Speaker: Mike Rauch (Parkin)

When: Friday, December 9th, 2016 at 4:30 PM

Where: 209 Havemeyer

Abstract: Due to its high abundance, relative non-toxicity and low cost, magnesium is an attractive metal for advancements in homogeneous catalysis. This seminar will outline our recent progress in synthesizing organometallic complexes containing terminal magnesium hydride or fluoride ligands. Utilizing the newly prepared tris(1-isopropylbenzimidazol-2-yldimethylsilyl)methyl ligand, [TismPriBenz], and the well-studied tris(3-tert-butyl-5-pyrazolyl)hydroborato ligand, [TpBut,Me], we have accessed one of the first well-characterized examples of a complex containing a terminal magnesium hydride ligand as well as the first structurally characterized complex containing a terminal magnesium fluoride ligand. [TismPriBenz]MgH is a highly reactive species that is susceptible to (i) insertion (ii) metathesis and (iii) protolytic cleavage. Consequently, it can be used as a catalyst for (i) the hydrosilylation of styrenes and (ii) the reduction of carbon dioxide to methane under mild conditions. The magnesium fluoride species, [TpBut,Me]MgF, serves as a hydrogen bond and halogen bond acceptor, and can be used for C-F bond formation. X-ray crystallography, NMR spectroscopy and DFT calculations are employed to support the findings.