



## ORGANIC CHEMISTRY SEMINAR

### *Mechanistic Approaches to Complexity- Building Catalytic Reactions*



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**FRIDAY**

**April 26, 2024 @4:00**

**219 BRL**

This talk will focus on recent complexity building reactions discovered at Minnesota. Cyanoformamides are easily prepared but underused, offering new opportunities for discovery. With palladium catalysis, the C–C bond linking the acyl and nitrile carbons can be activated, with subsequent intramolecular addition across alkenes to form the desired product through a process called cyanoamidation. Related chemistry of cyanamides, in which the N–CN bond is cleaved for alkene amino-cyanation, an “aza-Heck” type process, will also be presented. Our mechanistic work in this area elucidated the role of Lewis base and Lewis acid additives in these reaction through a combination of initial rate kinetics, natural abundance  $^{13}\text{C}$  isotope effects, control experiments, and crossover studies. The acyl C–O bond of esters has rich chemistry; we discovered a new mechanism for sterically-directed acylation of aromatics through iridium catalysis. We applied these reactions to the synthesis hydroxyphenstatin, (+)-eburnamonine, and madangamine A. In the final part of the presentation, I will present our re-entry into the popular area of alkene hydroacylation. We have re-investigated 2-aminopyridine co-catalysts for rhodium-catalyzed asymmetric alkene hydroacylation using the aldehyde C–H bond. This chemistry provides a streamlined approach to a selective antagonist of the nociception/orphanin FQ peptide (NOP) receptor, SB61211.

