Seminar

Title:
“Catalytic Methods for Selective Functionalization of C–C π-Bonds”

Speaker:
Professor Keary M. Engle
Department of Chemistry
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Date:
Tuesday, December 11th, 2018, at 10.00 AM

Venue:
Magnéli

Host: Belén Martin-Matute
Short Abstract:

Vicinal (1,2-disubstituted) functional group motifs are ubiquitous in structurally complex small molecules that are of academic and industrial importance, including many widely used pharmaceutical agents. Many such functional group combinations, however, remain exceptionally challenging to synthesize. The goal of research in the Engle lab is to develop a general catalytic platform for alkene and alkyne difunctionalization to introduce a diverse array of functional groups at each of the two carbon atoms in a programmable fashion. Our central hypothesis is that coordination of a $\pi$-Lewis acidic metal, such as palladium(II), to the alkene will promote nucleophilic attack and that the resultant organometallic species can be trapped with an electrophile to furnish the desired 1,2-difunctionalized product. In the overall net transformation, one of the two new functional groups is introduced in the form of a nucleophile, and the other in the form of an electrophile. Directing groups are used to control the regiochemical course of the reaction and stabilize key alkylmetal intermediates. These concepts have been used to expand the synthetic toolkit to include new retrosynthetic disconnections, including “homo-Michael” addition and $\beta,\gamma$-vicinal dicarbofunctionalization of alkenyl carbonyl compounds.