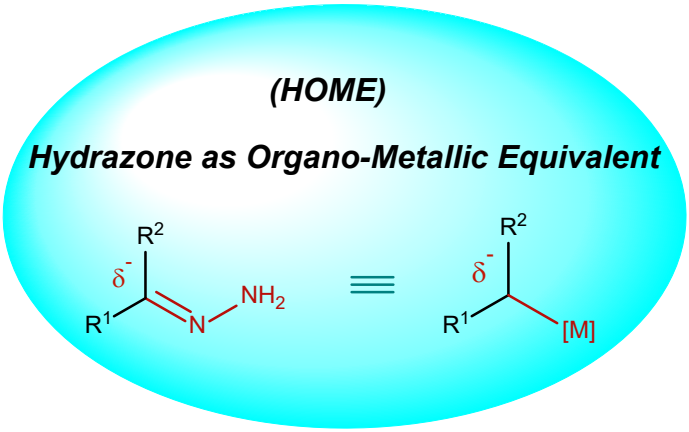
ORGANIC SEMINAR

Hydrazones as Organo-Metallic Equivalents (HOME)

Professor Chao-Jun Li

Department of Chemistry
McGill University

The construction of new carbon-carbon bonds is the cornerstone of organic chemistry. Organometallic reagents are amongst the most robust and versatile nucleophiles for this purpose. Polarization of the metal-carbon bonds in these reagents facilitates their reactions with a vast array of electrophiles to achieve chemical diversification. The dependence on stoichiometric quantities of metals and often organic halides as feedstock precursors, which in turn produces copious amounts of metal halide waste, are the key limitations of the classical organometallic reactions. Inspired by the classical Wolff-Kishner reduction converting carbonyl groups in aldehydes or ketones into methylene derivatives, our group has recently developed strategies to couple various alcohols, aldehydes, and ketones with a broad range of both hard and soft carbon electrophiles in the presence of catalytic amounts of transition metals, via the hydrazone derivatives: i.e., as ***Organometallic Reagent Equivalents***. This talk will discuss this concept, leading to a novel carbon-carbon bond-forming strategy in various transition-metal catalyzed chemical transformations: including 1,2-carbonyl/imine addition, conjugate addition, carboxylation, olefination, cross-coupling, allylation, alkylation and hydroalkylation and others, which can also use water as solvent.[1]



[1]Li, C.-J. "HOME Chemistry: hydrazones as organometallic equivalents" *Pure & Appl. Chem*. **2023**, *95*, 465-474; Dai, X.-J.; Li, C.-C.; Li, C.-J. "Carbonyl umpolung as organometallic reagent surrogate", *Chem. Soc. Rev*. **2021**, *50*, 10733-10742; Li, C.-J.; Huang, J.; Dai, X..; Wang, H.; Chen, N.; Wei, W.; Zeng, H.; Tang, J.; Li, C.; Zhu, D.; Lv, L. "An old dog with new tricks: enjoin Wolff-Kishner reduction for alcohol deoxygenation and C-C bond formations" *Synlett*, **2019**, *30*, 1508-1524.

Tuesday, September 10, 2024 | **4:30 pm** | **WTHR 104**

PURDUE UNIVERSITY | James Tarpo Jr. and Margaret Tarpo Department of Chemistry