctoral Fellow. In Jacobsen's lab, Hao discovered several highly enantioselective strong acid-chiral urea/thiourea co-catalyzed reactions for the greener synthesis of nitrogen-containing complex molecules.

Hao joined the faculty of Georgia State University (Atlanta, GA) in Fall 2010 and his passion of incorporation of nitrogen atoms into complex molecules has continued. At Georgia State, he has established a unique synthetic chemistry program that focuses on the Iron-Catalyzed Nitrogen Atom Transfer for Selective Olefin Difunctionalization. Along with his students, Hao has discovered a range of iron-catalyzed selective atom transfer reactions in which a nitrogen atom and a heteroatom-based group are selectively transferred to olefins. These catalytic reactions readily transform commodity chemicals to highly functionalized building blocks valuable to medicinal chemistry and pharmaceutical research. His research is currently supported by the National Institute of General Medical Sciences (NIGMS) and he has been tenured since Spring 2016.

Hao has been recognized by a list of accolades, including Skaggs Predoctoral Fellowship (2003), Shelton Award in Graduate Studies (2005), Bristol-Myers Squibb Graduate Fellowship in Synthetic Organic Chemistry (2006), Camille and Henry Dreyfus Postdoctoral Fellowship (2007), Thieme Chemistry Journal Award (2014), National Science Foundation (NSF) CAREER Award (2014), Dean's Early Career Award at Georgia State (2015), CAPA Biomatch Distinguished Junior Faculty Award (2015), and most recently Alfred P. Sloan Research Fellowship (2015).

### Date:

Wednesday,  
11/30/16

### Time:

10:30 AM

### Location:

SE1 270K

For More  
Information  
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