The donor-acceptor ability of frustrated Lewis pairs (FLPs) has led to widespread applications in recent years.[1] Recently, it was shown that single electron transfer (SET) from a Lewis base donor to a Lewis acid acceptor can produce a frustrated radical pair (FRP) species. This depends on both the substrate and energy required (photochemical or thermal) to promote an FLP into an FRP.[2] In this lecture, we will discuss the Csp3–Csp and Csp3–Csp2 coupling reactions of aryl esters with alkenes and alkynes using the B(C6F5)/Mes3P FLP (See Figure).[3,4] The nature of these reaction pathways as well as their selectivity has been investigated by extensive electron paramagnetic resonance (EPR) studies, kinetic studies, and density functional theory (DFT) calculations both to elucidate the mechanism of these coupling reactions.

Figure 1. Cross-coupling reactions using FLPs.

References: