From Asymmetric Organocatalysis to Photoredox Strategies for Building Complex Molecules

Géraldine Masson[1,2]

[1]*Institut de Chimie des Substances Naturelles (ICSN), CNRS UPR 2301, Université Paris-Saclay, 1 avenue de la Terrasse, 91198 Gif-sur-Yvette Cedex, France*

[2]*HitCat, Seqens-CNRS joint laboratory, Seqens'Lab, 8 Rue de Rouen, 78440 Porcheville, France*

geraldine.masson@cnrs.fr

This lecture will first address advances in asymmetric enantioselective synthesis, highlighting how asymmetric organocatalysis can be used to build complex chiral molecules.1 Particular emphasis will be placed on its application to natural product synthesis, through the total synthesis of exotine A and B. Key stereocontrolled transformations enabling the efficient and selective construction of these architectures will be discussed.[2]

In a second part, I will present complementary approaches based on visible-light photoredox catalysis.[3]

This will include stereoselective Smiles-type rearrangements directed by a chiral auxiliary,[4] as well as photocatalyst-free decarboxylative borylation of amino redox-active esters.[5] These methodologies enable the selective installation of aryl groups at otherwise challenging positions and the efficient incorporation of boron motifs, providing access to β-arylpropamides and α-aminoboron derivatives under mild conditions.

Overall, the combination of asymmetric catalysis and radical-based strategies provides versatile tools for the synthesis of complex and functionally rich molecules.

References:

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(4) (a) Ma, W.-Y.; Leone, M.; Derat, E.; Retailleau, P.; Reddy, C. R.; Neuville, L.; Masson, G. *Angew. Chem. Int. Ed.* **2024**, e202408154. (b) Di Terlizzi, L.; Nicchio, L.; Montinho-Inacio, E.; Tiwari, N.; Derat, E.; Retailleau, P.; Fagnoni, M.; Neuville, L.; Protti, S.; Masson, G. *JACS Au* **2025**, *5*, 4972.

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