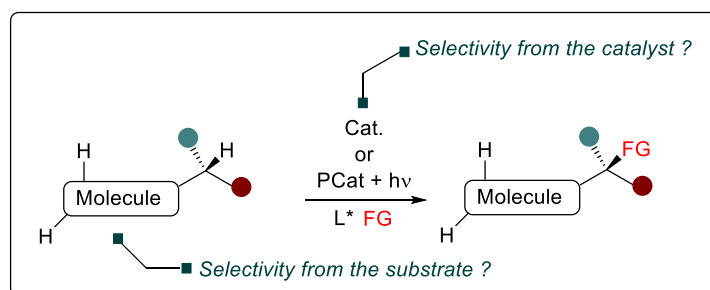


NEW PERSPECTIVES IN HYDROGEN ATOM TRANSFER (HAT) FOR ORGANIC SYNTHESIS

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As radical chemistry has now entered mainstream organic synthesis and is quite frequently encountered in multi-step syntheses of complex molecules due to its high versatility, much attention has been paid to catalytic processes involving homolytic processes because of their mild and sustainable conditions. In this context, radical Hydrogen Atom Transfer (HAT) has emerged as a powerful tool in organic synthesis, enabling the activation of inert C-H bonds under mild conditions.^[1] This method allows for the selective functionalization of complex molecules at a late stage in their synthesis, which can significantly streamline the production of pharmaceuticals, agrochemicals, and advanced materials. To promote the radical event, various activation mode will be investigated like thermal homolytic processes or photoredox catalysis. Despite significant progress in recent years, several key aspects of HAT-based methodologies remain underexplored, including: (i) regioselectivity, (ii) enantioselectivity,^[2] and (iii) the design and mechanistic understanding of (photo)catalysts.

The proposed project aims to develop and investigate new HAT reactions with the control of both the regio- and stereoselectivities (Scheme 1). The design of well-defined model substrates and tailored (photo)catalysts would be required to determine the set of chemical and physical parameters that drive the selectivities. Then, the optimized methodology will be applied to important target molecules to highlight its late-stage functionalization ability in the context of pharmaceutical, food and material applications.



Scheme 1

Our group, *Chimie Radicalaire, Hétérocycles et Interfaces (CRHI)* from LIMA Laboratory (UMR 7042) at the Institut Jean-Baptiste Donnet in Mulhouse, is worldwide renowned for the development of new radical processes dedicated to organic synthesis, with a strong expertise in photocatalysis.^[3-6] The PhD candidate will work under the supervision of Dr. M. Cormier and Prof. J.-P. Goddard. He/She should demonstrate a strong background in organic synthesis and methodology development. He/She will evolve in an international environment and will be helped to develop his communication skills through oral presentations, writing articles, participation to conferences.

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[3] J.-P. Goddard, C. Ollivier, L. Fensterbank. *Acc. Chem. Res.* **49**, 1924 (2016).

[4] M. Walter, M. Cihan, M.-L. Goddard, J.-P. Goddard, M. Cormier, *Chem. Commun.* **61**, 16830 (2025)

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