

New Forays in Total Synthesis of Polyoxygenated Diterpenes and Photoredox Chemistry

The synthesis of complex polyoxygenated natural products remains one of the most compelling challenges in organic chemistry, offering opportunities to develop new strategies, methods, and reactivity paradigms. In this presentation, we describe our approach to the total syntheses of havellockate and ginkgolide C using a functionally guided strategy that leverages controlled C–C bond constructions and site-selective oxidations.

In parallel, we explore the growing potential of photoredox catalysis for structural editing of complex molecules. We have developed a cerium-based multicatalytic platform capable of activating O–H bonds in lactols under visible light irradiation, enabling the selective cleavage of C–C bonds β to hydroxyl groups. This redox-neutral strategy, which operates independently of inherent substrate strain, offers access to formate esters and has been extended to hydrodecarboxylation and hydrodecarbonylation reactions.