NANYANG TECHNOLOGICAL UNIVERSITY

CBC SEMINAR ANNOUNCEMENT

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Phosphine Catalysis and Its Applications

Soft nucleophilic phosphine catalysis has been known since the 1960s as a result of the pioneering work of Rauhut−Currier and Morita. In the 1990s, Trost and Lu made important discoveries based on nucleophilc phosphine catalysis and reported isomerization, umpolung addition, and [3+2] cycloaddition. Nonetheless, it was not until the 2000s that the area of nucleophilic phosphine catalysis began to flourish, with the report of numerous new reaction manifolds and asymmetric variations. My group, through careful analysis of the mechanism of the phosphine catalysis reactions, has demonstrated over a dozen new reactions facilitated under nucleophilic phosphine catalysis conditions. The results are a one-step conversion of simple acyclic starting materials into various carbo- and heterocycles, such as tetrahydropyridines, cyclohexenes, dioxanes, pyrones, dihydropyrones, pyrrolines, bicyclic succinimides, dihydrocoumarins, cyclic nitronates, benzoxazolines, benzothiazolines, benzodioxolines, benzoxathiolines, benzodithiolines, oxazolines, thiazolines, pyrrolines, oxathiolanes, oxathianes, indolines, dihydropyrrolopyridines, benzimidazolines, dihydrobenzo-3,1-oxazines, dihydrobenzo-1,4-oxazines, tetrahydroquinolines, and tetrahydroisoquinolines. The practical values of these phosphine-catalyzed annulation processes are significant since (1) they are atom-economic and environmentally friendly, and (2) the heterocycles are an immense class of organic compounds with numerous practical applications. To further illustrate the utility of the phosphine-catalyzed [4+2] annulation chemistry, we have been engaged in the total synthesis of indole alkaloids, completing total syntheses of alstonerine, macroline, and hirsutine. More recently, enantioselective total synthesis of (+)-ibophyllidine has been completed.

Date:	**28th March 2012 (Wednesday)**
Time:	**11am – 12:30pm**
Venue:	**NTU SPMS CBC Building Level 2, Conference Room**
Host:	**Professor Loh Teck Peng**