Department of Chemistry & Biochemistry Seminar

Friday, March 5th, 2021

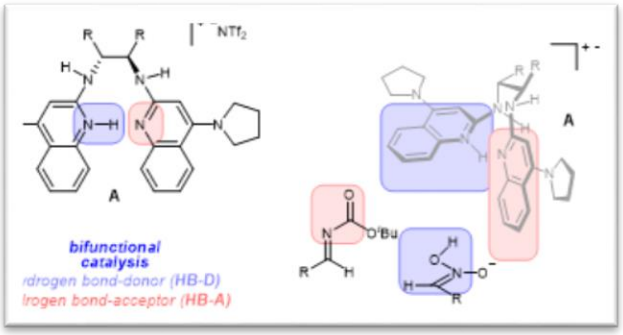
1:30pm – 2:45pm

Zoom ID: 960 452 0800

Password: Strategies

New Chemical Tools and Strategies that Enable Discoveries in Natural Product-Based Therapeutic Development

Speaker: ***Prof. Jeffrey N. Johnston***, **Vanderbilt University**



Abstract: Small molecules are a mainstay of drug development, offering structural and functional topologies to precisely engage receptors. Increasingly complex protein-protein interactions demand greater breadth of structural and stereochemical complexity, as well as size, within a discrete compound collection. Furthermore, the incorporation of fluorine into small molecules can provide directed conformational bias, enhance desirable drug like properties, and improve metabolic stability. All of these features are meaningful only when they are at arm's reach – essentially on-demand – such that attention is focused predominantly on the greater issues of potency and selectivity. Tools that enhance the immediacy of availability and acquisition are in high demand (*JACS* **2016**, *138*, 14160).

Chiral proton catalysis using Bis(AMidine) (BAM) ligands has generalized access to numerous types of enantioenriched, functionally complex secondary amines. Now readily available, this feedstock is the platform for new reaction development that provides unfettered access to a broad range of enantiopure products, including α-amino amides and heterocycles. Highlights of our contributions to this area will be described, embedded within our approach to problem selection and study.

Biography: Prof. Johnston is a Stevenson Professor of Chemistry at Vanderbilt University in Nashville, TN. He earned his B.S. Chemistry degree at Xavier University (OH), and then Ph.D. at The Ohio State University with Leo A. Paquette. As an NIH Postdoctoral Fellow, he completed his training with David Evans at Harvard University. His graduate research work focused on natural product total synthesis, and his postdoctoral training was in the area of enantioselective catalysis. He began his independent career in these two general areas, and ultimately added translational work to extend the impact of new chemistries. His research program has contributed new reactions and reagents, including Umpolung Amide Synthesis (UmAS) and chiral Bis(AMidine) (BAM) catalysis. These efforts are always driven by the need to access complex small molecules in a step-limited manner, and numerous natural products and experimental therapeutics have been prepared using new chemistry developed by his student and trainee co-workers.