

PhD Departmental Seminar

ALL ARE WELCOME TO ATTEND

Arshdeep Kumar Ghai

Evans Research Group

Friday, 17 July 2026

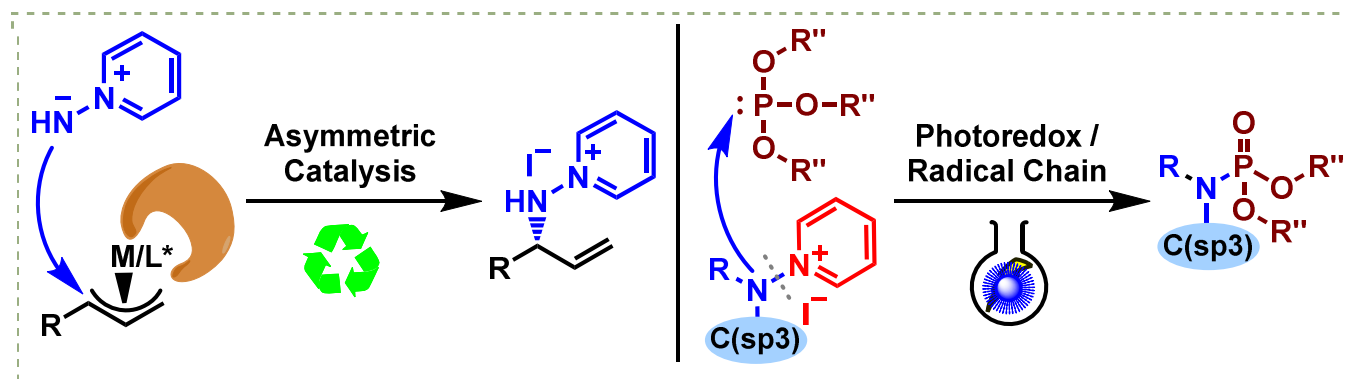
11:30 a.m.

Chernoff Hall, Room 117

"AMINOPYRIDINIUM REAGENTS FOR ONE- AND TWO-ELECTRON N-FUNCTIONALIZATION: ASYMMETRIC ALLYLATION & PHOTO N-PHOSPHORYLATION"

ABSTRACT:

Nitrogen-rich motifs are ubiquitous in pharmaceuticals, agrochemicals, materials, and natural products, creating a continuing demand for practical and modular methods to access and diversify nitrogen-containing molecules. Aminopyridinium salts and their derived aza-ylides provide a uniquely versatile platform for this purpose, as their exocyclic nitrogen can be elaborated through complementary ionic ($2e^-$) and radical ($1e^-$) pathways. Despite this potential, general access to N-alkyl derivatives remains underdeveloped, limiting their broader synthetic utility. This seminar will describe two strategies that harness these distinct modes of reactivity to address longstanding challenges in the preparation and application of aminopyridinium reagents. The first enables the catalytic asymmetric synthesis of chiral allylic amines, privileged building blocks in bioactive molecules and natural products, through C–N bond formation followed by selective N–N bond cleavage. The second exploits radical reactivity to enable mild and broadly applicable P–N bond formation, providing access to phosphoramidates, a motif central to ProTide antiviral and anticancer prodrugs but inadequately served by conventional synthetic methods. Collectively, these studies establish aminopyridinium reagents as a unified platform for selective and modular nitrogen functionalization, demonstrating how complementary ionic and radical pathways can unlock fundamentally distinct bond constructions from a common reagent class.



1. Evans, P. A.; Clizbe, E. A. *J. Am. Chem. Soc.* **2009**, *131*, 8722.
2. Grange, R. L.; Clizbe, E. A.; Counsell, E. J.; Evans, P. A. *Chem. Sci.* **2015**, *6*, 777.
3. Grange, R. L.; Evans, P. A. *J. Am. Chem. Soc.* **2014**, *136*, 11870.

Supervisor – P. A. Evans

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