Abstract: “Photochemical approaches in radical organocatalysis”

The development of new catalytic systems with enhanced reactivity and selectivity is a cornerstone of modern organic synthesis.

Over the past two decades, both organocatalysis and photoredox catalysis have experienced remarkable advancements, emerging as major fields in molecular catalysis. The use of small organic molecules as catalysts has unlocked diverse opportunities in activation modes and reaction design, particularly in enantioselective synthesis. Simultaneously, photoredox catalysis has proven to be a powerful tool for converting visible light into molecular potential energy. By enabling the generation of catalytic amounts of free radicals from closed-shell substrates, photoredox catalysis excels at orchestrating reactions involving highly reactive open-shell intermediates.

At the intersection of these two domains, we are developing novel catalytic systems that utilize the generation of radical organocatalysts upon visible-light irradiation. Our work explores their synthetic potential and underlying mechanisms. This seminar will showcase some of the synthetic challenges we have sought to address through this approach.